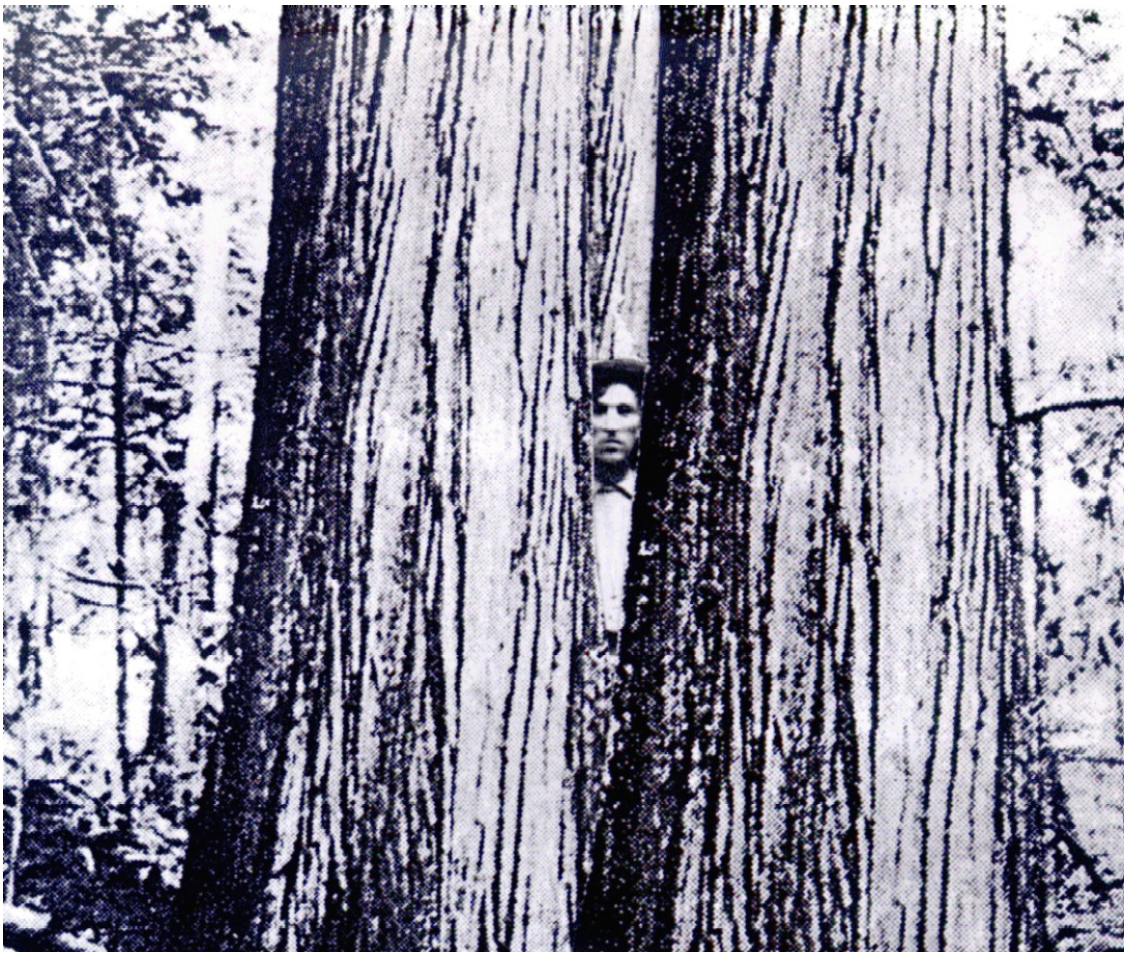
Hidden Cedar Project

Final Supplemental Environmental Impact Statement



United States
Department of
Agriculture
Forest Service

Idaho Panhandle
National Forests
St. Joe Ranger District
March 2007

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Hidden Cedar
Final Supplemental Environmental Impact Statement

Idaho Panhandle National Forests, St. Joe Ranger District
Clearwater, Latah, and Shoshone Counties, Idaho
March 2007

Lead Agency: USDA Forest Service

Responsible Official: Ranotta K. McNair, Forest Supervisor
Idaho Panhandle National Forests
3815 Schreiber Way, Coeur d'Alene, ID 83815

For Further Information Contact: Pete Ratcliffe, Project Team Leader
St. Joe Ranger District
222 7th Street, Suite 1, St. Maries, ID 83861
(208)245-2531

Abstract: The final supplemental environmental impact statement (FSEIS) addresses needs to manage vegetation conditions and the transportation system for protection of resources and for the development and utilization of lands and resources for both the National Forest and adjacent land owners. The project area is located approximately 26 miles from St. Maries, Idaho along the upper St. Maries River and the West Fork of the St. Maries River on the St. Joe Ranger District. It encompasses approximately 33,000 acres which are approximately 47 percent National Forest System lands. The major issues identified during scoping include: effects of road construction, existing road management, and possible conflict between commercial timber harvest and watershed restoration. Alternatives considered include:

Alternative A - No Action: Maintain the existing level of management including fire suppression, road maintenance, recreation use, and previously authorized projects.

Activities Common to Action Alternatives: Precommercial thinning on 324 acres, 15 acres of riparian planting, road decommissioning and long-term storage, and 2.0 miles of road construction and 1.2 miles of reconstruction on National Forest System (NFS) lands to provide access for adjacent landowners and for management of NFS lands.

Alternative B - Proposed Action: Includes activities common to action alternatives and timber harvest on approximately 1,368 acres, another 9.1 miles of system road construction, another 6.1 miles of road reconstruction, 1.6 miles of temporary road construction, and 15.9 miles of road decommissioning and storage.

Alternative C - Includes activities common to action alternatives, timber harvest on approximately 1,393 acres, 6.1 miles of road reconstruction, and 15.9 miles of road decommissioning and storage.

Alternative D - Includes activities common to action alternatives, timber harvest on approximately 602 acres, 3.7 miles of road reconstruction, and 24.8 miles or road decommissioning and storage.

Alternative E- Includes activities common to action alternatives and 24.8 miles of road decommissioning and storage. It does not include commercial timber harvest.

Alternative F - Includes activities common to action alternatives, timber harvest on approximately 1,304 acres, another 6.8 miles of system road construction, 6.0 miles of road reconstruction, and 25.2 miles of road decommissioning and storage.

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PREFACE

Introduction to the Supplemental EIS

This document is a final supplemental environmental impact statement (FSEIS). It is intended to provide supplemental and updated analysis and information to the Hidden Cedar Project Final Environmental Impact Statement (FEIS) which was released to the public in June 2002. A decision was issued at that time. The Record of Decision was administratively appealed to the Regional Forester, and the decision was affirmed on September 27, 2002. A lawsuit was filed on April 21, 2003 in the District Court of Idaho alleging that the Hidden Cedar decision was in violation of federal environmental laws. The court ordered a preliminary injunction enjoining the Forest Service from implementing the logging and associated road building identified in the Hidden Cedar ROD of 2002. On May 18, 2005 Forest Supervisor Ranotta McNair withdrew the ROD for the Hidden Cedar Project. The purpose for this withdrawal was to allow the St. Joe Ranger District to further address the issues raised by the Ninth Circuit Court of Appeals in *Lands Council v. Powell, 395 F. 3d 1010 (9th Cir. 2005).* A Notice of Intent to prepare a Supplemental Environmental Impact Statement for the Hidden Cedar Project was published in the Federal Register on November 21, 2005.

The proposed action and alternatives that were analyzed in the original FEIS are largely the same as those proposed in the Supplemental EIS (See Chapter 2), but they were updated to reflect activities that were accomplished between the 2002 decision and the withdrawal of that decision. The existing condition was updated to reflect new information and activities that were done in the project area since the original Hidden Cedar decision.

The main differences between the alternatives and the existing condition of the project area discussed in the original FEIS and the Final SEIS resulted from implementation of parts of the original decision. Major changes include the following:

- Under the 2002 Record of Decision (ROD), Hidden Creek Road 498 would have been decommissioned and a new road would be built to provide access to the remaining road system. Portions of the new construction would have gone through allocated old growth stands, so the new road construction was eliminated from the draft SEIS. In the final SEIS Alternatives B and C would not decommission the Hidden Creek Road. Under Alternatives D and E the road would be decommissioned after an alternate route is developed some time in the future. In Alternative F a new road location was identified that would not go through old growth.
- 291acres of the original 615 acres of precommercial thinning were accomplished. The remaining 324 acres of precommercial thinning are proposed in the SEIS.
- The proposed construction and stocking of a fish pond were not completed and are not proposed in this SEIS.
- Since the 2002 ROD the Idaho Department of Environmental Quality (DEQ) approved Total Maximum Daily Loads (TMDLs) for the West Fork and Lower St. Maries River for temperature and sediment.

- The following watershed restoration projects were completed:
    - Riparian planting on 15 acres (30 acres originally authorized)
    - Placement of large woody debris on approximately 1.2 miles of the West Fork of the St. Maries River
    - Decommissioning and storage of 12 miles of road (37 miles originally authorized)
- Field surveys for rare plants were completed.
- Additional stand exams were completed in 2005. This updated stand data was used for this analysis.
- The existing vegetation GIS layer that is the basis for much of the analysis was redelineated for greater accuracy, so stand acres changed slightly from those in the original documents. No significant changes have occurred on National Forest System lands, and the updates changed stand acres by less than 3% over the total 33,000-acre project area.
- The existing road data was updated to reflect current conditions. The spatial map of existing roads was updated for greater accuracy, so road miles were adjusted accordingly and may differ slightly from those displayed in the original documents. Miles of new road construction for access request changed from 2.2 to 2.0 on NFS lands. Several miles of new road originally proposed on other lands were constructed, so the road layer was updated to reflect that.
- The Northern Region Sensitive Species lists of animal and plant species changed, and the SEIS reflects that.
- The list of literature cited was updated to reflect new references used to supplement the analysis.

Other changes are related to clarifying and refining analysis and conclusions, or updating analysis that has been affected by the passage of time or new information. The beginning of each chapter contains a chapter-specific summary explaining changes between the FEIS and the Final SEIS. Chapter 3, which contains the detailed analysis of effects by resource, has a summary of changes between the FEIS and the Final SEIS at the beginning of each resource section.

Important Considerations about the Analysis

The purpose of this environmental impact statement is to explain what the Forest Service is proposing, disclose the potential effects of the proposal to the public, and provide the necessary information for the responsible official to make an informed and reasoned decision.

To analyze the effects the Forest Service uses information including, but not limited to, field surveys and reviews, historical data, maps, models, research, monitoring data, and professional judgment based on experience and research data. Numbers in our analyses are sometimes slightly different because of rounding differences. We tend to show greater effects than what would likely occur, and we design our activities to have the least amount of effects in order to protect resources.

CHAPTER 1 – PURPOSE AND NEED

Changes Between the 2002 FEIS and this SEIS

Numbers (miles of road, stand acres) were updated based on activities accomplished and new information. The discussion about the management of the transportation system in Purpose and Need #3 for the development and utilization of lands and resources was updated to better explain the need for action. The scope of the project was updated. It originally discussed the proposed Garnet Stars and Sands Mineral Exploration Project that was considered for cumulative effects, but that project was cancelled after the original Hidden Cedar FEIS.

Changes Between the Draft SEIS and the Final SEIS

More explanation was added to the discussions of purpose and need to better show why the proposed actions are needed.

Introduction

This chapter describes what the Idaho Panhandle National Forests propose to do, explains why the proposed action is needed, defines the scope of the analysis, and defines the decision to be made with this project.

Project Area Description

The Hidden Cedar Project Area is approximately 26 miles from St. Maries, Idaho in Shoshone, Clearwater and Latah Counties along the St. Maries River in portions of Township 41, 42, and 43 North; Range 1 and 2 East, Boise Meridian. The project area is in the Upper St. Maries and West Fork St. Maries River Drainages (Vicinity Map). The project area is approximately 33,000 acres and includes the Cedar Creek, Blair Creek, Christmas Creek, and Staples Creek Drainages in the Upper St. Maries River Drainage and the Bechtel, Mazie, Wood, Hidden, Cat Spur, Long Slim and Keeler Creek drainages in the West Fork of the St. Maries River Drainage. Besides National Forest System lands, the project area includes privately-owned industrial land, State lands, privately-owned residential land, railroad and highway right-of-ways, and an electricity transmission line corridor. Approximately 47% of the analysis area is National Forest System land. There are no inventoried roadless areas within or adjacent to the project area.

The area has a favorable climate and good site conditions for forest vegetation. Average annual precipitation is 35 to 40 inches. The forest types are primarily mixed conifer types.

Many sites within the assessment area have been managed through timber harvest and reforestation. Most of the National Forest System land was acquired by the Forest Service between 1932 and 1934. Before that timber was harvested from some of the lands in the 1910s and 1920s. Beginning in the 1940s, timber harvest on National Forest System lands occurred in all subsequent decades and varied from white pine salvage to stand-replacement harvest (Table 3-1 and Map M-2).

Forest Plan Direction

Management direction defined in the Idaho Panhandle National Forests Plan, along with other laws and regulations, helps define the human values and needs. It sets forth the general direction for managing all of the resources for the Forest, and consists of both Forest-wide and area-specific goals, standards, and guidelines that provide for land uses with anticipated resource outputs. This SEIS documents the analysis of the second level of planning, Forest Plan implementation, for the Hidden Cedar Project Area.

Management Area Direction

The Idaho Panhandle National Forests Plan divided National Forest System land into 20 Management Areas (MAs). MAs affected by the proposed treatments have been validated by the interdisciplinary team for suitability (project file (PF): VEG-28, VEG-29). National Forest System lands within the project area are comprised of MA - 1 (6,690 acres), MA - 4 (8,525 acres), MA - 5 (271 acres), and MA-16 (West Fork of the St. Maries and Log Creek). A full description of management area direction is in the Forest Plan (IPNF, 1987).

A brief description of the Management Area direction pertinent to the proposed activities for this project is displayed in Table 1-1. The MAs for the project area are displayed on the Management Areas Map M-3.

Table 1-1 Forest Plan Management Area Descriptions for Proposed Action

MA-1: Timber Production (Forest Plan Vol. 1, III-2) Description: Lands are variable. Vegetation is mostly mixed conifer, all major habitat types are present. Goals: Manage lands suitable for timber production for the long-term growth and production of commercially valuable wood while protecting soil; meeting water quality standards; providing wildlife habitat and dispersed recreation; and meeting visual quality.
MA- 4: Big Game Winter Range with Timber Production (Forest Plan Vol. I, III-17) Description: Lands are generally below 4,000' elevation with southerly exposures. Vegetation includes brush fields and all stages of forest cover. MA-4 includes elk winter range and whitetail deer winter range. Goals: Manage big game winter range through scheduled timber harvest and permanent forage areas and provide long-term growth and production of commercial wood products, provide for cost effective timber production, protect soils, meet water quality standards, provide dispersed recreation consistent with wildlife needs and meet visual quality objectives.
MA –5: Big Game Winter Range (Forest Plan Vol. I, III-23) Description: Lands are below 4,000' elevation along the breaks of the St. Joe River Drainage. Vegetation consists of brush fields with some forest cover. Majority of land is unsuitable for timber production, and has high visual sensitivity. Goals: Manage to provide sufficient cover and forage while meeting water quality standards, providing dispersed recreation consistent with wildlife needs, and meeting visual quality objectives.
MA-16: Aquatic Ecosystems and Adjacent Uplands (Forest Plan vol. I, III-68) Description: Areas with distinctive resource values and characteristics that are comprised of an aquatic ecosystem and adjacent upland areas that have direct relationships with the aquatic system. Includes important fisheries streams. Contains a great diversity of vegetation. Provides access to National Forest with major roads either within or adjacent to the management area. Receives highly concentrated recreation use. Goals: Manage to feature riparian dependent resources, maintain natural channels and certain vegetation and wildlife communities. Produce other resource outputs that meet state water quality standards, protect soils, cost effective timber production, provide wildlife habitat and dispersed recreation and meet visual quality objectives.

Purpose and Need for Action

The purpose and need was developed through an assessment of the project area and identifying the desired condition as defined by the Idaho Panhandle Forest Plan goals and objectives. The need for the proposed action is generated by the difference between the current and projected conditions in the project area and the desired conditions for resources. The interdisciplinary team reviewed the Interior Columbia Basin Ecosystem Management Project (ICBEMP), The Northern Region Overview (USDA April, 1999), and the St. Joe Geographic Assessment (GA). The St. Joe GA is a landscape-level assessment of the St. Joe River Basin, which identified ecosystem uses, conditions, trends, and risks in the St. Joe River Basin (IPNF, 1997). Using the larger scale assessments mentioned above and information specific to the project area, the interdisciplinary team completed an Ecosystem Analysis at the Watershed Scale (EAWS) for the St. Joe Landscape Analysis Area 12 - Sherwin-Staples (made up almost entirely of the Hidden Cedar Project Area; project file (PF): PD-2) to document resource conditions and note opportunities to move the landscape towards the desired condition. The following needs for the Hidden Cedar Project Area were derived from the EAWS. The roads analysis process (RAPS) was used to identify the minimum transportation system needed and roads not needed in the project area. Detailed information on project proposals to meet the purpose and need is presented under the Alternative Descriptions section of Chapter 2.

The Purpose and Need for a Changed Condition in the Project Area

1. There is a need to manage for vegetative conditions that, in the long-term, encourage more resilient and sustainable forest conditions. This includes a need for treatments to improve tree species composition and structure and to address increased stand densities, increase in pole- and medium-sized trees, and loss of species diversity.

More specifically:

a. In the moist habitat types, there is a need to treat stands where western larch and western white pine forest types have been reduced. A defined shift in species composition is occurring through the reduction of long-lived, early seral species and an increase in the representation of the more shade tolerant mid- to late-seral species within the Sherwin-Staples Landscape Analysis Area (EAWS PD-2 p. 22). Hemlock and grand fir are two of the more moisture-demanding tree species and are highly stressed during drought periods. Unprecedented quantities of drought-sensitive species in areas subject to periodic drought create increased risk of large-scale insect and disease outbreaks and mortality. Hemlock and grand fir are also more fire-intolerant than the species they replaced which creates a risk of high mortality in any fires that do occur (GA p. 46). Forest stands are more stressed, more sensitive to drought, and at greater risk from insects and diseases than they were historically (GA p. 15). Increased species diversity would reduce both stand and landscape susceptibility to insect and diseases.

   The Northern Region Overview (USDA, 1999) describes the changes in vegetation that are contributing to the purpose and need: "In Northern Idaho and moist portions of western Montana, Douglas-fir was largely an early succession species that regenerated well after wildfire in various mixes with white pine and larch, but then was largely eliminated by root disease and beetles after 100-140 years, giving way to pine and larch. In the absence of

white pine and larch, we have experienced an increase in Douglas-fir during early succession, and an apparent increase in rot disease inoculum levels as succession proceeds. When Douglas-fir dies in stands now, the result is an effective 50-150 year acceleration of succession to grand fir and hemlock (Northern Region Overview Detailed Report; USDA October 1998, p. 22).

Replacement of white pine and larch forest types by Douglas-fir/grand fir/hemlock forest types significantly accelerates successional rates, and decreases tall tree canopy cover, large tree and large wood production, and biomass productivity (GA, p. 46).

b. Stand structure is altered from natural conditions, including a reduction of mature large old trees and an increase in pole-sized to medium sawtimber-sized trees. Compared to historic conditions there has been a decline in ecologically important large trees and large wood with potential consequences for nutrient cycling, wildlife habitat and aquatic function. There has been a corresponding increase in densely stocked young stands and stands with dense understories (GA, p. 15). There is a need to reduce overall tree density to encourage retention and development of larger trees. There is a need to manage stands, individually and cumulatively, to develop increased resiliency to various disturbances and contribute to a landscape that is more reflective of historic conditions. There is a need to thin overstocked sapling/pole stands created by past regeneration harvest and wildfires to improve growing conditions, and maintain species and structural diversity. Biological productivity is less than historic forests with particular decreases in the production of large trees, large snags, and large down wood. Wildlife habitat and stream functions are likely to be impacted (GA, p. 47).

   Within the project area risk of loss from certain insects and diseases is increased relative to historical conditions. This is partially due to the change in stand density. The risk of more frequent large catastrophic fires is increasing as well with the increased stand densities and general reduction in tree size (EAWS PD-2 p. 22).

2. There is a need to manage the transportation system (roads in the analysis area) to improve water quality, soils, fish habitat and wildlife security.

More specifically:

a. There is a need to improve water quality and reduce long-term sedimentation to streams caused by existing roads. The State of Idaho listed the West Fork St. Maries River and the main stem of the St. Maries River below Clarkia under Section 303(d) of the Clean Water Act as water quality impaired. The pollutants of concern are temperature and sediment for the West Fork and the main stem of the St. Maries River.

   The IPNF Forest Plan states that if water quality is below standards it will be improved through restoration projects (Forest Plan p. II-9).

   Some roads were constructed with lower standards than are used today and in locations where roads would not be constructed now. Road encroachment on the narrow valley portions of the West Fork have forced the channel into a transport zone causing stream bank instability, channel erosion, and an increase in sedimentation (EAWS PD-2 p. 6). Riparian areas are under-stocked with trees leading to increased stream temperatures. Roads are

associated with mass erosion during flood events; accelerated stream sedimentation rates; reduced channel stability; impaired floodplain functions; reduced large, woody, debris recruitment potential; reduced stream shade; and fish migration barriers (EAWS PD-2 p. 17).

b. There is a need to improve fish habitat by reducing barriers caused by road/stream crossings because several of the stream crossings inhibit migratory fish access to suitable aquatic habitat and likely contribute to reduced productivity for fisheries resources within the Hidden Cedar Area (EAWS PD-2 p. 17). The Forest Plan states that the forest road system is to be managed to avoid adverse effects on inland native fish. Specific direction with respect to roads includes: stabilizing or obliteration of roads not needed for future management activities. Forest Plan standards are to provide fish passage to suitable habitat by design of road crossings of streams to allow fish passage or remove in-stream migration barriers and pursue fish habitat improvement projects. Additional standards were identified in the Inland Native Fish Strategy (INFS), which amends the Forest Plan.

c. There is a need to improve wildlife security. Wildlife security areas provide for low human disturbance for those species sensitive to human activities (GA p. 72). Human access is affecting suitability of wildlife habitat in the Landscape Analysis Area. Due to the extensive road systems there is little security for wildlife (EAWS PD-2 p. 25). The existing open road density in the project area increases wildlife species' vulnerability to hunting and trapping and increases disturbance levels, which may displace animals. Reductions in road density (open roads) will increase acres of wildlife security.

   The Forest Plan goals for Management Area 1 are to provide wildlife habitat. Standards related to this are to utilize road use restrictions to enhance wildlife habitat except as needed for timber activities. In Management Area 4, goals are to provide for opportunities for dispersed recreation consistent with wildlife habitat needs, and wildlife standards state that road closures may be used as needed to meet wildlife habitat needs. Forest Plan (II-27), Wildlife, Elk standards state: utilize the "Guidelines for evaluation and Managing Summer Elk Habitat in Northern Idaho" (Leege, 1984) for evaluating effects of proposed activities on elk habitat. Although the analysis area has a considerable amount of winter range (MA-4), these areas also provide year-round habitat for elk.

d. Soil conditions need to be improved on roads and landings that are no longer needed. Soils are detrimentally impacted on these areas and have essentially been taken out of the productive land base (EAWS PD-2 p. 5). Old landings and existing roads have had the most impact on soil productivity. The Forest Plan states that soil-disturbing management practices will strive to maintain 80 percent of activity areas in a condition of acceptable productivity, projects should maintain sufficient large woody debris, and provisions should be made to maintain sufficient nutrient capital of the soil (Forest Plan pp. II-32 and II-33).

3. There is a need to address the management of the transportation system (roads in the analysis area) for the development and utilization of lands and resources for both the National Forest and others. The Alaska National Interest Lands Conservation Act (ANILCA) requires the granting of reasonable access across National Forest lands to other land owners. Access for management of National Forest System lands is also needed.

More specifically:

a. Access needs for the Forest Service, the Idaho Department of Lands (State of Idaho or state) and Potlatch Corporation (Potlatch) within the Hidden Cedar Project Area were identified through a joint transportation system needs analysis. Those mutual needs were agreed upon to accommodate, as much as practical, the joint use of the same roads or road segments by each party, thereby reducing the possibility of additional roads needed by each party individually.

   Forest Plan objectives, in accordance with ANILCA and FRTA, state that non-federal landowners will not be denied reasonable access to their property, if unavailable across other land, subject to compliance with applicable regulations and Forest Service policies and where other ownerships compromise 25% or more of a major drainage.

   Coordination of road planning, design, construction and maintenance for the project area has taken place among private individuals, private corporations, the State of Idaho, and the Forest Service in the past since approximately 53 percent of the project area consists of lands owned or managed by others. Operations and maintenance is currently occurring on those existing joint ownership roads. The proposed joint ownership roads that would be constructed under all action alternatives would also be subject to design and construction coordination and operation and maintenance to accommodate each entity's needs.

b. Roads are needed to meet Forest Plan goals and objectives related to the development and utilization of National Forest System lands in the project area.

   Forest Plan objectives for transportation facilities are to construct, manage and maintain transportation facilities to meet the management area goals in a cost-effective way while meeting needs, as much as practical, for all users and resources with the safety of all users the primary guiding principle. Forest Plan standards are to utilize the lowest standard road to meet transportation objectives compatible with resource protection and area management goals. The roads analysis process (RAP, FSM 7712) was used to identify the minimum transportation system needed and roads not needed (36 CFR 212.5) in the project area. The need for new roads and evaluating the opportunities for reconstruction and decommissioning of roads can be found in the roads analysis (project file (PF): Book 9).

   New roads on National Forest lands would be located, designed, constructed and maintained to minimize the miles of road constructed and minimize roads constructed on undesirable areas, thus reducing the environmental impacts to other resources (PF: Book 9).

Scope of This Project

The scope of the project refers to both the geographical area affected and the timeframe of the proposal, including any connected or cumulative actions. The scope of the proposed activities addressed in this SEIS are specific to timber harvest, watershed rehabilitation, pre-commercial thinning, road construction and reconstruction, and other activities associated with the Proposed Action within the project area. All activities associated with the access requests, both on National Forest System land and on other lands, are described in Chapter 2 - Activities Common to the Action Alternatives (40 CFR 1508.25). The activities that are associated with access across National Forest System lands and would take place on other lands are considered connected actions and are analyzed for their cumulative effects.

Any resulting timber sales would be offered for sale in 2007 or 2008, and timber harvest is expected to be completed by 2013. Slash disposal, site preparation and reforestation are expected to be completed by 2015. Activities not associated with the proposed timber harvest could occur at any time after the administrative appeal period ends. These dates are tentative based upon anticipated budgets, workforce, weather and other considerations. Actual dates of implementation and accomplishment could vary.

Decisions To Be Made

1. Whether to implement the proposed timber management practices (silvicultural prescriptions, logging methods, fuels treatment, reforestation, and pre-commercial thinning).
2. If timber management practices were to be implemented what road construction and reconstruction would be necessary to provide access for them.
3. What amount, type, and distribution of watershed rehabilitation projects would be implemented, if any.
4. What are the appropriate design features and mitigation measures for the activities that are selected to be implemented?
5. What, if any, specific project-monitoring requirements are needed to assure design features are implemented and are effective or to evaluate success of project objectives.
6. Whether to grant access and share in joint construction and use of cooperative road systems.

Responsible Official

The responsible official for this decision is the Forest Supervisor, Idaho Panhandle National Forests, 3815 Schreiber Way, Coeur d'Alene, Idaho, 83815.

CHAPTER 2 - ALTERNATIVES

Changes Between the 2002 FEIS and this Final SEIS

The following changes were made in Chapter 2 since the original EIS was released:

- The Scoping and Public Involvement section was augmented to display events that have occurred since the original EIS.
- Measurement criteria for issues were updated based on the analysis that was completed using updated information.
- Discussion was added to the section on "Alternatives Considered but Eliminated from Detailed Study" to better display work that was done prior to the release of the original EIS.
- Cumulative Impacts of the Project, Management Indicator Species Viability, and Old Growth were added as "Other Concerns" because they were points of contention in litigation.
- Alternative descriptions were updated to reflect activities that were accomplished before the Forest Supervisor withdrew that original decision or were eliminated from the proposed action for other reasons. See Preface for details.
- The "Summary of Comparison of Alternatives" was updated to show results from the analysis using updated information.

Introduction

In January of 2000, an interdisciplinary team was formed to identify activities in the Hidden Cedar Project Area that would move this area toward desired conditions as defined in the Forest Plan, the St. Joe Geographic Assessment, Hidden Cedar Roads Analysis Process (RAPS) based on Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (USDA Forest Service, 1999c), and an Ecosystem Analysis at the Watershed Scale (EAWS) for the Hidden Cedar Project Area.

This chapter describes how alternatives were developed, including how public comments helped formulate the alternatives; the alternatives considered but eliminated from detailed study; and the alternatives considered in detail. Five action alternatives are carried forward and analyzed in detail in Chapter 3, along with the No-Action Alternative. Alternatives that were considered but not given detailed study are discussed in this chapter.

Alternative Development

Scoping and Public Involvement

The scoping and public participation for this project began in March 2000 when the project was listed in the Idaho Panhandle National Forests Quarterly Schedule of Proposed Actions. A Scoping Notice was sent to the mailing list for the project that included local landowners, government

agencies, and interested groups. The concerns of the Coeur D'Alene Tribe were solicited through project scoping. A Notice of Intent to prepare an Environmental Impact Statement was published in the Federal Register on March 22, 2000. The Forest Service received four letters in response to scoping.

On May 25, 2001 a legal notice was published in the *Spokesman-Review* announcing the availability of the Hidden Cedar Draft Environmental Impact Statement for public review. The Notice of Availability was published in the Federal Register June 1, 2001. The Forest Service received four letters in response to the Draft Environmental Impact Statement.

The Final EIS was completed, and Idaho Panhandle National Forests Forest Supervisor, Ranotta McNair, signed a Record of Decision (ROD) on June 28, 2002. A legal notice of availability was published in the Spokane *Spokesman-Review* June 29, 2002, and a Notice of Availability was published in the Federal Register July 19, 2002. The Record of Decision was administratively appealed to the Regional Forester, and the Regional Forester affirmed the decision on September 27, 2002.

A lawsuit was filed on April 21, 2003 in the District Court of Idaho alleging that the Hidden Cedar decision was in violation of federal environmental laws. The court ordered a preliminary injunction enjoining the Forest Service from implementing the logging and associated road building identified in the Hidden ROD. On May 18, 2005 Forest Supervisor Ranotta McNair withdrew the ROD for the Hidden Cedar Project. The purpose for this withdrawal was to allow the St. Joe Ranger District to further address the issues raised by the Ninth Circuit Court of Appeals in *Lands Council v. Powell, 395 F. 3d 1010 (9th Cir. 2005).*

The Forest Service published a Notice of Intent to prepare a Supplemental Environmental Impact Statement for the Hidden Cedar Project in the Federal Register on November 21, 2005. Chuck Mark (St. Joe District Ranger) and other representatives of the Forest Service met with representatives of the Coeur d'Alene Tribe on March 24, 2006. The group discussed the Hidden Cedar Project, and representatives of the Coeur D'Alene Tribe expressed no concerns about the project. The Hidden Cedar Draft Supplemental EIS was mailed to the public on June 1, 2006, and a Notice of Availability was published in the Federal Register on June 16, 2006. A notice of availability was published in the newspaper of record, *The Spokesman Review*, on June 19, 2006. The comment period ended on July 31, 2006. The Forest Service received eight comment letters. Those letters and the Forest Service's responses to them are included as Appendix E of this FSEIS.

Issue Identification

Comments received in response to scoping efforts were used to identify issues. These issues became the focus for alternatives presented in the original Draft Environmental Impact Statement. The interdisciplinary team reviewed and categorized the scoping comments (project file (PF): PI-12). Two types of issues were used in this analysis: alternative-driving issues and other concerns. Some of these comments revealed issues representing unresolved conflict with the proposed action (Alternative B). The interdisciplinary team summarized those comments and used them to develop alternatives to the Proposed Action.

Other concerns helped frame the scope of the analysis, and were evaluated by the team during the scoping process. These concerns were not considered major issues, and therefore were not used to

develop alternatives analyzed in detail. Most issues could be adequately addressed by the design of the proposed Hidden Cedar Project (see Design Features). These concerns are discussed below and in the effects analysis by resource in Chapter 3 of this EIS.

Some concerns were determined to be outside the scope of this project or are addressed in the Forest Plan. Other issues are addressed through design features or by contrasting the no-action and action alternatives.

In addition to issue identification, the interdisciplinary team considered the following elements in design of the alternatives:

- The goals, objectives, standards and guidelines, and desired future condition for the project areas, as outlined in the Forest Plan and St. Joe Geographic Assessment Area.
- The affected environment of natural resources within the project area as described in Chapter 3.
- The laws, regulations, and policies that govern land use of the National Forest System lands.
- The Roads Analysis (FS-643, August 1999) for National Forest Transportation System.
- The scientific findings of the Interior Columbia Basin Ecosystem Management Project.
- The Hidden Cedar Ecosystem Analysis at the Watershed Scale

Alternative-Driving Issues

Issue 1 - Road Construction

(Addressed with Alternatives A, C, D, and E)

Some people objected to road construction because of potential effects on forest resources such as water quality, fisheries, and wildlife habitat. They were also concerned about future maintenance of those roads. Alternatives C, D and E were developed to address concerns related to new road construction. See descriptions of alternatives later in this chapter.

a. Effects of new road construction on water and fish in the project area: New road construction can impact water quality and fish habitat by increasing the potential for sediment delivery to the stream system. Sediment production from new road construction is compared in the alternatives.

Measurement criteria:

- Miles of road construction
- Sediment increase from road construction (tons / year)
- Net change in sediment production (tons / year)
- Net change in the number of stream crossings
- Miles of appropriately functioning habitat
- Trend of fishery condition

b. The effects of road construction on wildlife security in the project area: Road construction may alter wildlife habitat by changing wildlife movement or habitat connectivity. A comparison of alternatives takes into account the long-term effects of roads as they relate to open-road densities.

Current levels and changes in disturbance/security resulting from implementation of the project are displayed by alternative.

Measurement criteria: total road densities (wildlife analysis area).

Issue 2 - Existing Road Management

(Addressed in all action alternatives, but to a greater extent in Alternatives D & E)

People were concerned that the proposed action did not go far enough to restore watersheds, particularly the decommissioning of existing roads in riparian areas; and some were concerned with how existing roads affect wildlife security. Alternatives D and E were developed to specifically address the issues related to roads in riparian areas and wildlife security.

a. The effects of existing roads on water quality and fish habitat: Riparian roads and road/stream crossings intercept and alter natural water flow patterns and fluvial process, which can increase sediment supply to the stream system, which in turn may increase channel degradation or aggradation and may adversely affect fish habitat.

Measurement criteria:

- Miles of road in each road management prescription
- Sediment increase from road construction (tons per year)
- Sediment decrease from road storage and decommissioning (tons / year)
- Net change in number of stream crossings
- Miles of road decommissioning or storage within 50 feet of stream channel
- Miles of appropriately functioning habitat
- Trend of fishery condition

b. Effects of existing roads on wildlife security: Motorized vehicle use on roads reduces wildlife security. A comparison of acres of secure habitat (acres greater than ½ mile from an open road) is derived from changes in road management prescriptions (see elk analysis in Chapter 3).

Measurement criteria:

- Acres of secure habitat
- Changes in road management prescriptions

Issue 3 - Possible Conflict Between Commercial Timber Harvest and Watershed Restoration:

(addressed in Alternative E)

A concern was expressed regarding the use of timber harvest and road building while at the same time trying to achieve objectives related to watershed restoration, and an alternative with no commercial timber harvest was suggested. Alternative E was developed to address the issue of timber harvest and related road construction while restoring watersheds.

A comparison of the alternatives indicates acres affected by timber harvest and improvements in conditions for soil, water, and fish. Effects of timber harvest are discussed in terms of soil productivity, water quality and beneficial use.

Measurement criteria:

- Water yield increase for the St. Maries River within the project area
- Estimated acres of soil productivity improvement from road storage and decommissioning
- Maintain at least 80 percent of the activity area in a condition of acceptable productivity potential (see Tables 3-50 and 3-51)
- Miles of appropriately functioning habitat
- Trend of fishery condition

Other Concerns

These concerns are not alternative-driving issues but are important for identifying design features and for showing effects of the alternatives on different resources.

Access Requests

The feasibility of accessing other land without going across National Forest System lands was considered. Minimizing environmental impacts and miles of road constructed was the main concern of the interdisciplinary team in handling the access requests. Priorities included utilizing existing roads before building any new roads and avoiding or mitigating road building on less than desirable conditions such as difficult terrain or crossing rivers/streams (project file (PF): Roads Analysis Process, Book 9). The access requests were modified to serve all parties' lands, because many of the areas are cost-share agreement areas (state, private and federal).

Cumulative Impacts of the Project

Past, present, and reasonably foreseeable activities are displayed at the beginning of Chapter 3. These include actions on National Forest lands and on other lands. Each resource section in Chapter 3 discusses the existing condition and cumulative effects of alternatives in addition to past, present, and reasonably foreseeable future activities. The activities that occurred in the past in addition to natural conditions make up the existing condition for each resource. In some cases the effects of past activities are easily discernable (*e.g.* stream temperatures increased when riparian vegetation was removed), but in other cases the direct effects of a specific action cannot be separated from the effects of other actions and can only be displayed as part of the existing condition (*e.g.* Sediment moving through a stream may be a result of natural conditions combined with human activity; but it is nearly impossible to determine how much is a result of human activity, and in most cases it is impossible to determine how much is a result of each individual activity that took place in a stream system.). See Chapter 3 for discussions on cumulative effects for each resource.

Forest Heath

Forest structure and forest species composition lack diversity in the project area. Forest health issues become apparent in stands lacking both structure and composition. These concerns are addressed in Alternatives B, C, D, and F and in Chapter 3 under "Forest Vegetation".

Management Indicator Species Viability

Management indicator species viability is discussed in the Fisheries and Wildlife sections of Chapter 3. All alternatives would maintain viable populations of management indicator species. Alternatives were developed with management indicator species in mind, and design features were incorporated for each action alternative (Design Features 13. A.-G.).

Old Growth

No activities are proposed within allocated old growth. There would be no direct or indirect or cumulative effects resulting from any of the action alternatives on existing allocated old growth. Specific goals, objectives and standards for old growth management as described in the Forest Plan on pages II-5 and II-29 are met with all alternatives. See the Old Growth section in Chapter 3 for details.

Openings

During the original scoping some people opposed forest canopy openings (regeneration harvests, especially in the form of clearcuts, and road construction) or expressed concerns about them or their effects on water yield, rain on snow, and habitat fragmentation. These concerns are addressed through design of action alternatives (Design Features 10.).

Soil Quality

A concern for maintaining soil quality was expressed. The most significant component of the soil quality threshold is the limitation of detrimental soil conditions to 15 percent or less of an activity area (R1, supplement FSM 2500). Soil quality is maintained when erosion, compaction, displacement, rutting, burning, and loss of organic matter are maintained within defined soil quality guidelines. This is addressed with design features (Design Features 10. B. – L. and Site-Specific Design Features, Table 2-5). Chapter 3 (Soils) displays the overall changes in soil quality from activities proposed in the analysis area.

Visual Quality Objectives

Harvest units were designed to meet Visual Quality Objectives (VQOs). Some of the silvicultural prescriptions initially proposed may not have met VQOs, so they were adjusted to meet VQOs.

Issues Beyond the Scope of this Analysis

Based on the assessment of potential effects and on public and agency comments, it was determined that a few issues would not be analyzed in detail in Chapter 3. They include: global warming, competition with alternative (non-timber) fiber sources, loss of business and revenue by people practicing ecologically sensitive timber harvest on private lands due to subsidized public timber sales, loss of life or personal injury from collisions with or accidents caused by log trucks. These issues are not addressed in detail because they are either not relevant to the project or its resources; beyond the scope of the purpose and need; already decided by law, regulation, Forest Plan, or other higher-level decision; or are irrelevant to the decision to be made.

The potential for conflict with road management (public safety) is recognized and described in the Roads Analysis Process (RAP) under Step 4 (PF: Book 9, Vol. I, Step 4, GT-4) and Design Features

8.C. Also note that Chapter 2 Design Features address recreation and harvest operation traffic conflicts.

Roadless areas and unroaded areas are not addressed in detail. Scoping did not reveal concerns about these subjects because they do not pertain to this analysis. There are no Inventoried Roadless Areas in or adjacent to the project area (PF: SRDLS-1). Areas without roads in the project area are not large enough to provide roadless resources values. Their proximity to roads would make them difficult to manage for wilderness, and they are too small (~ 500 to 1,000 acres) to provide high-quality wilderness experiences (PF: Book 9, Vol. I, App. 2A-2).

Range Of Alternatives

Section 102(2)(e) of the National Environmental Policy Act (NEPA) states that all Federal agencies shall "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflict concerning alternative uses of available resources."

An environmental assessment must also "rigorously explore and objectively evaluate all reasonable alternatives" [40 CFR 1502.14(a)].

The courts have established that this direction does not mean that every conceivable alternative must be considered, but that selection and discussion of alternatives must permit a reasoned choice and foster informed decision making and informed public participation.

The range of alternatives presented in this chapter was determined by evaluating public and internal comments and the Purpose and Need for the project. Other influences included Forest Plan goals, objectives, desired future condition, and standards and guidelines; federal laws, regulations, and policies; and economic viability. Within these parameters, the alternatives developed by the interdisciplinary team display a reasonable range of outputs, treatments, costs, management requirements, design features, and effects on resources. In addition to the alternatives considered in detail, the interdisciplinary team examined a number of other alternatives during the analysis process.

Although these alternatives contributed to the reasonable range, they were eliminated from further consideration for the reasons listed below.

Alternatives Considered But Eliminated From Detailed Study

Conventional Logging Systems Only, No Helicopter – This alternative was originally proposed for the area. It would require 25 miles of new road construction. Based on knowledge of the conditions of the resources, this would not meet environmental standards or Forest Plan standards. Resources of concern were: 303(d) listed streams, historical bull trout habitat, loss of wildlife security and sediment /peak flow increases from high road densities. Forest Plan standards related to the Clean Water Act or the Purpose and Need to improve water quality would not be met with this alternative.

No Road Construction – This alternative was proposed to address the controversy over road construction on National Forest System (NFS) lands. Adjacent land owners, however, requested access across National Forests that would require road construction.

The Alaska National Interest Lands Conservation Act (ANILCA) requires the federal government to provide a method for owners of non-federal land access to their land for the reasonable

enjoyment of those lands. 36 CFR 251 Subpart D governs procedures by which landowners may apply for access across National Forest System lands. The National Forest Roads and Trails Act (FRTA), specifically Section 2, works as the vehicle for providing that access by authorizing the granting of easements across National Forest System lands to those landowners who have property adjoining National Forest System lands. It also provides a method for the Secretary of Agriculture to acquire easements from, and construct and maintain Forest Development roads in a cooperative program, with other land owners. Thus, this granting and acquiring of easements is generally the form by which the parties develop a permanent road system that serves National Forest System lands and lands or resources of the landowner.

Both the State and Potlatch Corporation have existing construction and use agreements (cost-share) with the Forest Service for the areas where new cost-share road construction is proposed. Other than the No-Action Alternative, an alternative with no road construction was not considered in detail because of State and Potlatch Corporation access requests. Under Alternatives C, D, and E the only road construction would be cost-share roads proposed under Activities Common to All Action Alternatives. Those roads are required for access to private and State land, and they would provide access for the management of National Forest System lands. There would be no other new road construction for Forest Service activities in Alternatives C, D, and E.

Timber Harvest with other Silvicultural Prescriptions – Silvicultural prescriptions, as originally proposed, may not have met Forest Plan standards for visual quality. A concern was raised internally that 29% of the proposed units were in the Visual Quality Objective (VQO) of "retention". This was addressed in the proposed action and alternatives by changing silvicultural prescriptions to meet VQOs (PF: VIS-3 and VIS-4).

Dry-Site Habitat Management - Opportunities for improvement and expansion of sawtimber/mature sawtimber dry-site habitat (the forest type of primary interest is ponderosa pine) were explored. At this time there are no existing dry-site ponderosa pine stands that would benefit from active management.

Alternative Descriptions

Alternative A – No Action

The National Environmental Policy Act (NEPA) requires that an EIS include a "no-action" alternative to serve as a baseline to compare action alternatives. The No-Action Alternative is based on the premise that ecosystems change in the absence of active management.

This alternative proposes to maintain an existing level of management within the Hidden Cedar Project Area. Fire suppression, road maintenance, recreation use, and vegetative treatments such as planting would continue. It does not propose any new management. A list of on-going activities can be found at the beginning of Chapter 3 under Past, Present and Reasonably Foreseeable Activities.

Activities Common to Alternatives B, C, D, and F

These activities include timber harvest and the activities associated with timber harvest. None of these activities apply to Alternative E which does not include timber harvest. Activities common to all action alternatives are discussed after this section.

Timber Harvest

All harvest would be on lands identified as suitable for timber production or where timber harvest is allowed according to the Forest Plan. Various harvest methods described below are prescribed depending on individual stand conditions:

Clearcut with Reserves (CC w/RES): This is a stand-replacement activity that would remove nearly all the standing crop for the purpose of creating a new, even-aged stand. Reserves would be any tree or group of trees left uncut and kept for part of or the entire next rotation. Reserves would be safe snags; live culls; healthy, early-seral trees; and other individuals/groups of trees with specific resource value scattered throughout stand. This treatment would develop an even-aged stand structure and would include site preparation and reforestation. Reforestation would be accomplished by hand planting a species mix which consists of more than 60% early seral species appropriate for the site.

Commercial Thin (CT): This is an intermediate harvest that would be used in an immature stand in order to accelerate diameter increment and improve the average form of the trees that remain, without permanently breaking or opening the canopy. No site preparation or planting would be required. The purpose of the treatment is to regulate stand density to promote tree growth and vigor. Generally, smaller trees would be harvested and larger trees would be retained. This treatment can be applied to both even- and uneven-aged stand structures.

Shelterwood Cut (SW): Often called an Irregular Shelterwood due to the variable treatment intensities that may be applied within a stand or unit. This is usually a mixture of variable-density, commercial thinnings due to the variable conditions encountered within the stand or unit. This may also include creation and reforestation of openings no bigger than five acres within the same stand. This treatment generally includes two or more of the various treatments (see SW1, SW2, SW3, and GSW below) generally associated with the shelterwood method to manage forest stands.

Shelterwood Preparatory Cut (SW1): An intermediate treatment of the shelterwood system to improve tree growth, promote better crown development and correct other unfavorable stand conditions. This is usually applied to even-aged stand structures; however, it does not preclude converting to an uneven-aged structure in the future. This treatment generally would remove trees near the end of rotation to open the canopy and enlarge the crowns of seed bearers and/or shelter providers, with a view to improving conditions for seed production and natural regeneration in a shelterwood system. Generally, smaller trees would be harvested and larger trees would be retained. Site preparation and planting may be required in the openings.

Shelterwood Seed Cut (SW2): An intermediate treatment of the shelterwood system to begin regeneration of a mature, or near mature, stand. It would involve removing trees in a mature stand to open the canopy and provide conditions for regeneration from the seed of trees retained for that purpose and/or sheltering natural and artificial regeneration in a shelterwood system.

This is a stand-replacement activity designed to provide for regeneration as well as site mitigation (such as shade and protection) to that regeneration. This treatment may also be applied to address other resource values such as visuals or to meet certain needed stand structure objectives. Although this treatment would retain moderate numbers of trees throughout the stand, it is still regarded as a treatment that creates openings. This treatment is generally applied to develop even-aged stand structure. Although this treatment would utilize natural seed for regenerating the stand, it often requires site preparation and artificial reforestation to achieve desired regeneration characteristics in a timely fashion. As with other regeneration harvests, this treatment often includes hand planting with a species mix that is greater than 60% early seral species appropriate for the site to influence a more desirable species composition.

Shelterwood Removal or Final Cut (SW3): This would be a final, or near final, entry of the shelterwood system which would remove seed/shelter trees after regeneration is established following a shelterwood seed cut. This is designed to gradually reduce the shelter and admit more light to aid the new trees and encourage establishment of additional regeneration. There can be multiple removal cuts depending on the stand needs. If gradual removal of seed/shelter trees is not needed, then only one removal cut would be implemented, and this would be referred to as a Shelterwood Final Cut.

Group Shelterwood (GSW): This is a modification of the shelterwood system which creates a stand consisting of two to three crown classes by even-aged groups. This treatment would develop openings in stands ranging in size from three to five acres, and often includes thinning or other management activities in portions of the unit not included in the openings. In general, the openings would require adequate site preparation and planting with an appropriate species mixture to support the identified resource objectives, especially assisting in reestablishing early-seral species in the stand. Although this treatment would develop a multi-storied even-aged stand, it is restricted to development of three crown classes or less.

Construction, Reconstruction, & Temp Road Construction Associated w/ Timber Harvest

(see alternative descriptions below for specific amounts for each alternative)

All temporary road construction would be fully recontoured to the natural slope upon completion of activities. Temporary road that remains on the landscape more than one dry season would be waterbarred according to specific interval direction and at specific angles to minimize erosion. It would then be mulched with a natural, weed-free material to prevent runoff and erosion during spring and/or winter runoff events.

Some existing roads would require reconstruction to allow for safe timber haul, improve drainage, and improve water quality. Reconstruction may include the installation of drain dips and culverts, grading, clearing, dust abatement, and resurfacing.

Fuels Reduction

When harvest unit slash is expected to be greater than five tons per acre of material less than three inches diameter (fine fuels), one or more of the following fuels reduction treatments would be prescribed:

Jackpot burning: Jackpot burning breaks up and reduces fuel concentrations. It can be used in commercial thins and shelterwood harvest methods.

Broadcast burning: Broadcast burning is a type of burn treatment designed to reduce fuel accumulations in a clearcut with reserves, and prepare the site for reforestation.

Excavator (grapple) piling: To facilitate fuel reduction while protecting remaining trees, woody debris would be gathered and piled mechanically using an excavator. The piles would be ignited in the late fall during periods of optimum smoke dispersal. The piles would not be placed next to leave trees or leave islands to protect them from possible ignition.

Lopping: This method of slash treatment entails lopping (cutting) slash to reduce fuel concentrations and slash depth. The lopped limbs are more subject to compression by snow loads. This proximity to the ground increases the rate at which the slash sheds its needles.

Hand Piling: This method entails piling by hand hazardous fuels (those four inches and less in diameter) with the rest left on site. The piles would be ignited in the late fall during periods of optimum smoke dispersal.

Reforestation

Where regeneration harvest occurs, planting would supplement the expected natural regeneration. Planted conifer seedlings would enhance diversity, assure timely reforestation, and contribute to long-term desired habitat conditions. All planting would be a mix of species, but would predominantly be early-seral western white pine, western larch, and ponderosa pine (where appropriate), mixed with Douglas-fir and other species appropriate for the habitat type and site conditions.

Gopher Control

This treatment would be applied in regeneration areas (units with regeneration harvest methods) to protect both natural and artificial regeneration from pocket gopher damage during establishment. It consists of placing poisoned baits in the burrows or runs or the trapping of pocket gophers. An initial treatment would be followed by up to two more treatments, if needed, to minimize losses in the regeneration.

Activities Common to the Action Alternatives

These activities apply to Alternatives B, C, D, E and F.

Precommercial Thinning

For ***all*** action alternatives (Alternatives B, C, D, E and F), approximately 324 acres of pre-commercial thinning is proposed to improve the growing conditions of the selected trees by eliminating competition for light and nutrients (see Table 2-1).

Precommercial thinning would occur in previously harvested immature stands to improve or accelerate diameter increment growth and to improve the average form of the trees retained in the stand. Please refer to alternative maps for locations.

Table 2-1 Precommercial Thinning

Unit	Acres	Drainage
A	29	St. Maries River 4
B	83	St. Maries River 4
C	77	St. Maries River 4
D	15	St. Maries River 4
E	8	Bechtel
G	31	W. Fork St. Maries
H	7	Bechtel/W. Fork St. Maries
I	15	Wood
J	16	Wood
K	14	Mazie
L	13	Mazie
M	16	Mazie
Total	**324**	

Riparian Planting

This would occur on approximately 15 acres in Wood Creek, Hidden Creek, and the St. Maries River (see Maps M5, M7, M9, M11, M14). Cottonwood, conifers, shrubs and possibly sedge would be planted to increase riparian functionality and channel stability. In the long term these plantings would provide for large woody debris recruitment into the stream channel system, thus improving stability and habitat.

Providing Access for Other Lands and National Forest System Lands

All action alternatives include 2.0 miles of road construction across National Forest System (NFS) lands to provide access for adjacent landowners and for the management of National Forest System lands. Some of this 2.0 miles would also be used for timber harvest proposed on National Forest System lands (Alternatives B and F: 1.1 miles; Alternatives C and D: 0.9 miles). Approximately 1.6 miles of the 2.0 miles would be cost-share roads, and on 0.4 miles of the 2.0 miles the Forest Service would grant easements to adjacent land owners for access. The road construction on National Forest System lands (2.0 miles) is assessed in the Direct and Indirect Effects section of each resource (Chapter 3).

Approximately 1.2 miles of road would be reconstructed on NFS land (0.4 miles would be cost-share), and about 0.6 miles would be reconstructed on adjacent land (0.5 miles would be cost-share).

Approximately 5.6 miles of new road construction is proposed on private land associated with access requests from State and private land owners. Of that approximately 1.6 miles would be cost-share. The State and private corporate landowners are planning on harvesting timber on their parcels. The activities on private and State lands associated with road construction on National Forest System lands are considered connected actions and are assessed in the cumulative effects sections for each resource (Chapter 3).

Table 2-2 New Construction for Access: Road Management Prescriptions After Use

Prescription	Road Miles on NFS Land	Road Miles on Other Land
Gated	1.4	3.7
Barriered	0.3	1.2
Long-term storage	0.3	0.7
Total	**2.0**	**5.6**

Road Decommissioning and Long-term Storage to Improve Water Quality, Soils, Fish Habitat, and Wildlife Security

Road decommissioning and long-term storage and are proposed to meet the need to: 1) maintain and improve water quality conditions in Water Quality Limited Streams, 2) protect and improve aquatic habitat in watersheds supporting native trout, 3) improve soils conditions on roads that are no longer needed, and 4) increase wildlife security. Based on opportunities identified by the interdisciplinary team the following activities are proposed.

Decommissioning

Between 2.5 and 16.2 miles of existing road would be decommissioned depending on the alternative (see alternative descriptions below). A determination was made through an interdisciplinary process that there is no foreseeable use for these roads (ST-8). Some roads are blocked with vegetation, or contain washouts and slumps. Following decommissioning they would not be passable by motor vehicles. Access (foot, horseback) would vary dependent on terrain and type of treatment. See individual alternative descriptions later in this chapter for more detail. Road Management Maps: M-6, M-8, M-10, M-12, and M-15 display the change in road management from the existing condition.

Long-term Storage (Rx C) retains a road for future use but removes features to reduce hydrologic risks. Includes removal of culverts and recontouring for 200 feet on both sides of stream crossings, recontouring at the beginning of the area of treatment to eliminate vehicle traffic, and decompaction to a depth of 18 inches. It may also include removal of unstable fill material, and revegetation as needed.

Decommission (Rx D) stabilizes and restores unneeded roads to a more natural state. Includes removal of culverts and recontouring for 200 feet on both sides of stream crossings, recontouring at the beginning of the area of treatment to eliminate vehicle traffic, decompaction to a depth of 18 inches, full or partial recontouring all or some of the road prism, addition of woody debris, and revegetation as needed.

Decommission (Rx E) is similar to Rx D, but the entire road prism would be recontoured for the entire length of the road.

Long-term Storage

Roads identified to go into long-term storage are not needed in the near future, but use is expected in the future (10-20 years). The road bed would be left intact except where fill removal is necessary to reduce the risk of mass failures. Stream crossing would be left in self-maintaining conditions. Roads would be allowed to naturally revegetate.

Some of the roads identified to be decommissioned would be used for the proposed timber harvest in some alternatives and would be decommissioned when harvest activities are complete (see Tables 2-9, 2-13, 2-17, 2-24).

Anticipated Timing of Activities

Any resulting timber sales would be offered for sale in 2007 and 2008. Timber harvest is expected to be completed by 2013, with slash disposal and reforestation completed by 2015. Activities not associated with the proposed timber harvest could occur at any time after the administrative appeal period ends. These dates are tentative based upon anticipated budgets, workforce, weather and other considerations. Actual dates of implementation and accomplishment could vary.

Design Features and Mitigation Measures Common to the Action Alternatives

The following is a description of design features included to protect resource values. Site-specific design features and their objectives are described in Table 2-5. The effectiveness of design features is discussed where appropriate in Chapter 3 and in the project file. Effectiveness of protection measures is based on literature and research, administrative studies, professional experience, results of previous monitoring on other projects, and logic.

1. Air Quality

A. Proposed burning activities follow procedures outlined by the North Idaho Smoke Management Memorandum of Agreement. Currently, the period of air quality monitoring and restriction is March 1 to November 30.

   1. During this period, all burning by the Forest Service is regulated to prohibit or restrict burning where stagnant weather conditions result in poor smoke dispersion and by conducting prescribed burns when ventilation and air quality conditions are good.

   2. The project is within Airsheds 12a and 12b, which contain no EPA designated non-attainment areas for pollutants. The project area does not contain any Class I Airsheds as designated by the Clean Air Act.

   3. Burning during any time of the year is regulated by the Idaho State Department of Environmental Quality, which issues burning closures when necessary to protect air quality. The Forest Service cooperates with the State by requesting approval to burn through the Montana/Idaho Airshed Management System in compliance with the Idaho State Implementation Plan.

   4. PM10 and PM2.5 projections would be sent to the North Idaho Smoke Management Group one day prior to ignition.

B. Measures used to mitigate effects of prescribed burning on air quality would include:

   1. Broadcast and understory burning would be accomplished as much as practical in the spring and early summer with spring-like conditions. This would reduce the total emissions by burning less of the duff and larger fuels. Risk of fire escape is also less in the spring months than during summer and early fall months.

   2. The discretion to terminate burns when air quality is threatened.

   3. Slash piles would be constructed as clean as practical and be burned as dry as practical to enhance efficient combustion.

2. Fish

A. Activity in and around streams would occur during base flows, July 15 through September 1.

B. Inland Native Fish Strategy Standards and Guidelines are specific based upon the proposed activity, i.e. timber harvest, road management, pre-commercial thinning, etc. Standard buffer widths (summarized in Table 2-3) apply to activities within this project area unless otherwise designated by the district fisheries biologist or district hydrologist. During the layout of units the widths may be greater based on ground conditions. Standard buffer widths are described in Table 2-3.

Table 2-3 Summary of Inland Native Fish Strategy (INFS) RHCA Widths

INFS Category	Description	RHCA Width
1	Fish-bearing streams	300 feet from either side of channel
2	Permanent, flowing, non-fish-bearing stream	150 feet from either side of channel
4	Seasonal, flowing or intermittent streams; Wetlands < 1 acres; Landslide prone areas	50 feet (non-priority watersheds)

3. Heritage Resources

All known heritage resource sites, eligible or potentially eligible to the National Register of Historic Places, would be protected as directed by the National Historic Preservation Act. Any future discovery of heritage resources sites or caves would be inventoried and protected if found to be of cultural significance. A timber sale contract provision would be included in all timber sale contracts to ensure protection of the sites.

4. Noxious Weeds

The following preventative measures would be taken to reduce the risk of noxious weed introduction and spread in accordance with the St. Joe Weed Control EIS (ROD, 10/12/99).

A. Existing populations of weeds along haul roads would be treated prior to harvest activities.

B. All off-road logging and construction equipment (including machinery used in restoration projects) would be cleaned prior to entering the project area to remove dirt, plant parts, and material that may carry weed seeds. A provision would be included in contracts.

C. Mulching agents, such as hay or straw, would be certified weed-free prior to use.

D. All seed used for revegetation and erosion-control purposes would be certified weed-free.

E. Areas where ground-disturbing activities occur would be inspected for new populations of noxious weeds.

F. If new populations of noxious weeds are found, treatment would be implemented in accordance with priorities set by the noxious weed program. New invader species would be slated for eradication immediately upon discovery. Other weed infestations would be

treated according to the direction in the St. Joe Noxious Weed Project EIS and district priorities.

G. All weed treatments would be monitored for effectiveness.

5. Plants (Threatened, Endangered, and Sensitive)

If Threatened, Endangered, and Sensitive (TES) species are discovered during project implementation, an agency Botanist would be notified so that measures could be taken to maintain population viability. Measures to protect population viability and habitat for all known and newly discovered occurrences would include altering or dropping proposed units from activity, modifying the proposed activity, or implementing buffers around plant occurrences. Timber sale contract provisions for protection of Endangered Species, and settlement for environmental cancellation would be included in any subsequent timber sale contracts.

6. Pre-commercial Thinning

A. The maximum diameter of felled trees would be seven inches. Cull trees that exceed the diameter limit would be girdled in lieu of felling to provide additional cavity-nesting habitat.

B. Snags or dead trees would not be cut.

C. Directional felling would be used to minimize slash depths. Trees that cannot be directionally felled would be bucked in lengths not to exceed 6 feet.

D. Slash would be pulled back a minimum of four feet away from all system roads, cut banks and fill slopes.

E. Established game trails would be kept clear of slash by directional felling and slash pullbacks to maintain travel linkages.

F. A 50-foot no-activity buffer would be maintained along all wetted defined channels, springs, and seeps within and adjacent to thinning units.

G. Existing closed gates would be locked after each entry and exit.

H. Activity behind closed gates would be scheduled for completion prior to the opening of the elk any-weapon hunting season (commonly referred to as “rifle season”). An extension may be allowed based on extenuating circumstances (fire, weather, etc.) after interdisciplinary review.

I. Earthen barriers removed to allow access for project activities would be replaced upon completion of the unit and before October 10th each year.

J. If access is desired via roads that have naturally closed through revegetation, interdisciplinary field reviews would be conducted to evaluate options and make recommendations regarding opening the road to allow motorized traffic.

7. Public Motorized Access/Access Management

A. The following National Forest System Roads (NFSR) would be managed as unrestricted routes, available for all legal motorized vehicle use:

- East Elk Road 1451 (Staples Creek), from SH 3 to Road 1491
- Christmas Creek Road 3321, from County Road to the end of road
- Bluebell Road 3685, from Segment 1 of Road 1486 to 3685C
- Cat Spur Road 361, from Road 1486 (County Road) to Road 1450
- Log Creek Road 1450, from Road 361 to Road 1480
- Keeler Connection Road 765, from SH 3 to Road 765A
- County Line Road 765A, from Road 765 to SH 3
- Clarkia Emerald Creek Road 504, from SH 3 to Road 447
- Bechtel Mountain Road 3478, from Road 504 to the top of Bechtel Butte
- Anthony Peak Road 1486, Segment I, from the Road 361 (County Road) to Road 3685
- Anthony Peak Road 1486, Segment III, from Road 3685 to Road 3686

B. Some roads that are currently restricted would be temporarily opened to accommodate timber harvest operations, and public travel would not be permitted on these roads due to safety concerns, wildlife security, and soil and water concerns (Appendix D):

- 504A (Clarkia Peak Road) at the junction with Road 504 (gate)
- 498 (Hidden Creek Road) gate at mile post 2.8
- 3380 (Q Chalk Road) at the junction with State Highway 3 (gate)
- 3557 (Cedar Butte Road) at the junction with Road 447 (gate)
- 3335(Poacher Road) at road to warehouse (Clarkia Work Center)
- 3327J (Palouse Road) at the junction with Road 3327G (gate)

C. Gates would be installed on the following roads after new construction to control access during timber harvest-related activities:

- Off of Road 765 (to Units 30, 31, and 32) – When timber harvest-related activities are complete this road would be put into long-term storage.
- Off Cattail Road 361C (to Units 27 & 28, under the transmission line)

8. Recreation

A. Dispersed recreation sites used for harvest operations activities would be restored or rehabilitated.

B. Contractors would follow timber sale contracts and any other permit provisions required for camping.

C. In areas where logging traffic may interfere with recreational traffic warning signs would be placed to inform visitors of logging activities.

D. Portions of Hidden Creek and Wood Creek Roads would be decommissioned. Access to the dispersed site along the first mile of Hidden Creek Road 498 would be maintained. Decommissioning would be done beyond the dispersed site

9. Roads

A. Sediment Control: Road plans and specifications would include measures to minimize sediment production based on site-specific evaluation. They could include, but are not limited to slash filter windrows, surfacing, gravel or slash blankets, interim seeding, mulching, controlling the timing or extent of activities, and sediment traps.

B. Cost-Share Agreements: The Forest Service has cost-share agreements with Potlatch and the State of Idaho in the analysis area. Cost-Share principles apply to construction, reconstruction, maintenance and use of shared facilities. Cost-Share roads are National Forest System Roads that are needed for the long-term management of the National Forest and also serve the needs of the cooperators.

C. Road Maintenance: The ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective. The overall condition and standards of the road are adequate for the anticipated uses. Provisions for and execution of maintenance on existing roads and newly constructed roads within Forest Service jurisdiction and on NFS lands are designed to minimize resource disturbance, as required by the Forest Plan.

D. Reconstruction: Any existing road used for timber activities would be rebuilt to its approved traffic service level or would be improved to increase safety, operational efficiency or resource protection. For this document, reconstruction includes rebuilding roads to their original standards. All road reconstruction plans, standards and specifications would provide for minimum needed road width, drainage and safe operation while incorporating measures for mitigating for resource disturbances.

The overall existing condition of roads to be reconstructed is generally inadequate for resource protection or anticipated use or the road is impassable for the design vehicle. Spot reconstruction may also occur, where the primary disturbance is confined to a limited area, such as culvert installations, rebuilding a shoulder or addition of turnouts. Areas between the spots generally would need reconditioning (reshaping and processing the road surface and ditches and brushing the shoulders). Most of the work described as reconstruction and reconditioning would actually be maintenance (FSM 7705) to restore the road to its original condition.

E. New Road Construction: All road construction plans, standards and specifications would provide for minimum needed road width, drainage and safe operation while incorporating measures for mitigating for resource disturbances. New roads would be single-lane facilities, suitable for log truck or lowboy use.

10. Soil and Water

A. All activities would comply with:

i. Standards identified in the Inland Native Fish Strategy (INFS) EA Decision Notice and Finding of No Significant Impact, signed in July 1995. All alternatives would implement standard Riparian Habitat Conservation Area (RHCA) widths specified by

INFS (Table 2-3). These buffer zones are no-entry for harvest and equipment. Exceptions are described in the Standards and Guidelines, General Riparian Area Management (RA-2) that states: Trees may be felled in riparian habitat conservation areas when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives. When necessary to fall trees (for skyline/cable units); the sale administrator may approve the minimum number required and ensure that they remain where dropped.

ii. Objectives of Appendix O of the IPNF Forest Plan, Stream Protection.

iii. Activities are designed to protect water quality. Best Management Practices (BMPs) would be used to achieve water quality standards (SSW-2). The Forest Service Handbook 2509.22 (Soil and Water Conservation Handbook) outlines BMPs that meet the intent of the water quality protection elements of the Idaho Forest Practices Act, and through a memorandum of understanding with the State of Idaho (9/19/88) replaces the Forest Plan Appendix S – Best Management Practices. Other site-specific BMPs may be identified and be developed during layout, design or implementation of proposed activities.

iv. Requirements and Erosion Control Guidelines of the Rules and Regulations pertaining to the Idaho Forest Practices Act, Title 18, Chapter 13, Idaho Code.

B. Areas of recent or historic landslides and slumping are considered landslide-prone and constitute Category 4 – RHCAs (INFS). Harvest and road design would avoid known sites using INFS buffers (Small areas of instability may be found on roads).

C. Tractor Yarding: The following tractor skid trail placement would be used:

i. Ground-based yarding would be limited to slopes less than 35%.

ii. Only approved skid trail locations would be allowed.

iii. Trails would be spaced at least 100 feet apart, except where converging at intersections.

iv. Skid trail spacing closer than that listed above may be planned when winter logging occurs on at least two feet of settled snow or frozen ground or where adequate slash matting exists.

v. No excavated skid trails would be constructed.

vi. Skid trails in tractor-yarded units would be limited to less than 15% of the unit acreage to comply with IPNF Forest Plan soil quality standards and Region 1 soil quality recommendations.

vii. To minimize disturbance (soil compaction or displacement), practices such as skidding, grapple-piling and mechanical harvesters would occur over slash or on existing skid trails (Forest Plan Monitoring Reports). Units would be designed to utilize non-excavated skid trails and directional falling.

D. Skyline Yarding: The leading end of logs would be suspended during yarding.

E. Temporary Road: All temporary roads would be fully recontoured to the natural slope upon completion of activities. Temporary road that would remain on the landscape more than one dry season would be waterbarred according to specific interval direction and at specific

angles to prevent erosion. It would then be mulched with a natural, weed-free material to prevent runoff and erosion during spring and/or winter runoff events.

F. For roads that would be stored or decommissioned: at a minimum all culverts would be removed, all fill within the stream crossing sites would be removed, stream gradient and valley side-slopes would be returned to natural conditions for 200 feet on both sides of stream, and road surfaces would be decompacted to a minimum of 18 inches to facilitate and augment infiltration.

G. Where roads would be stored or decommissioned, the beginning of the treatment area would be fully recontoured for 300 feet or a sight-distance (which ever is less) to eliminate motorized access.

H. Prescribed burning would be done during the spring or when soil moistures exceed 25% to maintain soil productivity (IPNF, Updated Soil Guidelines, 1998).

I. The Intermountain Forest Tree Nutrition Cooperative assembled data suggesting that soil potassium levels may be conserved in treatment units by allowing logging slash to over-winter. By leaving sufficient levels of wood on site, long-term soil productivity would be protected.

   i. Potassium sources such as needles and limbs would be maintained on site by allowing slash to over-winter prior to all slash disposal treatments (Intermountain Forest Tree Nutrition Cooperative- Garrison, Moore, 1998).

   ii. Tops of trees would be left in harvest units.

   iii. Silvicultural and burning prescriptions would retain sufficient levels of coarse woody debris on site after slash disposal. The following recommendations would be used in prescriptions:

      a. Douglas-fir, larch, and pine types: minimum coarse woody residues of 4-6 inches diameters well distributed through a treatment area at 10-15 tons/acre (Harvey et al. 1987).

      b. Grand fir / beargrass types at 7-14 tons/acre of coarse woody residues (greater than three inches diameter), western hemlock/bead lily types at 17-33 tons/acre coarse woody residues (greater than three inches diameter)

      c. Subalpine fir / beargrass types at 12-23 tons/acre coarse woody residues (greater than three inches diameter) Graham and others (1994).

J. Wetlands identified during field review or harvest preparation would be excluded or protected by INFS buffers (50 feet for those less than one acre and 150 feet for those greater than one acre). A resource protection provision in the timber sale contract would be utilized to protect wetlands that may be discovered during operations.

K. Rodent control treatment would not occur within INFISH buffers; in areas where the soil is saturated; or during periods of or forecasted periods of heavy precipitation.

11. Transmission Lines

A. Timber sale roads near the large transmission lines would be kept reasonably free of equipment, products, and debris. The Bonneville Power Administration (BPA) may need to have road access for emergencies. In this case "reasonably free" means that the road could be cleared within an hour of notice and roads would be left clear and passable when the timber sale purchaser or contractors leave the area for more than an hour at a time. Logging trucks and equipment may be parked on the right-of-way only during emergencies. When this occurs, the truck/equipment should be grounded with a flexible wire connecting the chassis to a ground rod driven into the ground, or by making the connection to ground with a drag chain attached to the truck/equipment chassis.

B. Where units are adjacent to the transmission line right-of-way, timber would be harvested to reduce the risk of blowdown into the transmission line. Trees immediately adjacent to or under the transmission line would be harvested. If this is not possible, enough timber would be left to maintain wind firmness and reduce the risk of wind-throw into the transmission line.

C. Haul roads would remain a minimum of 50 feet from the point where steel lattice tower legs enter the earth. If this clearance cannot be met, use of road may be permitted if adequate protection for BPA structures from vehicles were provided by the use of guard devices (guard rails, posts, Jersey-type barriers, etc.) If guard devices were used, their location and design must be approved by the BPA.

D. Yarders used near the transmission line would be grounded with copper wire attached to a copper rod pounded six to eight feet in the ground. Skyline cables would be grounded as described above at the tailhold.

E. Chokers would be allowed to hit the ground before they are touched. Track mounted equipment is recommended near transmission lines to drain off induced voltage. If rubber mounted machines are used, a chain should be dragged behind on the ground to drain off voltage. A minimum separation of 20 feet between equipment and transmission line conductors would be maintained.

F. High-lead or skyline yarding across the right-of-way would not be done.

G. Transmission lines sag on warm days or when they are weighed down by snow or heavy frost. Lines that span long distances have greater potential to sag. The distance between equipment and transmission line cables in the same place can be different with different conditions. The timber sale prospectus would describe this to potential timber sale bidders.

H. Concentrated columns of smoke under transmission lines would be avoided in order to prevent electrical arc. Burning proposed within the right-of-way would be discussed with the BPA prior to writing the burn plan.

I. No loading of logging trucks, fueling of vehicles or equipment, log decking or storage of logs or flammable materials would be allowed on the transmission line right-of-way.

J. Logging trucks would not be loaded to a height greater then 14 feet above the roadbed. If a tree comes in contact with the transmission line, no attempt would be made to remove it.

The BPA Dispatcher would be contacted immediately, 24 hours per day, seven days per week: 360-693-4703 or 800-392-0816.

K. For extreme safety-hazard trees near the transmission line, BPA may be able to provide personnel at the work site with advance notification.

L. The right-of-way width for the Dworshak-Taft No. 1 500-kV transmission line is 150 feet, measured 75 feet on each side of transmission line centerline.

12. White Pine Leave Tree Guidelines (Schwandt and Zack, 1996)

These guidelines would be utilized in all silvicultural prescriptions for timber harvest. The objective of these guidelines is to retain and protect genetic resources which may contribute to long-term white pine restoration.

13. Wildlife

A. Slash depths next to new and reconstructed roads would not exceed 1.5 feet or if that is not practical, 16-foot wide openings every 200 feet would be created - especially on ridges and across game trails (Leege, 1984).

B. To provide elk security, timber sales in adjacent areas would have a ridgeline between the disturbance and security area (Leege, 1984). This would be done by either subdivisions (larger sales) or scheduling (smaller sales) in the timber sale contract.

C. The following snag management recommendations (Table 2-4) from the Northern Region Snag Management Protocol (January 2000) would be met (where these or higher levels exist). The retention of snags and snag replacements would be applied at the scale of every 5 to 25 acres (Bull et al. 1997). Replacement snags would be retained at five times the number of snags per acre.

Table 2-4 Snag Guidelines

Habitat	Snags / Acre Retention Prescriptions
Warm dry ponderosa pine and Douglas-fir	1-2 greater than 20” dbh
Cool Douglas-fir, warm grand fir, slope <30%	4 greater than 20” dbh
Cool Douglas-fir, warm grand fir, slope >30%	6-12 total, with 2-4 greater than 20” dbh
Cool, wet, and dry spruce, grand fir, hemlock, and alpine fir	6-12 total with 2 greater than 20” dbh
Low elevation cedar and hemlock	12 total with 4 greater than 20” dbh
High elevation spruce/fir/lodgepole pine	5-10 greater than 10” dbh
Whitebark pine/limber pine	All available

D. To meet the objectives listed above in Table 2-4 Snag Guidelines:

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

ii. Snags that show signs of decay, loose bark, or broken tops would not be designated for harvest (Bull et al. 1997). Exceptions would be made for road construction and log landings.

iii. The Reserve Tree Guide (IPNF, 1995) would be followed to reach objectives of the Snag and Woody Debris Guidelines (IPNF Forest Plan, Appendix X) and worker safety.

iv. Tree-marking guidelines for wildlife reserve trees would favor the retention of large diameter trees, particularly hollow and broomed trees (Bull et al. 1997) except when they pose a safety concern. Western larch, ponderosa pine, and western redcedar greater than 20 inches d.b.h. would be marked as first choices for snags and reserve trees.

v. Snags cut for safety reasons would be left in the unit - preferably where they fall.

E. In most cases travel cover would be maintained and vegetation management would avoid making openings (i.e. areas with <30% canopy cover) within 200 feet of the ridge top or 400 feet if the other side of the ridge does not provide cover. Where openings would be created on ridges designated as potential travel areas they would meet the following criteria:

i. Less than 300 feet wide (Heinemeyer and Jones, 1994)

ii. Limited to one side of the ridge top

iii. Minimum of 800 feet between openings (Leege, 1984)

iv. None to be situated in a saddle (Leege, 1984; Heinemeyer and Jones, 1994)

v. Less than 25% of the distance from the peak of the ridge to the drainage would consist of openings.

F. Excavator-piled slash would be left unburned at a rate of one slash pile per five acres and would be constructed to provide wildlife habitat (Heinemeyer and Jones, 1994).

G. Information from goshawk surveys (nest sites and Post Fledging Areas) would be used to protect goshawk habitat (see Monitoring section below). Existing goshawk nests and any nests found before and during implementation would be protected by a 30-acre, no-activity buffer (Reynolds, et al. 1992). Project activity would be suspended within the post fledgling areas of any active goshawk nests between March 15 and August 15 (Kennedy, 2003). Activity restrictions could be removed after June 30 if the nest sites are determined by the district biologist to be inactive or unsuccessful. Activity within an approximately 420-acre area surrounding each active goshawk nest would comply with the following management recommendations (Reynolds, et al. 1992):

i. 20% or less in shrub/seed/sapling size class

ii. 60% or more canopy closure in immature and older size classes

iii. Created openings are less than two acres with a minimum of 300 feet between existing or other created openings and snag retention guidelines are applied on each acre of created opening.

iv. Non-regeneration treatment in immature and older stands is thinning from below using irregular spacing of leave trees.

Site Specific Design Features

Table 2-5 and Table 2-6 describe site-specific design features common to all the action alternatives.

Table 2-5 Site-Specific Design Features

Objective	Site-Specific Design Features
Maintain Visual Quality	No grapple piling or underburning in **Units 3 and 4**; Grapple piling is restricted to the southern portion of **Unit 5**; No grapple piling/underburning between Road 504 and new road construction in **Units 8, 16, and 17**
Meet Soil Quality Standards	**Unit 48** will be yarded using a ground-based system. In addition to design features discussed above the following will be implemented: • Unit will be monitored using IPNF's Soil Analysis Process after timber harvest and after fuels treatment • If monitoring shows detrimetal disturbance is above Forest Plan standards, skid trails and landings will be decompacted after use
Reduce Sediment Production	Roads listed in **Table 2-6** to be constructed or reconstructed will be surfaced with gravel. The intent of the treatment is to reduce sediment and minimize effects of roads on water quality.
Protect known populations of rare plants	**Unit 7**: One individual of *Buxbaumia viridis* is located east of the unit boundary. A tree height exclusion buffer would be marked to protect the site. **Unit 16**: A single deefern was located in a draw on the boundary of the unit. The planned buffer for the unit would provide adequate protection for the site. One site of *Buxbaumia viridis* (with two individuals) is in the southern portion of the unit. A buffer of 100 feet would be necessary here to protect the site. A road is proposed to be constructed within this buffer. A 100-foot buffer would be established around the site. The road could be constructed through it but no cable or ground yarding would occur within it. Downed wood would be retained on the site to provide for future recruitment. The site would then be monitored for effects to the *Buxbaumia viridis*. **Unit 24:** A small population of *Buxbaumia viridis* and a large population of *Blechnum spicant* were found in this unit. All cut snags would be retained on site for woody debris recruitment. A buffer would be marked to extend beyond the top of the draw in which the plants were found. On average the buffer would extend approximately 100 feet beyond the farthest deerfern occurrence. **Unit 30**: Two sites of *Buxbaumia viridis* are here, about 200 yards from one another. One population is in extremely poor habitat with little possibility for recruitment due to the lack of appropriate substrate. A 25-foot radius buffer would be marked around the site to provide physical protection. A 100-foot buffer would be marked around the second population. The gentle draw in which the individuals are located would have the downed wood preserved throughout. A proposed road ends near here and would need to remain outside of the buffer. **Unit 35**: A single individual of *Blechnum spicant* was located near the unit boundary. A tree-height buffer with directional falling would be marked to protect the site. **Unit 46:** A reserve island would be marked around a population of *Rhizomnium nudum*.

Table 2-6 Roads to be Surfaced with Gravel to Reduce Sediment Generation

Watershed	Road No.	Miles	Road Status
Cedar Creek	504A spur	.27	Construction - Unit 18 - NFS
Cedar Creek	504A spur	1.03	Construction - Units 2, 3, 9, 19 - NFS
Cedar Creek	504a spur	.87	Construction - Units 7, 8,16,17 - NFS
Emerald Creek	3557	1.01	Reconstruction - FRTA
Emerald Creek	3557	2.2	Reconstruction - NFS
Long Slim Creek	765 B	.74	Construction - cost share
Lower St. Maries	1420- Potlatch access	.66	Reconstruction - cost share
Lower St. Maries	1452 - Potlatch access	.16	Reconstruction - cost share
Lower St. Maries	504A spur	.32	Construction NFS - to Unit 18
Lower St. Maries	361 C	.93	Reconstruction - NFS
Lower St. Maries	3321	.11	Construction - cost share
Mazie Creek	765-SH-3, NF sale road	.22	Construction - cost share
Mazie Creek	765-SH-3 to Units 25 & 30	.45	Construction - NFS
Mazie Creek	765/SH-3	.57	Construction - NFS
W. Fk. St. Maries	361C west	.50	Construction - cost share
W. Fk. St. Maries	361C west NF sale road	1.03	Construction - cost share
TOTAL		**11.07**	

Activities Specific to the Action Alternatives

Alternative B - Proposed Action

Alternative B includes all actions described in Activities Common to the Action Alternatives and the timber harvest and road work summarized below. Treatment acres are summarized in Table 2-7. Approximately 32% of the harvest units would be harvested using helicopter. Alternative B proposes to construct 11.1 miles of road and reconstruct 7.3 miles of existing roads. It addresses the issues of roads (existing and new construction), fish, wildlife, water and soils by putting new road construction into long-term storage, decommissioning temporary roads, storing 13.4 miles of existing road, and decommissioning about 2.5 miles of existing roads. Alternative B includes 2.0 miles of road construction across National Forest System (NFS) lands to provide access for adjacent landowners. Approximately 1.2 miles of the 2.0 miles would also be used for timber harvest proposed on National Forest System lands. Proposed activities are displayed on the Alternative B Map (M-5). Tables 2-8 and 2-9 summarize road activities. Map M-6 displays changes in road prescriptions from the existing condition.

Table 2-7 Alternative B Harvest Treatment Summary

Timber Harvest Method	**Acres**
Commercial Thin	826
Shelterwood Prep Cut	216
Shelterwood Seed Cut	39
Shelterwood Removal Cut	16
Irregular Shelterwood Cut	72
Group Shelterwood Cut	57
Clearcut with Reserves	142
Total Acres of Timber Harvest to Meet Objectives	1,368
*Total Acres of Planting to Increase Long-lived, Shade-intolerant Species	228
Fuels Treatment	**Acres**
Jackpot and Broadcast Burning	210
Excavator Piling	533
Lopping	612
Hand Piling	12

** Total estimated acres that would require reforestation to assure rapid reforestation and to better promote the long-lived, early-seral species.*

Table 2-8 Alternative B Road Construction and Reconstruction

Road Activity	**Road Miles on NFS Lands**	**Road Miles on Other Lands**
Road Activity Not Associated with Private Lands		
Temporary Road Construction on NFS Land	1.6	
New System Road Construction on NFS Land Not Associated with Access Requests (Long-Term Storage After Use)	7.5	
Total Road Construction	**9.1**	
Road Reconstruction on NFS Land	**6.1**	
Private Lands and Cost-Share Road Activity		
Construction		
Cost-Share Construction on NFS Lands for Access Request	0.6	
Cost-Share Construction on NFS Lands for Access Request and for Timber Harvest Proposed in the Alternative	1.2	
Non-Cost Share Construction on NFS Lands for Access Request	0.2	
Total Road Construction	**2.0**	
Reconstruction		
Cost-Share Reconstruction on NFS Lands for Access Request and for Timber Harvest Proposed in the Alternative	0.4	
Non-Cost-Share Reconstruction on NFS Lands for Access Request	0.8	
Total Road Reconstruction	**1.2**	
Cost-Share Reconstruction on Other Lands for Access Request and for Timber Harvest Proposed in the Alternative		0.5
Non-Cost-Share Reconstruction on Other Lands for Access Request		0.1
Other Construction (Access Request - Connected Action)		5.6

Total Construction Miles on NFS lands = 11.1 (includes temporary road)
Total Reconstruction Miles on NFS lands = 7.3

Table 2-9 Alternative B Road Management on Existing Roads After Project Implementation

Road Number	Existing Prescription	Proposed Prescription	Miles	Needed for Timber Harvest
1450B	open	storage	0.6	
1452	gated	decommission (Rx D)	0.5	
1457	gated	storage	1.2	
1457A	gated	storage	0.2	
1916UC	barrier	storage	0.2	
1916UD	barrier	storage	0.6	
3321A	open	storage	0.2	yes
3321B	open	storage	1.0	
3327J	gated	storage	1.4	yes
3334	barrier	storage	1.5	
3334UA	barrier	storage	0.9	
3334UB	barrier	storage	0.2	
3334UC	barrier	storage	0.3	
3334UD	barrier	storage	1.2	
3335UA	barrier	storage	0.5	
3335UB	barrier	storage	0.3	
3335UD	barrier	storage	0.1	
3335UE	barrier	storage	0.1	
3335UF	barrier	storage	0.2	
3335UG	barrier	storage	0.2	
3340A	stored	decommission (Rx D)	0.7	
3340UH	stored	decommission (Rx D)	0.2	
3380	gated	storage	0.4	yes
341A	barrier	decommission (Rx D)	0.6	yes
3553	stored	decommission (Rx D)	0.5	
3914A	barrier	storage	0.4	
3914B	gated	storage	0.2	
3914C	gated	storage	0.3	
3UBH	barrier	storage	<0.1	
504C	barrier	storage	1.1	

Table 2-10 Alternative B - Management Rx Miles for Roads Where Change is Proposed

	Open	A	B	C	D/E	Total
Existing	1.8	4.2	8.5	1.4	0	15.9
Proposed	0	0	0	13.4	2.5	15.9

Alternative C

Alternative C includes all actions described in Activities Common to All Action Alternatives described above and the timber harvest and road work summarized below. Alternative C was designed to address **Issue #1 – Road Construction.** Under Alternative C, the only road construction would be 2.0 miles of cost-share roads proposed under Activities Common to All Action Alternatives. Those roads are required for access to private and State land and would also provide access for the management of National Forest System lands. Approximately 1.0 mile of the 2.0 miles would also be used for timber harvest proposed on National Forest System lands. There would be **no other new road construction** for Forest Service activities. This alternative has more helicopter harvest (83%) than the proposed action. Alternative C also addresses **Issue #2 – Existing Roads.** The issue of existing road management is addressed by proposing 13.4 miles of road storage and 2.5 miles of road decommissioning. Alternative C proposed activities are displayed on Map (M-7). Changes in road activities are described in Tables 2-12 and 2-13. Map (M-8) displays changes in road prescriptions from the existing condition.

Table 2-11 Alternative C Harvest Treatment Summary

Timber Harvest Method	**Acres**
Commercial Thin	851
Shelterwood Prep Cut	216
Shelterwood Seed Cut	39
Shelterwood Removal Cut	16
Irregular Shelterwood Cut	72
Group Shelterwood Cut	57
Clearcut with Reserves	142
Total Acres of Timber Harvest to Meet Objectives	1,393
*Total Acres of Planting to Increase Long-lived, Shade-intolerant Species	228
Fuels Treatment	**Acres**
Jackpot and Broadcast Burning	260
Excavator Piling	312
Lopping	802
Hand Piling	19

** Total estimated acres that would require reforestation. Although we readily get natural regeneration on these sites, the plan is to plant all acres that require regeneration to assure rapid reforestation and to better promote the long-lived, early-seral species.*

Table 2-12 Alternative C Road Construction and Reconstruction

Road Activity	Road Miles on NFS Lands	Road Miles on Other Lands
Road Activity Not Associated with Private Lands		
Road Reconstruction on NFS Land	**6.1**	
Private Lands and Cost-Share Road Activity		
Construction		
Cost-Share Construction on NFS Lands for Access Request	0.8	
Cost-Share Construction on NFS Lands for Access Request and for Timber Harvest Proposed in the Alternative	1.0	
Non-Cost-Share Construction on NFS Lands For Access Request	0.2	
Total Road Construction	**2.0**	
Reconstruction		
Cost-Share Reconstruction NFS Lands for Access Request And for Timber Harvest Proposed in the Alternative	0.4	
Non-Cost-Share Reconstruction on NFS Lands for Access Request	0.8	
Total Reconstruction	**1.2**	
Cost-Share Reconstruction Other Lands for Access Request And for Timber Harvest Proposed in the Alternative		0.5
Non-Cost-Share Reconstruction Other Lands for Access Request		0.1
Other Construction (Access Request - Connected Action)		5.6

Total Construction Miles on NFS lands = 2.0
Total Reconstruction Miles on NFS lands = 7.3

Table 2-13 Alternative C Road Management on Existing Roads After Project Implementation

Road Number	Existing Prescription	Proposed Prescription	Miles	Needed for Timber Harvest
1450B	open	storage	0.6	
1452	gated	decommission (Rx D)	0.5	
1457	gated	storage	1.2	
1457A	gated	storage	0.2	
1916UC	barrier	storage	0.2	
1916UD	barrier	storage	0.6	
3321A	open	storage	0.2	yes
3321B	open	storage	1.0	
3327J	gated	storage	1.4	yes
3334	barrier	storage	1.5	
3334UA	barrier	storage	0.9	
3334UB	barrier	storage	0.2	
3334UC	barrier	storage	0.3	
3334UD	barrier	storage	1.2	
3335UA	barrier	storage	0.5	
3335UB	barrier	storage	0.3	
3335UD	barrier	storage	0.1	
3335UE	barrier	storage	0.1	
3335UF	barrier	storage	0.2	
3335UG	barrier	storage	0.2	
3340A	stored	decommission (Rx D)	0.7	

Road Number	Existing Prescription	Proposed Prescription	Miles	Needed for Timber Harvest
3340UH	stored	decommission (Rx D)	0.2	
3380	gated	storage	0.4	yes
341A	barrier	decommission (Rx D)	0.6	yes
3553	stored	decommission (Rx D)	0.5	
3914A	barrier	storage	0.4	
3914B	gated	storage	0.2	
3914C	gated	storage	0.3	
3UBH	barrier	storage	<0.1	
504C	barrier	storage	1.1	

Table 2-14 Alternative C - Management Rx Miles for Roads Where Change is Proposed

	Open	A	B	C	D/E	Total
Existing	1.8	4.2	8.5	1.4	0	15.9
Proposed	0	0	0	13.4	2.5	15.9

Alternative D

Alternative D was developed for watershed restoration and vegetation management with emphasis on decommissioning and storing existing roads. It includes Activities Common to the Action Alternatives. It also addresses **Issues #1 and 2 - new road construction and existing road management**: Approximately 15.8 miles of existing road would be decommissioned including removing riparian roads in Wood Creek and Hidden Creek to improve fish habitat and water quality (long term) and about 9.0 miles would be put into long-term storage including the Mazie Creek Road to improve wildlife security, water and fish. Under Alternative D, the only road construction would be 2.0 miles of cost-share roads proposed under Activities Common to All Action Alternatives. Those roads are required for access to private and State land and would also provide access for the management of National Forest System lands. Approximately 1.0 miles of the 2.0 miles would also be used for timber harvest proposed on National Forest System lands. There would be **no other new road construction** for Forest Service activities. About 72% of the units would be harvested using helicopter logging systems. Map (M-9) shows proposed activities and Map (M-10) shows changes in road prescriptions from existing condition. Changes in road activities are described in Tables 2-16 and 2-17.

Table 2-15 Alternative D Harvest Treatment Summary

Timber Harvest Method	**Acres**
Commercial Thin	324
Shelterwood Prep Cut	120
Shelterwood Seed Cut	0
Shelterwood Removal Cut	0
Irregular Shelterwood Cut	0
Group Shelterwood Cut	40
Clearcut with Reserves	122
Total Acres of Timber Harvest to Meet Objectives	606
*Total Acres of Planting to Increase Long-lived, Shade-intolerant Species	141
Fuels Treatment	**Acres**
Jackpot and Broadcast Burning	174
Excavator Piling	157
Lopping	262
Hand Piling	13

** Total estimated acres that would require reforestation. Although we readily get natural regeneration on these sites, the plan is to plant all acres that require regeneration to assure rapid reforestation and to better promote the long-lived, early-seral species.*

Table 2-16 Alternative D Road Construction and Reconstruction

Road Activity	Road Miles on NFS Land	Road Miles on Other Land
Road Activity Not Associated with Private Lands		
Road Reconstruction on NFS Lands	**3.7**	
Private Lands and Cost-Share Road Activity		
Construction		
Cost-Share Construction on NFS Lands for Access Request	0.8	
Cost-Share Construction on NFS Lands for Access Request and for Timber Harvest Proposed in the Alternative	1.0	
Non-Cost Share Construction on NFS Lands for Access Request	0.2	
Total Road Construction	**2.0**	
Reconstruction		
Cost-Share Reconstruction on NFS Lands for Access Request and for Timber Harvest Proposed in the Alternative	0.4	
Non-Cost-Share Reconstruction on NFS Lands for Access Request	0.8	
Cost-Share Reconstruction on Other Lands for Access Request and for Harvest Proposed in the Alternative		0.5
Total Road Reconstruction	**1.2**	
Non-Cost-Share Reconstruction on Other Lands for Access Request		0.1
Other Construction (Access Request - Connected Action)		5.6

Total Construction Miles on NFS lands = 2.0
Total Reconstruction Miles on NFS lands = 4.9

Table 2-17 Alternative D Road Management on Existing Roads After Project Implementation

Road Number	Existing Prescription	Proposed Prescription	Miles	Needed for Timber Harvest
1450B	open	storage	0.6	
1452	gated	decommission (Rx D)	0.5	
1457	gated	storage	1.0	
1457	gated	decommission (Rx D)	0.3	
1457A	gated	decommission (Rx D)	0.2	
1916UC	barrier	decommission (Rx D)	0.2	
1916UD	barrier	decommission (Rx D)	0.6	
3321A	open	storage	0.2	yes
3321B	open	storage	1.0	
3321C	stored	decommission (Rx D)	0.2	yes
3327J	gated	storage	1.4	yes
3334	barrier	decommission (Rx D)	1.5	
3334UA	barrier	decommission (Rx D)	0.9	
3334UB	barrier	decommission (Rx D)	0.2	
3334UC	barrier	decommission (Rx D)	0.3	
3334UD	barrier	decommission (Rx D)	1.2	
3335A	barrier	storage	1.1	
3335UA	barrier	decommission (Rx D)	0.5	
3335UB	barrier	storage	0.3	
3335UD	barrier	decommission (Rx D)	0.1	
3335UE	barrier	decommission (Rx D)	0.1	

Road Number	Existing Prescription	Proposed Prescription	Miles	Needed for Timber Harvest
3335UF	barrier	decommission (Rx D)	0.2	
3335UG	barrier	decommission (Rx D)	0.2	
3340A	stored	decommission (Rx D)	0.7	
3340UH	stored	decommission (Rx D)	0.2	
3343	gated	barrier	1.0	yes
3380	gated	decommission (Rx D)	0.4	yes
341	open	storage	0.2	
341	open	decommission (Rx E)	0.8	
341A	barrier	decommission (Rx E)	0.6	yes
3457	open	storage	0.2	
3478A	stored	decommission (Rx D)	1.0	
3478UE	stored	decommission (Rx D)	0.1	
3478UF	stored	decommission (Rx D)	1.2	
3499	stored	decommission (Rx D)	0.6	yes
3499UB	stored	decommission (Rx D)	0.1	
3553	stored	decommission (Rx D)	0.5	
3557	gated	storage	1.0	yes
3914	gated	barrier	1.1	
3914A	barrier	storage	0.4	
3914B	gated	barrier	0.3	
3914B	gated	storage	0.2	
3914C	gated	storage	0.3	
3UBH	barrier	storage	< 0.1	
498	open	decommission (Rx E)	1.1	yes
498UB	stored	decommission (Rx D)	0.2	yes
504C	barrier	decommission (Rx D)	1.1	
504AUA	barrier	storage	1.0	yes

Table 2-18 Alternative D - Management Rx Miles for Roads Where Change is Proposed

	Open	A	B	C	D/E	Total
Existing	4.1	7.7	10.6	4.8	0	27.2
Proposed	0	0	2.4	9.0	15.8	27.2

Alternative E

Alternative E includes pre-commercial thinning, watershed improvements, access requests, and other non harvest related activities as described in Activities Common to All Action Alternatives. It addresses the **Issues #1 - Road Construction and #2 - Existing Roads** by placing approximately 9.0 miles of existing roads into long-term storage and decommissioning 15.8 miles, which would benefit fish, water, soil, and wildlife. Road decommissioning is identical to Alternative D in that riparian roads in Wood Creek and Hidden Creek would be removed and Mazie Creek would be put into long-term storage. In addition, it addresses **Issue #3 - Commercial Logging** because no commercial timber harvest is proposed. Activities proposed in Alternative E are displayed on Map (M-11). Changes from existing road activity are displayed on Map (M-12).

Table 2-19 Alternative E Road Construction and Reconstruction

Road Activity	Road Miles on NFS Land	Road Miles on Other Land
Private Lands and Cost-Share Road Activity		
Construction		
Cost-Share Construction on NFS Land for Access Request	1.8	
Non-Cost Share Construction on NFS Land for Access Request	0.2	
Total Road Construction	**2.0**	
Reconstruction		
Cost-Share Reconstruction on NFS Land for Access Request	0.4	
Non-Cost-Share Reconstruction on NFS Land for Access Request	0.8	
Total Road Reconstruction	**1.2**	
Cost-Share Reconstruction on Other Lands for Access Request		0.5
Non-Cost-Share Reconstruction on Other Lands for Access Request		0.1
Other Construction (Access Request - Connected Action)		5.6

Total Construction Miles on NFS lands for Access Request = 2.0
Total Reconstruction Miles on NFS lands for Access Request = 1.2

Table 2-20 Alternative E Road Management on Existing Roads After Project Implementation

Road Number	Existing Rx	Proposed Prescription	Miles		Road Number	Existing Rx	Proposed Prescription	Miles
1450B	open	storage	0.6		3340UH	stored	decommission (Rx D)	0.2
1452	gated	decommission (Rx D)	0.5		3343	gated	barrier	1.0
1457	gated	storage	1.0		3380	gated	decommission (Rx D)	0.4
1457	gated	decommission (Rx D)	0.3		341	open	decommission (Rx E)	0.8
1457A	gated	decommission (Rx D)	0.2		341	open	storage	0.2
1916UC	barrier	decommission (Rx D)	0.2		341A	barrier	decommission (Rx E)	0.6
1916UD	barrier	decommission (Rx D)	0.6		3457	open	storage	0.2
3321A	open	storage	0.2		3478A	stored	decommission (Rx D)	1.0
3321B	open	storage	1.0		3478UE	stored	decommission (Rx D)	0.1
3321C	stored	decommission (Rx D)	0.2		3478UF	stored	decommission (Rx D)	1.2
3327J	gated	storage	1.4		3499	stored	decommission (Rx D)	0.6
3334	barrier	decommission (Rx D)	1.5		3499UB	stored	decommission (Rx D)	0.1
3334UA	barrier	decommission (Rx D)	0.9		3553	stored	decommission (Rx D)	0.5
3334UB	barrier	decommission (Rx D)	0.2		3557	gated	storage	1.0
3334UC	barrier	decommission (Rx D)	0.3		3914	gated	barrier	1.1
3334UD	barrier	decommission (Rx D)	1.2		3914A	barrier	storage	0.4
3335A	barrier	storage	1.1		3914B	gated	barrier	0.3
3335UA	barrier	decommission (Rx D)	0.5		3914B	gated	storage	0.2
3335UB	barrier	storage	0.3		3914C	gated	storage	0.3
3335UD	barrier	decommission (Rx D)	0.1		3UBH	barrier	storage	< 0.1
3335UE	barrier	decommission (Rx D)	0.1		498	open	decommission (Rx E)	1.1
3335UF	barrier	decommission (Rx D)	0.2		498UB	stored	decommission (Rx D)	0.2
3335UG	barrier	decommission (Rx D)	0.2		504C	barrier	decommission (Rx D)	1.1
3340A	stored	decommission (Rx D)	0.7		504AUA	barrier	storage	1.0

Table 2-21 Alternative E - Management Rx Miles for Roads Where Change is Proposed

	Open	A	B	C	D/E	Total
Existing	4.1	7.7	10.6	4.8	0	27.2
Proposed	0	0	2.4	9.0	15.8	27.2

Alternative F – Preferred Alternative

Alternative F includes all actions described in Activities Common to the Action Alternatives. Table 2-22 summarizes treatment acres. Approximately 30% of the harvest units would be harvested using helicopter.

Alternative F addresses **Issues # 1 and 2** associated with existing roads and new road construction. Specifically, no new roads would be constructed in Keeler Creek; and there would be less road construction in Cedar Creek than what is proposed in Alternative B. As a result of the reduced road construction fewer acres of forest vegetation treatments are proposed. Newly constructed roads would be placed into storage, temporary roads would be decommissioned, approximately 9.0 miles of existing road would be stored, and approximately 16.2 miles of existing roads would be decommissioned. The decommissioning of roads addresses issues related to fish, wildlife, water and soils. Proposed decommissioning is similar to Alternative D in that Hidden Creek riparian road would be completely recontoured and the Mazie Creek Road would be put into long-term storage. Wood Creek Road 341 would be decommissioned except for the 0.2 mile segment that would be needed for access between Roads 3340 and 3499. That segment would be put into long-term storage. Approximately 8.8 miles of road would be constructed of which 1.6 miles would be temporary road, 2.0 miles would be on NFS lands associated with the access requests, and 0.6 miles would be constructed concurrently with the decommissioning of Hidden Creek Road 498 to provide access to the road system in the Emerald Creek Drainage. Approximately 1.2 miles of the 2.0 miles would also be used for timber harvest proposed on National Forest System lands. Proposed activities are displayed on the Map (M-14). Tables 2-23 and 2-24 summarize road activities and changes in road prescription from existing condition are displayed on Map (M-15).

Table 2-22 Alternative F Harvest Treatment Summary

Timber Harvest Method	**Acres**
Commercial Thin	836
Shelterwood Prep Cut	216
Shelterwood Seed Cut	39
Shelterwood Removal Cut	16
Irregular Shelterwood Cut	22
Group Shelterwood Cut	57
Clearcut with Reserves	118
Total Acres of Timber Harvest to Meet Objectives	1,304
*Total Acres of Planting to Increase Long-lived, Shade-intolerant Species	192
Fuels Treatment	**Acres**
Jackpot and Broadcast Burning	186
Excavator Piling	468
Lopping	631
Hand Piling	19

** Total estimated acres that would require reforestation to assure rapid reforestation and to better promote the long-lived, early-seral species.*

Table 2-23 Alternative F Road Construction and Reconstruction

Road Activity	Road Miles on NFS Land	Road Miles on Other Land
Road Activity Not Associated with Private Lands		
Temporary Road Construction on NFS Land	1.6	
New System Road Construction on NFS Land Not Associated with Access Requests (Long-Term Storage After Use)	4.6	
Not Associated with Access Requests, Needed for Access to the Emerald Creek road system when Hidden Creek Road 498 is Decommissioned (Barriered After Construction)	0.6	
Total Road Construction	**6.8**	
Road Reconstruction on NFS Land	**6.0**	
Private Lands and Cost-Share Road Activity		
Construction		
Cost-Share Construction on NFS Land for Access Request (not needed for proposed timber harvest)	0.4	
Cost-Share Construction on NFS Land for Access Requests and for Proposed Timber Harvest	1.2	
Non-Cost Share Construction on NFS Land for Access Request	0.4	
Total Road Construction	**2.0**	
Reconstruction		
Cost-Share Reconstruction NFS Land for Access Request and for Harvest Proposed in the Alternative	0.4	
Non-Cost-Share Reconstruction on NFS Lands for Access Request	0.8	
Total Road Reconstruction	**1.2**	
Cost-Share Reconstruction on Other Land for Access Request and for Harvest Proposed in the Alternative.		0.5
Non-Cost-Share Reconstruction on Other Land for Access Request		0.1
Other Construction (Access Request - Connected Action)		5.6

Total Construction Miles on NFS lands = 8.8
Total Reconstruction Miles on NFS lands = 7.2

Table 2-24 Alternative F Road Management on Existing Roads After Project Implementation

Road #	Existing Road Prescription	Proposed Road Prescription	Miles	Needed for Timber Harvest
1450B	open	storage	0.6	
1452	gated	decommission (Rx D)	0.5	
1457	gated	storage	1.0	
1457	gated	decommission (Rx D)	0.3	
1457A	gated	decommission (Rx D)	0.2	
1916UC	barrier	decommission (Rx D)	0.2	
1916UD	barrier	decommission (Rx D)	0.6	
3321A	open	storage	0.2	yes
3321B	open	storage	1.0	
3321C	stored	decommission (Rx D)	0.2	yes
3327J	gated	storage	1.4	yes
3334	barrier	decommission (Rx D)	1.5	
3334UA	barrier	decommission (Rx D)	0.9	
3334UB	barrier	decommission (Rx D)	0.2	
3334UC	barrier	decommission (Rx D)	0.3	
3334UD	barrier	decommission (Rx D)	1.2	
3335A	barrier	storage	1.1	
3335UA	barrier	decommission (Rx D)	0.5	
3335UB	barrier	storage	0.3	
3335UD	barrier	decommission (Rx D)	0.1	
3335UE	barrier	decommission (Rx D)	0.1	
3335UF	barrier	decommission (Rx D)	0.2	
3335UG	barrier	decommission (Rx D)	0.2	
3340A	stored	decommission (Rx D)	0.7	
3340UH	stored	decommission (Rx D)	0.2	
3343	gated	barrier	1.0	yes
3380	gated	decommission (Rx D)	0.4	yes
341	open	decommission (Rx E)	0.8	yes (0.4 miles)
341	open	storage	0.2	
341A	barrier	decommission (Rx E)	0.6	yes
3457	open	storage	0.2	
3478A	stored	decommission (Rx D)	1.0	
3478UB	barrier	gated	< 0.1	
3478UB	barrier	decommission (Rx D)	0.4	
3478UE	stored	decommission (Rx D)	0.1	
3478UF	stored	decommission (Rx D)	1.2	
3499	stored	decommission (Rx D)	0.6	yes
3499UB	stored	decommission (Rx D)	0.1	
3553	stored	decommission (Rx D)	0.5	
3557	gated	storage	1.0	yes
3914	gated	barrier	1.1	
3914A	barrier	storage	0.4	
3914B	gated	barrier	0.3	
3914B	gated	storage	0.2	
3914C	gated	storage	0.3	
3914UD	stored	gated	0.4	

Road #	Existing Road Prescription	Proposed Road Prescription	Miles	Needed for Timber Harvest
3UBH	barrier	storage	< 0.1	
498	open	decommission (Rx E)	1.1	yes
498UB	stored	decommission (Rx D)	0.2	yes
504C	barrier	decommission (Rx D)	1.1	
504AUA	barrier	storage	1.0	yes

Table 2-25 Alternative F - Management Rx Miles for Roads Where Change is Proposed

	Open	A	B	C	D/E	Total
Existing	4.1	7.7	11.1	5.2	0	28.1
Proposed	0	0.5	2.4	9.0	16.2	28.1

Monitoring

Monitoring is conducted on a sample basis and is designed to verify that the projects are implemented as designed, are effective and most efficient in meeting the project and Forest Plan objectives, and determine whether the project and Forest Plan goals and objectives for the area are still appropriate. For this project, monitoring and evaluation would be conducted as described in Table 2-26 where monitoring activities are discussed by environmental component. Those monitoring components not specifically discussed in this appendix tier to the monitoring described in the Forest Plan. The IPNF annually conducts a review of BMP implementation and effectiveness. The results of this and other monitoring are summarized in Annual Monitoring and Evaluation Reports which provide information about how well the management direction of the Forest Plan is being carried out and measures the accomplishment of anticipated outputs, activities and effects.

Table 2-26 Monitoring Plan

Resource	Objective	Timing	Methodology	Responsible
Watershed	Implementation & effectiveness of applicable BMPs	Ongoing, during and a post harvest visit	Complete BMP inspection reports for the timber sale(s) and associated road work	Hydrologist/Sale Administration/ Engineering
Fisheries/ Watershed	Implementation of RHCAs	Prior to advertisement of timber sale(s)	Monitor application of RHCAs, as noted in Chapter 2	Fisheries Biologist / Hydrologist
	Determine status of riparian plantings	1st, 2nd, & 3rd year after initial planting	Walk-thru survey, ocular to determine survival of plants	Hydrologist
Soils	Ensure standards are met in Unit 48	After timber harvest & after fuels treatment	IPNF Soil Analysis Process	Technician trained in methodology
Silviculture /Fire	Determine whether silv. objectives were accomplished & assess site prep. and planting needs	Post harvest and prior to any site preparation or fuels treatment	Review treatment areas; evaluate silvicultural objectives compared with results; check for special fuels treatment needs and special planting needs	Fuels Mgmt Specialist / District Silviculturist
Silviculture	Determine status of regeneration harvest units	1st, 3rdand, if needed, 5th year, following initial planting	Monitor stocking & status of regeneration using walk-through & standard plot exams following R1 procedures	District Reforestation Specialist
Wildlife	Determine status and assess response to project activity of known goshawk territory	Prior to, during, and two years after project activity	Yearly – ocular evaluation of nest status; and or surveys of post-fledgling areas (PFA). Document timing of project activity within ¼ mile of PFA	Wildlife Biologist
Sensitive Plants	Gain information on response to disturbance	During growing season	Unit 16 – standard plant survey methodology	Agency Botanist

Summary Comparison of Alternatives

The following tables display a tabular comparison of the alternatives considered in detail and how they meet the purpose and need (Table 2-27) and the environmental effects of each alternative expressed by issue "indicators" (Table 2-28).

Table 2-27 Summary Comparison of Purpose and Need Objectives

Measurement Parameters	A		B		C		D		E		F	
Move Vegetation Toward Historical Conditions												
Composition:	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Long-lived, early-seral tree species:WL/WP Forest Types	1,661	11	1,959	13	1,959	13	1,851	12	1,661	11	1,923	12
Stand Structure:												
Brush-seedling sapling	2,147	14	2,375	15	Same as Alt B		2,228	15	Same as Alt A		2,339	15
Pole-small-medium	10,756	70	10,537	68			10,624	69			10.573	68
Mature-large	1,684	11	1,675	11			1,675	11			1,675	11
Old Growth = allocated w/in PA	851	6	851	6			851	6			851	6
Stand Density:	Acres		Acres		Acres		Acres		Acres		Acres	
Reduction in stand density	0		1,129		1,154		461		0		1,101	
Improve conditions for overstocked seedling/sapling stands	0		324		324		324		324		324	
Improve Water Quality, Aquatic Habitat, Soil Conditions and Wildlife Security Through Road Changes												
Miles of road recontour w/in 50 feet of stream channel	0.0		4.9		4.9		5.3		5.3		5.2	
Miles of road storage or decom on existing roads	0		15.9		15.9		24.8		24.8		25.2	
Net reduction in stream crossings* (after road construction)	0		20		20		33		33		34	
Net long-term reduction in sediment (tons/year) including work done under 2002 ROD	19.6		38.7		46.8		58.3		58.3		51.7	
Net acres of improving soil productivity related to roads	0		14		55		90		90		65	
Acres of wildlife security	660		1,009		1,009		2,240		2,240		2,240	
Provide Access for Other Landowners												
	no		yes		yes		yes		yes		yes	

Table 2-28 displays the alternatives issue by issue and is National Forest System lands and roads unless noted differently. Miles of road by management prescription (under Issue 2) **includes** proposed miles of new road construction and the connected action (access request) of 5.6 miles construction on private land.

Table 2-28 Summary Comparison of Issue Indicators by Alternative

Indicators	Alternatives					
	A	**B**	**C**	**D**	**E**	**F**
Issue #1 – Road Construction Activity						
New system road construction miles (NFS land)	0	11.1	2.0	2.0	2.0	8.8
Temporary road construction	0	1.6	0	0	0	1.6
Sediment increase from road construction (tons/year)	0.0	12.1	3.9	3.9	3.9	10.5
Sediment decrease from restoration work (tons/year)	0	31.1	31.1	42.6	42.6	42.6
Net long-term change in sediment production for entire Hidden Cedar Project (tons / year; negative number equals reduction in sediment production)	-19.6	-38.7	-46.8	-58.3	-58.3	-51.7
Number of new stream crossings – FS activities	0	17	5	5	5	16
Number of stream crossings removed – FS activities	0	20	20	33	33	34
Net change in number of stream crossings – FS activities	0	-3	-15	-28	-28	-18
Number of new stream crossings – other and FS activities	0	33	21	21	21	32
Number of stream crossings removed – other and FS activities	0	20	20	33	33	34
Net change in number of stream crossings – other and FS activities	0	+13	+1	-12	-12	+2
Miles of appropriately functioning fish habitat	0	0	0	6.2	6.2	6.2
Trend of fishery condition	stable	stable	↑ in 1 stream	↑ in 4 streams	↑ in 4 streams	↑ in 3 streams
Wildlife security on NFS land (total road density – mi. /sq. mi. in wildlife analysis area)	3.6	2.9	2.8	2.5	2.5	2.6
Wildlife security on all lands in wildlife analysis area (total road density – mi. / sq. mi.)	4.7	4.3	4.3	4.1	4.1	4.1

	Alternatives					
	A	**B**	**C**	**D**	**E**	**F**
Issue #2 –Road Management						
Miles of road by management Rx on NFS land in project area:						
Open road	40.5	38.7	38.7	36.4	36.4	36.4
Gated – Mgmt. Prescription A	14.5	11.9	11.9	8.6	8.6	8.7
Barrier – Mgmt. Prescription B	11.9	3.6	3.6	3.8	3.8	3.4
LTS – Mgmt. Prescription C	34.9	54.6	47.1	39.3	39.3	43.7
Decommission - Mgmt. Prescriptions D & E	11.2	15.3	13.7	26.8	26.8	28.4
TOTAL	**113.0**	**124.1**	**115.0**	**115.0**	**115.0**	**120.6**
Miles of road by management Rx on all land in project area after new construction:						
Open road	89.5	87.7	87.7	85.4	85.4	85.4
Gated – Mgmt. Prescription A	104.3	105.2	105.2	101.8	101.8	102.9
Barrier – Mgmt. Prescription B	52.2	45.0	46.4	45.2	45.2	44.9
LTS – Mgmt. Prescription C	53.2	73.9	66.4	58.6	58.6	62.8
Decommission - Mgmt. Prescriptions D & E	11.5	15.6	14.0	27.3	27.3	28.9
TOTAL	**310.7**	**327.4**	**319.7**	**318.3**	**318.3**	**324.9**
Sediment increase from road construction (tons/year)	0.0	12.1	3.9	3.9	3.9	10.5
Sediment decrease from road storage and decommissioning (tons/year)	0	31.1	31.1	42.6	42.6	42.6
Number of new stream crossings	0	17	5	5	5	16
Number of stream crossings removed	0	20	20	33	33	34
Net change in number of stream crossings	0	-3	-15	-28	-28	-18
Miles of road recontoured within 50 feet of stream channel	0	4.9	4.9	5.3	5.3	5.3
Miles of appropriately functioning fish habitat	0	0	0	6.2	6.2	6.2
Trend of fishery condition	stable	stable	↑ in 1 stream	↑ in 4 streams	↑ in 4 streams	↑ in 3 streams
Acres of security for wildlife	660	1,009	1,009	2,240	2,240	2,240
Issue #3 – Commercial Logging						
Water yield increase for the St. Maries River	7.3%	8.6%	8.6%	<8.6%	7.3%	8.6%
Estimated acres soil productivity improvement from road storage & decommissioning	0	64	64	99	99	101
Net acres of soil productivity improvement related to roads (after road construction)	0	14	55	90	90	65
Maintain at least 80 percent of the activity area (including system roads) in a condition of acceptable productivity potential	Yes	Yes*	Yes*	Yes*	Yes*	Yes*
Miles of appropriately functioning fish habitat	0	0	0	6.2	6.2	6.2
Trend of fishery condition	stable	stable	↑ in 1 stream	↑ in 4 streams	↑ in 4 streams	↑ in 3 streams

** Unit 40 is at the threshold*

CHAPTER 3 - AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Changes Between the 2002 FEIS and this SEIS

Changes are discussed at the beginning of each resource section. In the original EIS old growth was discussed in the Wildlife section. In this supplemented EIS Old Growth is a separate section.

Introduction

This chapter describes the affected environment and environmental consequences for resources affected by the proposed action and the other alternatives. It provides the scientific and analytic basis for the comparison of alternatives. The regulatory framework and analysis methods are also discussed. It provides information of relevant past, present, and reasonably foreseeable activities that occurred, are occurring, or are proposed to occur within each of the resource cumulative effects areas examined in this analysis. Past and ongoing activities along with natural processes have contributed to creating the current condition, as described in each resource section.

Past, Present, and Reasonably Foreseeable Future Actions

Changes Between 2002 FEIS and this SEIS

At the time of the original analysis the following timber sales were considered current and foreseeable actions and have now been completed: TriCounty, Dutch Cat II, and Merry Creek White Pine Progeny.

Keeler Creek Allotment is within the Hidden Cedar Project Area, but it is currently vacant, and no grazing permits are issued for that allotment.

The Garnet Stars and Sands Project was listed as a planned agency action. The project was cancelled and was replaced with the Emerald Creek Garnet Area Project which is much more limited in scope and location. The activities proposed now are entirely outside the Hidden Cedar Project Area and associated resource analysis areas.

Gopher baiting was listed as a planned agency action. It is now considered past, present and on-going.

Summary of Activities

In *Lands Council v. Powell*, the U.S. Court of Appeals for the 9th Circuit held that, under the circumstances presented in the case, proper cumulative impact analysis required some cataloguing of past projects and their effect on the current project area. Furthermore, such cataloguing should provide sufficient detail to allow for analysis of the differences between prior projects and proposed projects, which could provide the information necessary to consider alternatives that might have

less impact on the environment. This chapter and the project file for this project provide information of relevant past, present and reasonably foreseeable projects/activities that have occurred, are occurring, or are proposed to occur within each of the resource cumulative effects areas examined in this analysis.

The Council on Environmental Quality (CEQ), whose responsibility it is to coordinate federal environmental efforts and work closely with agencies and other White House offices in the development of environmental policies and initiatives, provided guidance to federal agencies on the consideration of past actions in cumulative effects analysis (SA-9). CEQ stated that "generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historic details of individual past actions" (SA-9 p. 2). Cumulative impact is defined in CEQ's NEPA regulations as the "impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions…" (40 CFR 1508.7). CEQ has interpreted this regulation as referring only to the cumulative impact of the direct and indirect effects of the proposed action and its alternatives when added to the aggregate effects of past, present, and reasonably foreseeable future actions (SA-9, p. 2).

With respect to past actions, during the scoping process and subsequent analysis of this project, the Forest Service determined what information regarding past actions was useful and relevant to the analysis of cumulative effects. While CEQ found that cataloging past actions and specific information about the direct and indirect effects of a past project's design and implementation could in some contexts be useful to predict the cumulative effects of the proposal, the regulations do not require the Forest Service to catalogue or exhaustively list and analyze all individual past actions (SA-9, p. 3).

The project file for this project provides a description of known past activities and their effects. There are, however, marked differences between past and current land management practices and policies. The evolution that has occurred in land management practices is the result of science, our ongoing monitoring actions, and changing public values.

On the Idaho Panhandle National Forests (IPNF), early to mid 20th century road construction activities focused construction mainly through river valleys, riparian areas, floodplains, and adjacent hillsides. The roads efficiently provided access but decreased the land's effectiveness as wildlife habitat and constricted stream channels, while providing a new avenue for erosion and discharge of sediment into streams. Roads on National Forest System lands were often an expansion of existing trails and paths that provided access so that they would accommodate newer equipment and current land uses. In some situations, roads were developed on abandoned railroad beds. In both cases, the location and design were predetermined from the previous use and era. As time progressed, roads were "designed" and located to achieve their primary purpose, which was to provide access and haul product at a minimal cost. In the decades following World War II (1950s – '70s), the road network was rapidly expanded to support the domestic need for lumber in housing construction.

Over the last twenty years, both road design and location have evolved as necessary tools to not only provide efficient access; but also to protect valuable watershed resources. Forest Service Best Management Practices (FSH 2509.22 Soil and Water Conservation Practices Handbook) currently incorporated into road construction/reconstruction activities on the forest include:

- Road surfacing (gravel, etc…) was incorporated to not only provide better travel conditions but also to prevent and control erosion from the road surface.
- Road drainage controls are now being incorporated into designs that:
    - Reduce the erosive flows in ditches by providing frequent cross-drains to relieve ditch flows;
    - Avoid water movement down the road by dispersing the drainage quickly by crowning or out-sloping the road surface;
    - Stabilize ditches by lining; and
    - Disperse drainage water (that often carries sediment) onto stable forested slopes before ditches discharge into waterways.
    - Allow new and existing stream crossings to safely pass extreme events (i.e. 100-year flood event).
- Special construction techniques and designs are utilized (i.e., full- or partial-benching of roads to avoid unstable side casting of waste materials; windrowing clearing slash to prevent sediment delivery to streams from construction activities themselves as well as from erosion of road fills and treads that are not yet protected with erosion control vegetation).
- Some roads now are designed to take advantage of the non-uniformities of the slopes they cross by "rolling grades" and grade breaks to prevent the potential for accumulations of water or excessive ditch-flows that have destabilized the road bed or cause surface erosion in the past.
- Designers and planners develop road networks that avoid highly erosive or unstable slopes utilizing the land system inventory, hydrologists, soil scientists, and geotechnical engineers.
- Road crossings are located at more stable sites; and crossing designs are now considering water quality and fish passage as primary design criteria, rather than criteria that just account for costs and traffic efficiency.
- Roads are located well away from streams and their riparian areas where ever practicable; and the number of crossing sites is minimized. These features are in stark contrast to past road locations that sometimes resulted in chronic sources of sediments, extended exposure of streams to direct sunlight resulting in temperature elevations, and nearly permanent reductions of the replacement sources of the structural components of streams and aquatic cover, riparian deadfall.
- In the past, when a road's utility ended, the road was simply abandoned. Some of these abandoned roads created water quality and slope stability issues as they deteriorated, especially without any maintenance. Current practice is to restore key abandoned or no longer useful roads to a "hydrologically neutral" condition where its remnants are self-maintaining and are no longer disturbing slope stability or the movement of slope water, either on or below the soil surface or the natural functions and adjustments of streams, wetlands, and other water bodies.

Impacts to forest water and soil resources from logging practices and road activities have also been reduced over the past 20 years with the introduction of Best Management Practices (BMPs) and Inland Native Fish Strategy (INFS) management direction. Based on research studies, current BMPs and INFS Riparian Habitat Conservation Areas (RHCAs) can reduce sediment yields compared with historical practices (Lee et al 1997, USDA 1995).

In 1972, Section 208 of the Clean Water Act Amendments established the regulatory framework for non-point source pollution control thorough use of BMPs. BMPs are defined in Idaho as a practice or combination of practices determined to be the most effective and practicable means of preventing or reducing the amount of pollution generated by non-point sources (IDAPA 20.02.01). BMP monitoring is conducted annually by the IPNF to validate the implementation and effectiveness of BMPs associated with land management activities. Monitoring results are used to adapt future management actions where improvements in meeting water quality objectives are indicated. Forest monitoring of BMPs indicates that in most cases they continue to function as expected and are meeting their intent (IPNF 2002, 2003).

At the time the IPNF Forest Plan was approved (1987), the emphasis was on developing a commodity production strategy while minimizing impacts to watersheds and aquatic resources, including fish. The strategy for watershed management was constructed in the forest plan as a "maintenance" objective. In some situations, thresholds, or "minimum impact" standards defined the criteria for maintenance. To ensure that watersheds and aquatic resources were maintained during forest management activities, BMPs were applied. Despite the existing forest plan standards and BMPs, the condition of fish habitat on the forest was declining, primarily due to timber harvest and road building activities (IPNF 1992).

In 1995, the Forest Plan was amended to include Inland Native Fish Strategy (INFS) management direction (USDA 1995). The implementation of INFS gave greater protection to aquatic resources, especially riparian-dependent systems. The management direction provided by the INFS amendment is designed to protect and maintain the structure and function of riparian and aquatic systems. INFS contains goals for healthy, functioning watersheds, riparian areas, and associated fish habitats; Riparian Management Objectives (RMOs), and performance-based standards and guidelines for land management activities (i.e., timber, roads, grazing, recreation, minerals, fire/fuels, lands, riparian area management, watershed restoration, fisheries and wildlife restoration). Instead of allowing some "acceptable" level of effects on riparian and aquatic systems, INFS aims to protect aquatic resources from detrimental effects. INFS gives riparian-dependent resources priority over other resources in the Riparian Habitat Conservation Areas (RHCAs), so that while RHCAs are not "lock out" zones, activities that occur in them must either benefit riparian and aquatic resources or at least "not slow the rate of recovery below the near natural rate of recovery if no additional human caused disturbance was placed on the system" (USDA 1995). Incorporation of the Inland Native Fish Strategy (INFS) management direction into the forest plan has led to improvement in the condition of aquatic resources by offering greater protections to the critical riparian areas. In addition, INFS allows for and encourages watershed restoration. Restoration has occurred over the years across the IPNF. Over 1,300 miles of roads were decommissioned on the IPNF from 1991-2003 (IPNF 2003).

Harvest methods and removal of timber products from the national forest changed substantially over time. Early harvest methods (1950s, '60s, and '70s) focused primarily on financial objectives of providing low-cost wood products. Harvest placement often occurred in the highest volume, easily accessible stands and often occurred within riparian areas and adjacent to streams. Most of the harvest prescriptions were primarily designed to produce healthy young stands with shorter rotation ages.

Modern timber harvest prescriptions and design emphasize desired conditions of the forest after the harvest. This usually results in the retention of various amounts of trees in a post-harvest stand,

addressing objectives that may include wildlife habitat, watershed conditions, hazardous fuels, visual quality, soil productivity, forest health and others. On sites determined suitable for timber production, timber harvest may also produce timber products on a regulated basis while compatible with these other resource objectives and values. Some examples where timber production and resource objectives can be achieved simultaneously are:

- Managing tree canopies and ladder fuels to limit fire spread from the forest floor to the tree crowns;
- Designing harvest patterns across the landscape to facilitate wildlife movement, such as providing corridors and preserving travel routes for ungulates. Also, using harvest prescriptions and landscape patterns as part of a wildfire hazard reduction strategy;
- Increasing the amount of native western white pine, western larch and ponderosa pine, which generally are insect- and disease-resistant and are long-lived, as well as increasing western redcedar in valley bottoms, where it historically was more abundant than today;
- Using variable retention harvests to meet scenic quality objectives and wildlife habitat objectives.

Other elements of modern harvest prescriptions that address specific resource objectives include retention of snags for cavity nesters, retention of down wood for soil nutrition and wildlife habitat, maintaining sediment filtering vegetation near riparian areas, and maintaining vegetation diversity through hardwood retention and protection of rare plants.

Increased environmental awareness has also lead to improvements in logging systems that we use to remove trees from the forest. Early harvests emphasized cheap, labor-intensive logging methods, such as railroad, horse, short distance jammer systems, and tractor logging. Logging systems were selected primarily by the least expensive method to transport the trees from the forest to the mill. This sometimes involved harvesting on steep slopes, creating excessive soil disturbance and increasing the risk of erosion. Streams were sometimes used as a method to transport logs from the harvest site, causing impacts to the aquatic system and adjacent riparian habitat. Road systems were sometimes dense (10 miles per square mile) to facilitate rapid and inexpensive removals, in some cases compromising water quality.

Today's logging systems recognize and reduce the threat of environment harm in a number of ways. Tractor logging generally occurs on slopes 35% or less, and is limited to designated locations, reducing soil impacts. Skyline and other cable yarding systems are used on steeper slopes, which greatly reduces the amount of soil disturbance. Increasingly, helicopter logging is used, which extends yarding distances and thereby reduces road densities. Tractor dozer piling was once a common practice. Monitoring showed that it resulted in heavily disturbed soils, so dozer piling is no longer used to treat fuels. Instead, the Forest Service uses grapple piling which causes much less results soil disturbance (see Soils section). A suite of best management practices and forest plan standards and guidelines aids in the development of the least impactive design possible. Monitoring during and after harvest provides a valuable feedback loop that identifies and corrects variances should they occur.

The forest ceased regeneration harvest of allocated old growth stands a number of years ago. Presently, our focus is on maintaining the old growth stands that we have and allocating additional stands for future old growth as they mature.

For the above stated reasons (changes in road construction/reconstruction and maintenance practices; implementation of INFS management direction and watershed BMPs; and changes in harvest practices and objectives) an individual analysis of past projects cannot be clearly compared to analysis of the proposed actions. However, the incremental effects of proposed action when added to the effects of the past, present, and reasonably foreseeable actions is displayed and provides a complete assessment of cumulative effects.

Analysis of cumulative effects presented in this chapter consider past, present, and reasonably foreseeable activities that could affect the issues pertinent to this analysis. Reasonably foreseeable actions include those management activities that are on-going or scheduled to occur and that we have developed a proposed action. These activities may occur regardless of which alternative is selected for implementation.

Following is a description of activities identified by resource specialists as being pertinent to some resource(s) for analysis of environmental cumulative effects for the Hidden Cedar Project.

Table 3-1 Past, Present, and Reasonably Foreseeable Future Activities

Activity	Past	Present	Reasonably Foreseeable
NFS LANDS PROJECTS IN THE PLANNING PHASE			
St. Maries River Basin Fuels Reduction Area 3 South Clarkia Interface			**X**
Catspur Prospecting Permit			**X**
NFS LANDS PAST, PRESENT AND ON-GOING ACTIVITIES			
Dutch Cat Timber Sale	**X**		
Tri-County Timber Sale	**X**		
DS Anthony Pine	**X**		
Merry Creek White Pine Progeny Test Site	**X**		
Operation of Cedar Creek Campground	**X**	**X**	**X**
Bechtel Butte DM – garnet lease and prospecting		**X**	**X**
Cattle grazing approved with the St. Maries Basin Grazing Allotment DN	**X**	**X**	**X**
Outfitters and guides	**X**	**X**	**X**
Timber harvest other than listed above:			
Decade / Regeneration Harvest Acres / Intermediate Harvest Acres / Total Harvest Acres			
1950s / 504 / 78 / 582			
1960s / 759 / 979 / 1,738			
1970s / 696 / 920 / 1,616			
1980s / 392 / 740 / 1,132			
1990s / 1,158 / 486 / 1,644			
2000s / 79 / 311 / 390			
Mechanical site preparation	**X**		
Prescribed burning	**X**		
Tree planting	**X**		
Road construction	**X**		

Activity	Past	Present	Reasonably Foreseeable
Road decommissioning	X		
Road maintenance	X	X	X
Pre-commercial thinning	X		
Gopher baiting	X	X	X
Riparian planting	X		
Large woody debris placement	X		
Inoculating trees with root/stem decay organisms	X		
Transmission line maintenance	X	X	X
Firewood gathering	X	X	X
Camping	X	X	X
Berry picking	X	X	X
Christmas trees (personal-use)	X	X	X
Motorized Use; Full-Size, ATV, and motorcycle	X	X	X
Fire Suppression	X	X	X
Wildfires	X	X	unknown
Weed control under the St. Joe Noxious Weed EIS	X	X	X
POTLATCH CORPORATION			
Timber harvest	X	X	X
Road construction	X	X	unknown
Activities similar to past activities	X	X	X
IDAHO DEPARTMENT OF LANDS			
Timber harvest	X	X	X
Road construction	X	X	
Other activities similar to past activities	X	X	X
OTHER PRIVATELY-OWNED LAND			
Timber harvest	X	X	X
Fossil Bowl Motorcycle Area and fossil digging	X	X	X
Other activities similar to past activities	X	X	X

Dutch Cat II Timber Sale: This activity was authorized under the Dutch Cat Decision Notice dated May 30, 1997, and harvest operations were completed in 2003. Within the Hidden Cedar Project Area 346 acres were harvested (311 acres commercial thin, and 35 acres regeneration cut). Less than one half (0.44) mile of road was constructed. Approximately 200 acres were harvested adjacent to the Hidden Cedar Area. Effects of these past activities are considered in the analysis for soils, transportation, water, and wildlife.

Tri County Timber Sale: This activity was authorized under the Emerald Resource Unit FEIS & Record of Decision dated April 30, 1992. Timber sale operations were completed in 2004. There are no harvest units associated with this timber sale in the Hidden Cedar Project Area; however, 105 acres of regeneration harvest units were adjacent to the project area.

Merry Creek White Pine Progeny Test Site: This 45-acre project included slashing, broadcast burning and planting rust-resistant white pine.

Other Timber Harvest: The timber stand data base includes records for timber harvests beginning in the mid-1950s (SA-1), but unrecorded harvests occurred prior to that time. Effects of past timber harvest including timber harvest prior to the 1950s are considered in the analysis for fire and fuels, fisheries, forest vegetation, plant species at risk, scenery, soils, water, and wildlife.

Road Construction: Most of the National Forest System lands in the Hidden Cedar Project Area are "acquired lands," which means there were other landowners prior to the land being acquired for the National Forest. Land ownership patterns have continued to shift through land exchanges and acquisitions from the early settlement days to the present. Several exchanges have occurred to consolidate various ownerships for the State of Idaho, Potlatch Corporation and the National Forest System. The land ownership patterns influenced the development of the road system, roads locations, and road construction standards. Roads were often built to avoid crossing ownerships. With most of the project area being within one mile of a major river and travelway, there has been a great deal of development and many activities. Settlement and associated road development increased with the construction of the railroad between St. Maries and Bovill in the early 1900s. The most recent road construction on National Forest System lands within the project area was in 2002 when 0.4 miles were built for the Dutch Cat Timber Sale. The effects of past road building are considered in the existing condition and in the analysis for air quality, fire and fuels, fisheries, noxious weeds, old growth, plant species at risk, recreation, scenery, soils, transportation, water, and wildlife.

Railroad Construction: Railroad construction activities occurred in the past within the project area. Following the 1910 fires railroad construction began with the main purpose of removing salvaged timber from both National Forest System lands and other lands hoping to recover some economic valve from the damage caused by the fires. These activities removed vegetation, and in some cases, caused the straightening of some stream channels. Effects of past railroad construction are considered in analysis for forest vegetation, heritage, transportation, and water.

Unauthorized Garnet Digging: Unauthorized digging for garnets has occurred along tributaries located within the project area. This minor, sporadic digging consisted of small holes dug by members of the public using hand tools. Effects of unauthorized garnet digging are considered in the analysis for forest vegetation, minerals, range, recreation, soils, and water.

Bechtel Butte Mineral Prospecting: There is a preference right lease application on a ridge near Bechtel Butte. If the lease is approved, pits up to six feet deep along this ridge would be dug by hand. Operating plans would be approved on a yearly basis. It is estimated that approximately five acres would be excavated over the next ten years in hand-dug trenches on the ridge-top. These would be rehabilitated. There would be no new road construction. Effects of ongoing prospecting are considered in the analysis for fisheries, forest vegetation, minerals, range, recreation, soils, and water.

Cat Spur Creek Mineral Prospecting: This area has had prospecting permits and testing for garnets in the past. Currently there is a prospecting permit waiting for Forest Service approval. Site-specific NEPA would be conducted prior to approval of the permit. This prospecting permit would specify that hand dug trenches and pits would be allowed on both sides of the tributary. Hand dug trenches would include yearly rehabilitation of the site. Mitigation and design features would be developed to minimize environmental disturbance and ensure the project complies with

the Endangered Species Act (ESA), Clean Water Act (CWA) and other regulations. Potential effects of mineral prospecting are considered in the analysis for fisheries, forest vegetation, noxious weeds, range, recreation, soils, and water.

Campground Operations: Operation and maintenance of the Cedar Creek Campground will continue. Effects of ongoing activities are considered in the analysis for fisheries, recreation, scenery, and transportation.

Outfitter Permits: One outfitter holds a special-use permits for guided deer hunting in the western portion of the analysis area. No camps are designated for the outfitter in the Hidden Cedar Project Area. Effects of ongoing outfitting are considered in the analysis for fisheries, recreation, and wildlife.

Data Gathering Activities: Field surveys to gather resource data are likely to occur within the project area within the next ten years. Types of data collection may include vegetation surveys, soil surveys, fire history sampling, cultural resource surveys, wildlife habitat surveys, snorkel and electro-fishing surveys for fisheries, noxious weed surveys, stream surveys, road maintenance surveys, and fuels surveys. Effects of ongoing data gathering are considered in the analysis for forest vegetation.

Road Maintenance: Routine road maintenance is likely to occur as needed on existing roads in the project area. The roads most likely to receive maintenance are those open to vehicle traffic. Effects of ongoing road maintenance are considered in the analysis for fisheries, forest vegetation, noxious weeds, old growth, plants at risk, soils, transportation, and water.

Fire Suppression: Consistent with current policy, efforts will be made to suppress all fires which occur within the project area. Effects of past and continuing fire suppression are considered for air quality, fire and fuels, fisheries, forest vegetation, plant species at risk, soils, water, and wildlife.

Weed Control: Spraying to control noxious weeds is proposed within the Hidden Cedar Project Area under the St. Joe Noxious Weed Control Project EIS and associated ROD, dated 10-6-99. Effects of ongoing weed control are considered in the analysis for air quality, fire and fuels, fisheries, forest vegetation, noxious weeds, old growth, plant at risk, range, and soils.

Public Activities Likely to Occur: Firewood cutting is likely to continue along open roads. Recreation use will continue including driving open roads, snowmobiling, hunting, hiking, and berry picking. Effects of ongoing recreational activities are considered in the analysis for fire and fuels, fisheries, forest vegetation, old growth, plants at risk, range, recreation, soils, transportation, water, and wildlife.

Grazing Permits: Three cattle grazing permits were authorized in the project area with the St. Maries Grazing Allotments Decision Notice (January 2005): Cat Spur Creek Allotment (26 animals / 104 animal months), Emerald Creek Allotment (41 animals / 164 animal months) and Merry Creek Allotment (27 animals / 108 animal months). The Cat Spur Allotment is entirely within the Hidden Cedar Project Area. Portions of Merry Creek and Emerald Creek Allotments overlap with the Hidden Cedar Project Area. Effects of grazing are considered in the analysis for fire and fuels, fisheries, forest vegetation, noxious weeds, soils, water, and wildlife.

St. Maries River Basin Fuels Reduction Project South of Clarkia Interface -Treatment Area 3: Fuel reduction treatment is proposed in the Wildland/Urban Interface (WUI) to the south and

west of Clarkia, Idaho. The project is designed to reduce fuel accumulations in close proximity to residences, businesses, and the community of Clarkia. The treatment area consists of approximately 27 acres of National Forest System Lands. Preliminary analysis indicates that no extraordinary circumstances exist. Potential effects from this project are considered in the analysis for fire and fuels, fisheries, soils, water, and wildlife.

Rodent Control Project: Rodent control to protect regeneration is proposed to continue on previously harvested areas within the Hidden Cedar Project Area. Effects of rodent control are considered in the analysis for fisheries, noxious weeds, range, water, and wildlife.

State and Private Past, Present, and Reasonably Foreseeable Actions

On private and state land within the analysis area, the decrease of shade-intolerant, long-lived early seral species and the increase of shade-tolerant species is expected to occur more rapidly due to the continued harvest of stands which contain western larch, white pine and areas with ponderosa pine. These harvested areas have historically had little site preparation and planting to favor long-lived, early-seral species. This historical pattern has changed in recent years, with substantial increases in site preparation and planting to assure rapid reforestation and improved species composition when regeneration harvests are applied on these other ownerships.

The management practices on lands other than National Forest System lands historically favored the removal of larger-sized, older trees where intermediate stand treatments were applied, and regeneration harvests were generally applied in mature or overmature stands of larger trees. This trend is expected to continue on these other ownerships. It is anticipated that the stand structures will continue to be predominantly in the brush/seedling/sapling and pole/small/medium size classes, and not much area would develop to the large mature/old growth size class on these state and private ownerships.

On lands other than National Forest System lands, the contribution of long-lived, early-seral, tree species is expected to be static or potentially decrease. This is the result of preferential removal of these species due to market value. During reforestation activities the planting and maintenance of long-lived, early-seral species has not been as intensive on other ownerships as on NFS lands. Effects of activities on other lands are considered in the analysis for fisheries, noxious weeds, plants at risk, transportation, soils, water, and wildlife.

Corporate Timberlands:

Road construction and road decommissioning on corporate lands owned by Potlatch Corporation are reasonably foreseeable; however, the Forest Service did not receive the details concerning the location, timing, or extent of these activities (ST-3). The Idaho Forest Practices Act and State water quality standards apply. Harvest activities (including some road construction) will most likely eventually occur on all corporate lands within the Hidden Cedar Project Area. The Forest Service does not have information about Potlatch Corporation's future plans.

State Lands:

The State of Idaho proposes:

150 acres of timber harvest using a shelterwood silvicultural system and 90 acres using a clear cut silvicultural system in T42N, R2E, Section 30

122 acres of timber harvest using a seed tree silvicultural system in T43N, R1E, Section 24

407 acres of pre-commercial thinning in T43N, R1E, Sections 13 and 24

The acres are approximate in all cases because they represent entire blocks of land and do not take into account area taken out for riparian area buffers and other features. The table below is a summary of past, present, and reasonably foreseeable activities on the state lands located within the Hidden Cedar Project Area. No new road construction is proposed except that associated with access across National Forest System lands (SA-4a).

Table 3-2 Past, Present, and Reasonably Foreseeable Future Timber Harvest on State Lands

Treatment	Past Acres	Present Acres	Reasonably Foreseeable Acres
Planting	195	0	230
Precommercial Thin	0	72	407
Overstory Removal	399	0	0
Shelterwood	1,620	566	150
Seed Tree	0	0	122
Clear Cut	25	0	90
Total	2,239	638	999

Private Lands:

Continued development of private land is expected throughout the St. Maries River bottoms. Development will include commercial timber harvest, land clearing, home construction, road construction, septic field installation, water well drilling, livestock grazing, and rip rap of migrating stream banks. According to the State of Idaho logging compliance checks, between 1999 and 2004 approximately 990 thousand board feet (MBF) of timber was removed from non-corporate private lands within the Hidden Cedar Project Area (SA-5). The harvest levels on these lands goes up and down with log prices. Because of the limited amount of non-corporate private land in the project area, it is difficult to predict whether this level of harvest will continue into the future.

Fossil Bowl Motorcycle Area: Activities occur on a weekly basis from May – October with a yearly average of 5,000 persons using the developed motorcycle track. Digging for fossils also occurs - with a yearly average of 2,400 persons participating in fossil digging. There are six parking spots also used as camping spots that in the future may be improved for weekend racers. The motorcycle course crosses Bechtel Creek twice. This will continue to be a source of sediment to the stream. Effects from activities at the fossil bowl are considered in the analysis for air quality, fisheries, recreation, and water.

Transmission line maintenance: Tall trees and shrubs will be controlled under the transmission line. Access roads to the transmission line and towers are presently controlled, mostly with gates, and will remain that way. Slash resulting from maintenance activities will normally be lopped and scattered. Herbicides are also used. If herbicides are used the BPA is required to notify the Forest Service in October before the year they will be applied. Effects of continuing transmission line maintenance are considered in the analysis for fisheries, forest vegetation, range, transportation, and wildlife.

Air Quality

Changes Between the Draft SEIS and the Final SEIS

Adjustments were made to the proposed fuels treatment acres between the Draft SEIS and the Final SEIS. Broadcast and jackpot burning acres changed for Alternatives B, C, and D, so estimates of PM_{10} and $PM_{2.5}$ emissions were updated to reflect these changes.

Regulatory Requirements

Current direction to protect and improve air quality on National Forests is provided by: 1) the Forest and Rangeland Renewable Resources Act of 1974 (16 U.S.C. 1601), as amended by the National Forest Management Act (16 U.S.C. 1602); 2) the Federal Land Management Policy Act of 1976 (43 U.S.C. 1701); and 3) the Clean Air Act amendments of 1977, 1990, 1999 (42 U.S.C. 7401-7626). The Clean Air Act (Section 110) requires states to develop State Implementation Plans (SIPS), which identify how states will attain and maintain air quality standards.

The Clean Air Act amendment of 1977 set up a process that includes designation of Class I, II, and III areas for air quality management. Airshed classifications are defined in Table 3-3. A map of the Idaho and Montana airsheds and designated restricted areas is available on the following web page: http://www.smokemu.org/map.php

Table 3-3 Airshed Classification Definitions

Class I – These area include all international areas and National Parks greater than 6,000 acres, and national wildernesses greater than 5,000 acres, that existed on August 7, 1977. This class provides the most protection to pristine lands by severely limiting the amount of additional man-made air pollution, which can be added to these areas. The nearest federally designated Class 1 areas are the Cabinet Wilderness (located near the Idaho-Montana border just south of the Canadian-USA boarder), the Selway-Bitteroot Wilderness (approximately 70 miles south of the St. Joe Ranger District), and the Flathead Tribal Reservation (60 miles northeast). The intrusion of smoke into Class I airsheds from prescribed burning operations in the Hidden Cedar Project Area would be minimal due to distance, the smoke dispersion, and the prevailing southwest to northeast air flow.
Class II – These areas include all other areas of the country. These areas may be upgraded to Class I, pending further legislation. A greater amount of additional man-made air pollution may be added to these areas, as opposed to Class I airsheds. All National Forest System lands that are not designated Class I are Class II airsheds. All of the lands in the Hidden Cedar Project Area are designated Class II.
Class III – These areas have the least amount of regulatory protection from added air pollution. To date, no Class III areas have been designated in the country.

The Clean Air Act requires the Environmental Protection Agency (EPA) to identify pollutants that have adverse effects on public health and welfare and to establish air quality standards for each pollutant. The EPA has issued National Ambient Air Quality Standards (NAAQS) for sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, lead, and particulate matter less than or equal to 10 microns (PM 10). Idaho and Washington also have standards for these pollutants. Particulate standards were originally defined in terms or Total Suspended Particulate (TSP). In recent years the EPA has changed the particulate standard to apply to small particulates less than 10 microns in

diameter (PM 10) and less than 2.5 microns in diameter (PM 2.5). This change was made because PM 10 and PM 2.5 are too small to be effectively filtered by the human respiratory system and much of it penetrates deep into the lungs. These particulates can cause respiratory problems, especially in smoke-sensitive people such as the young, elderly, or those predisposed to respiratory ailments. The Act defines NAAQS as levels of pollutant above which detrimental effects on human health and welfare could occur. An area that is in violation of NAAQS standards is called a "non-attainment area". Pollution sources in these areas are subject to tighter restrictions. Spokane, Washington; Libby, Montana; and Sandpoint, Idaho are federally designated non-attainment areas, because of an excess of PM 10. A portion of Kootenai County, Idaho (Coeur d'Alene) is a proposed non-attainment area for PM 10.

Airshed groups in North Idaho and Montana work cooperatively to "minimize or prevent" accumulation of smoke in Idaho and Montana to such a degree as necessary to meet state and federal ambient air quality standards when prescribed burning is necessary to conduct accepted forestry practices, i.e. hazard reduction, site preparation, and wildlife habitat improvement (MOA, 1090). As monitoring units, the airshed groups may limit burning, cease burning in specific areas, or cease entirely when meteorological or existing air quality conditions so warrant. Forest management burning is thereby regulated during the months of March through November (North Idaho Cooperative Smoke Management Plan). The Idaho Panhandle National Forests, including the St. Joe Ranger District, is a member of the North Idaho Memorandum of Agreement and adheres to the North Idaho Smoke Management Plan (Design Feature 1).

Burning during any time of the year is regulated by the Idaho State Department of Environmental Quality which may issue burning closures when necessary to protect air quality. The Forest Service cooperates with the State by requesting approval to burn through the Montana/Idaho Airshed Management System in compliance with the Idaho State Implementation Plan.

Analysis Area

The Hidden Cedar Project Area is in North Idaho Airsheds 12A and 12B (SAQ-2). Direct, indirect and cumulative effects are predicted for the project area.

Analysis Methods

Smoke from burning forest vegetation contains many combustion products that are regulated in accordance with the National Ambient Air Quality Standards by the Department of Environmental Quality. Particulate matter and carbon monoxide are the major emissions of concern in wood smoke because of the large quantities produced and potential health effects. Elevated particulate matter is generally the cause of violations of ambient air standards in the regional non-attainment areas (see Affected Environment below). Thus, estimated $PM_{2.5}$ (*particulate matter less than 2.5 microns in diameter*) and PM_{10} (*less than 10 microns in diameter*) particulate emission levels from the various burning activities are assessed. $PM_{2.5}$ is the portion of smoke that is most easily inhaled into the lungs as it is the smallest and constitutes the majority of visible smoke by volume. $PM_{2.5}$ particles can build up in the respiratory system, aggravate mucus glands, and lead to a variety of health problems or aggravate existing health problems. The production of $PM_{2.5}$ and PM_{10} also contributes to potential effects on visibility. Production of $PM_{2.5}$ corresponds with the amount of fuel consumed. The differences in production are due to burn types and volumes of fuel consumed.

The First Order Fire Effects Model (FOFEM) predicts the amount of $PM_{2.5}$ production from selected fuel models using specified fuel moistures, fuel loadings and expected fire behavior (Reinhart and others, 1997) (SAQ-1).

Fuel models are determined by cover type and dominant species, and the FOFEM includes typical default values for fuel components (duff, litter, live and woody down fuels etc) associated with the cover type unless altered to better represent known conditions. All proposed site preparation/hazard reduction burns for timber harvest areas were analyzed with the default typical values. The proposed prescribed burns were analyzed using expected spring moisture conditions or fall conditions, depending on the fuel reduction activity planned. Drier summer conditions were analyzed for potential wildfire smoke production.

The wildfire scenario assumes that crown fire would occur in this project area. The total potential of wildfire smoke from all activity acres is displayed for Alternative A. This represents the potential smoke production in lieu of any management. The action alternatives would decrease the potential for crown fire and would reduce the total surface fuel load available for an unplanned wildfire to burn within the proposed treatment areas.

Literature related to the application of herbicides for weed control was reviewed to provide supporting information for the cumulative effects analysis.

Affected Environment

The Clean Air Act designates Class I, II, and III areas for air quality management. There are no Class I or Class III areas within the IPNF: all areas are designated as Class II. Class II areas have good air quality with no additional air quality restrictions other than NAAQS. Class I areas are the most pristine areas which receive special visibility protection. The Cabinet Wilderness and the Flathead Indian Reservation are designated Class I areas and lie approximately 80 miles northeast and 80 miles to the north-northeast respectively. The Selway-Bitteroot Wilderness is a designated Class I area that lies approximately 70 miles south of the St. Joe Ranger District.

The EPA designates air quality sensitive sites as "non-attainment areas" because of violations of a NAAQS. Airsheds 12A and 12B have no non-attainment areas within their combined boundaries. The nearest non-attainment areas are Thompson Falls, 60 miles northeast and Pinehurst, 35 miles to the north. These areas occasionally are in violation of the PM_{10} standard during periods of winter inversions. The North Idaho and Montana Smoke Management Plans establishes "impact zones" around the non-attainment areas to include areas where emissions from prescribed burning could significantly impact the non-attainment area. There are no non-attainment areas in Airsheds 12A or 12B.

The air quality of the Hidden Cedar Project Area is good throughout the majority of the year due to good air dispersion. Human caused and natural events inside and outside the project area do occasionally affect air quality. Human influences such as stationary industrial pollution sources, woodstoves, vehicle exhaust and road dust due to a motor-cross track, state highway, and a logging yard in the area are moderate; however, regional haze occasionally occurs due to agricultural dust, agricultural field burning, and forest slash burning. Natural events such as dust storms and wildland fires have contributed to reduced air quality at times.

The wind direction in northern Idaho is generally from the southwest to west. Smoke dispersion is to the east and northeast. Long-duration, low-intensity frontal systems commonly occur from late fall to spring aiding atmospheric mixing and improving air quality.

The effects of smoke within this project area and surrounding areas are dependent upon a number of factors such as season, topography, atmospheric conditions and time of day of the burning.

Spring and early summer seasons have the best dispersion and mixing atmospheric conditions. Daytime heating lifts smoke high into the atmosphere, and seasonal instability disperses smoke down wind. Daytime heating lifts smoke out of valley inversions but can be difficult under stable, high-pressure systems. Inversions in the fall can potentially create the worst smoke problems of prescribed burning. Fall is the season monitored and regulated by the North Idaho Airshed Group. Cold winter months, however, are when the air quality can be poorest because of inversions. Prescribed burning rarely occurs during this season and is regulated by the States.

The topographic location of a prescribed fire will either aid smoke dispersion if it is high on the ridge and exposed to free air wind, or conversely increase the potential of smoke impacts if it is down in a valley bottom. Smoke produced low on the slope and not lifted up an out of the valley can become subject to nighttime downslope winds trapped by nighttime inversion and contribute to valley smoke pooling until the next daytime heating. Wildfire smoke has naturally been a part of the project area ecosystem due to the frequent fire-return intervals of the drier ponderosa pine forests to the west, local wildfires surrounding the project area, and the severe- and mixed-severity fire regimes within the project area. Wildfire smoke has been reduced in the Hidden Cedar area where fires were kept small and quickly extinguished. The project area atmosphere was often smoky and had a general haze from nearby fires as well as fires elsewhere in the Northern Rocky Mountains. Fire researchers have stated that northern Idaho is perhaps unmatched by other regions for forest conflagrations of similar magnitude, frequency, or degree of destruction (Barrett, 1982). The amount of smoke generated from wildfires has decreased since the 1930s and the advent of effective fire suppression. Prior to this time the northern Rocky Mountains probably had 1,500-2,000 fires burning annually. Before modern fire suppression these fires burned until they naturally went out, and many burned for prolonged periods of 60-120 days. Journals from early day explorers and newspaper articles from the late nineteenth century often mention the smoky conditions in western Montana and northern Idaho.

Prescribed fire from both inside and outside the project area has generated smoke during the spring and fall. Agricultural burning restrictions on the Palouse have reduced levels of regional haze.

Environmental Consequences

Table 3-4 estimates particulate emissions from each action alternative and the potential wildfire smoke production for Alternative A and E in lieu of harvest or prescribed fire (SAQ-1, Fire 2). For comparison purposes, the acres of a potential wildfire are equal to the number of acres that require pile, broadcast, jackpot, or underburning as described in Alternative B. Fuel models used for the wildfire simulation represent existing fuel conditions. The model showed that greater amounts of PM_{10} and $PM_{2.5}$ would be generated in a wildfire as would be generated by the burning proposed in Alternatives B, C, D, or F. Air quality standards are assumed to be met through the regulatory process for planned prescribed fire, however reduced visibility and air quality degradation will occur temporarily during times that burning is conducted.

Table 3-4 Estimated PM_{10} and $PM_{2.5}$ Emissions

Type Emissions	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Total Tons PM_{10}	703*	249	199	117	703*	222
Total Tons $PM_{2.5}$	599*	212	169	99	599*	189
Total Tons	1,302*	461	368	216	1,302*	411

** Simulated wildfire in proposed treatment units*

Alternatives A and E

Direct and Indirect Effects

There would be no immediate adverse effect on air quality. Current management activities in this area contribute little additional pollutants. The primary source of pollution would be from vehicle exhaust, wood smoke, and dust from traffic. Air quality would remain good. Watershed restoration activities in Alternative E would not directly contribute to a decline in air quality.

The wildfire scenario in treatment units of Alternatives A and E would not be regulated and could result in nearly twice the particulate production per acre and more severe concentrations without fuel treatment and hazard reduction through timber harvest or prescribed fire, during poor dispersion conditions. In the long term, this area is characterized by very large stand-replacing fires on average every 100-200 years.

The potential for air quality degradation and reduced visibility may increase with Alternative A and E compared with the other alternatives. Fuel accumulation from ongoing tree mortality in the analysis area would potentially increase fire intensity and severity if a wildland fire were to occur within the analysis area. Consumption of increased fuel loads and understory biomass would increase the amount of smoke emissions. These emissions may remain in the local and surrounding airsheds for a period of a few days to several weeks depending on fire size and intensity. Research has found that emissions are greater from contemporary fires, even though they have burned fewer acres annually than fires historically did. This trend occurs because consumption of fuel per unit area burned has been greater in the current period than that of the preceding historic period (USDA, USDI, 1997).

Cumulative Effects

The proposed noxious weed treatment would have short-term, localized impact on air quality because of the drift of spray particles. Generally the greatest part of this drift would settle within 25 feet of the site, although small amounts could carry greater distances (USDA Forest Service, 1993). The smell of chemicals such as 2,4-D may also persist at a spray site for several days following spraying. Human inhalation environmental exposures of 2, 4-D, would be less than occupational exposures since spray operators, involved with activities on the spray units, are more likely to be subject to spray mist than is a casual visitor. A casual forest visitor would be expected to receive an inhalation exposure of less magnitude than that of a backpack sprayer (USDA Forest Service, 1984).

All other activities (present and reasonably foreseeable) would have no measurable effect on air quality in the project area. Pollution from woodstoves, vehicle exhaust and road dust due to a motor-cross track, state highway, and a logging yard in the area are moderate.

Smoke from wildfires from outside the project area would add some accumulations to the air quality within the project area during the summer months.

Table 3-5 Approximate Fuel Treatment Acres

Treatment	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Broadcast/Jackpot Burning	0	188	188	123	0	188
Grapple Pile*	0	556	556	221	0	500
Lopping	0	119	119	38	0	144
Hand piling	0	12	19	14	0	19
Total Harvest Acres	0	1,368	1,396	603	0	1,300
Total Treatment Acres*	0	875	882	396	0	851

** Includes 65 acres of landing piles.*

Alternatives B, C, D and F

Direct and Indirect Effects

Broadcast, jackpot or under burning is done when there are no overstory trees to preserve or there are relatively few overstory trees to preserve that are predominantly fire tolerant. If very few trees remain and/or crown scorch is a minor concern, a higher-intensity surface fire with a well defined convection column can be developed. This improves combustion efficiency and vertical lifting of smoke into transport winds aloft, thereby improving dispersion.

The objective of underburning (as opposed to broadcast burning) is to reduce surface fuel loading while having a minimal impact on the remaining overstory trees. Underburning is generally carried out with a lower intensity or slower than broadcast burning. These factors may not allow good dispersion locally. Underburning is usually conducted under wetter conditions resulting in less fuel consumption than dryer conditions of broadcast burning.

Slash would be piled in landing areas and in grapple pile units. Piles burn with high efficiency and can be scheduled in late fall when unstable atmospheric conditions, associated with frontal passages, and good dispersion exist. Substantial rain and/or snow are prerequisite for fall pile burning. Fall rain and/or snow events that elevate fuels moistures (outside of piles) above the moisture of extinction provide containment of fire and consumption of fuels to the immediate vicinity of the individual piles.

The smoke emissions from prescribed burning activities could adversely affect air quality. In addition, dust may increase from road construction, maintenance, and stabilization as well as project-associated vehicular traffic. Dust is generally a very temporary and local problem. Road dust is primarily a minor local nuisance settling near the source. Dust is also generated at differing times than prescribed fire activity and not considered a significant cumulative impact.

Results of the FOFEM emissions modeling predicted annual $PM_{2.5}$ and PM_{10} standards are shown in Table 3-4. In Alternatives B, C, D, and F predicted emissions range from 216 to 461 total tons. However, accomplishment of the proposed prescribed burning would occur over a five-year time period and would be conducted only when atmospheric conditions are judged favorable. Given this five-year time frame for fuel activities, the annual expected smoke emissions would be roughly between 43 and 92 tons per year, depending upon the alternative selected. Potential annual smoke production from Alternatives B, C, D, and F would be within the 100 tons mentioned above in

regulatory requirements. The proposed burns would result in less smoke produced per acre than wildfire and reduce the wildfire risk on those acres treated. Alternatives B, C, D and F include prescribed burning that would occur in both fall (pile burning) and the spring (site preparation/hazard reduction). Broadcast and understory burning would be accomplished as much as practical in the spring and early summer with spring-like conditions (Design Feature 1.B.). Scheduling prescribed fires for spring-like conditions reduces emissions by as much as 54%, and burning slash in clean piles rather than broadcast burns reduces emissions by 25-50% (Radke and Ward 1991).

Proposed activities may temporarily affect air quality at Clarkia, Idaho and visitors using the developed and undeveloped campgrounds along the St. Maries River corridor because they would be down canyon from the project area. Effects would be from the down- canyon winds at night bringing smoke into the area until daytime lifting of the smoke occurs. Diurnal temperature inversions within the drainage may allow pooling of smoke to affect these sites. Smoke produced from prescribed fire would be dispersed generally to the northeast by prevailing winds over unpopulated forest lands. The smoke that reaching populated areas to the northeast such as Calder and Avery, Idaho and St. Regis, Montana would be lifted high in elevation and would primarily contribute to general regional haze.

Cumulative Effects

The monitoring of air pollutants during prescribed burning seasons is used to eliminate burning during times when such activities would result in violations of the State standards, including unacceptable impacts to non-attainment areas. The Forest Service voluntarily ceases burning operations to avoid violations of State standards. The monitoring of air pollutants during prescribed burning periods has not recorded any violations of the State standards to date.

Broadcast and jackpot burning of activity-created fuels would occur primarily in early spring when regional smoke production from all wildland sources has been historically low. Piles (grapple and/or hand piles) would be burned late fall early winter. Smoke and particulate matter would flow to the northeast and would dissipate rapidly during good to excellent dispersion days.

Prescribed fire from both inside and outside the project area has generated smoke during the spring and fall months. Agricultural burning restrictions on the Palouse have reduced levels of regional haze since restrictions were implemented.

Pollution from woodstoves, vehicle exhaust and road dust due to a motor-cross track, the state highway, and a logging yard in the area are moderate.

Wildfires from outside, as well as those from inside the project area generate smoke during the summer months. Wildfire smoke has been reduced in the Hidden Cedar Area where fires were kept small and quickly extinguished.

Noxious weed spraying would have a short-term, localized effect in the area of spraying. The area would be sprayed for noxious weeds according to the St. Joe Noxious Weed Control Environmental Impact Statement. The impact from spraying would be very minimal to the air quality in the project area. The proposed weed treatment would have short-term, localized impact on air quality because of the drift of spray particles. Generally the greatest part of this drift would settle within 25 feet of the site, although small amounts could carry greater distances (USDA Forest Service 1993). The

smell of chemicals such as 2,4-D may also persist at a spray site for several days following spraying. Human inhalation environmental exposures would be less than occupational exposures since spray operators, involved with activities on the spray units, are more likely to be subject to spray mist than is a casual visitor. A forest visitor should be expected to receive an inhalation exposure orders of magnitude less than that of a backpack sprayer (USDA Forest Service 1984).

Consistency with the Forest Plan and Laws

An implemented alternative would be monitored and controlled by airshed regulations to avoid violation of air quality standards, in compliance with the North Idaho Smoke Management Plan, as directed in the Idaho Panhandle Forest Plan.

Requirements of the North Idaho/Montana State Airshed Group (notification of planned burning one day in advance) allows the Idaho Department of Environmental Quality to place restrictions on or prevent burning if it determines that air quality standards can not be met, which meets the Clean Air Act.

Since the annual production of $PM_{2.5}$ and PM_{10} for the Hidden Cedar project is less than 100 tons, non conformity determination is required to meet the Clean Air Act.

<u>Finances</u>

Changes Between the Draft SEIS and the Final SEIS

Minor changes and corrections were made to the associated costs within action alternatives. These changes did not alter the comparative economic viability between action alternatives.

Changes Between the 2002 FEIS and this SEIS

Miles of system road decommissioning and storage to be done with timber sales, as shown in Table 3-9 were reduced from the original project proposal. These proposed roads would now be constructed as temporary road using timber sale funding. Temporary roads would be decommissioned after the completion of harvest activities. The actual total miles of road decommissioning has not changed substantially from the original project proposal.

In addition, a proposed fish pond construction project has been removed from economic consideration.

Introduction

The management of the Idaho Panhandle National Forests (IPNF) has the potential to affect local economies. People are an important part of the ecosystem. Use of resources and recreational visitation to the Forest generate employment and income in the surrounding communities and counties and generate revenues that are returned to the federal treasury.

This section presents concepts used to delineate an affected area and methods used to analyze the economic effects of the project, including the project feasibility, financial efficiency, and economic impacts.

Regulatory Framework

NEPA requires that consequences to the human environment be analyzed and disclosed, based on issues. NEPA does not require a monetary benefit-cost analysis. If an agency prepares an economic efficiency analysis, then one must be prepared and displayed for all alternatives [40 CFR 1502.23]. The preparation of NEPA documents is also guided by CEQ regulations for implementing NEPA [40 CFR 1500-1508].

OMB Circular A-94 promotes efficient resource use through well-informed decision-making by the federal government. It suggests agencies prepare an efficiency analysis as part of project decision-making. It prescribes present net value as the criterion for an efficiency analysis.

The development of timber sale programs and individual timber sales is guided by agency direction found in Forest Service Manual (FSM) 2430. Forest Service Handbook (FSH) 2409.18 guides the financial and, if applicable, economic efficiency analysis for timber sales.

Analysis Area

The analysis area for the efficiency analysis is the Idaho Panhandle National Forest. The analysis area for the affect on jobs and income is comprised of Boundary, Bonner, Kootenai, Benewah, and Shoshone counties in Idaho.

Affected Environment

The combination of small towns and rural settings, larger towns such as Coeur d'Alene, Idaho, and the urban area of Spokane, Washington create a diverse social environment for the geographical region around the Idaho Panhandle National Forests. Local residents pursue a wide variety of life-styles, but many share a common theme, an orientation to the outdoors and natural resources, especially within the smaller communities. This is evident in both vocational and recreational pursuits including employment in logging and milling operations, outfitter and guide businesses, hiking, hunting, fishing, camping and many other recreational activities.

Timber, tourism and agricultural industries are important to the economy of local areas. Despite the common concern for, and dependence on, natural resources within the local communities, social attitudes vary widely with respect to their management. Local residents hold a broad spectrum of perspectives and preferences ranging from complete preservation to maximum development and utilization of natural resources.

Timber management activities within the project area have the potential to impact the economic conditions of local communities and counties. To estimate the potential effect on jobs and income, a zone of influence (or impact area) was delineated. Counties were selected based on commuting data suggesting a functioning economy and where the timber is likely to be processed (log flows). Recent data on log flows from the IPNF was provided by the University of Montana's Bureau of Business and Economic Research. The zone of influence for this project is comprised of Boundary, Bonner, Kootenai, Benewah, and Shoshone Counties in Idaho.

A comprehensive socio-economic analysis and social assessment was completed during the forest plan revision process. See the social and economics section of Chapter 2 of the Analysis of the Management Situation for the revised Forest Plan (March 2003) and the Social Assessment for the Idaho Panhandle National Forests (Parker et al, 2002) for a description of the employment, income and social composition of the counties comprising the analysis area and the impact on each county from management of the Idaho Panhandle National Forest. These assessments indicate the counties within the analysis area are affected by timber management on the forest.

Analysis Methods

Project Salability

Different revenues and costs are associated with the management activities under each action alternative. To arrive at the expected stumpages a computer program "PLATA" was used to determine the potential stumpage (i.e. gross bid values) of timber harvested. The program runs the same regression equation that is contained in the Transactions Evidence (TE) appraisal model, used for appraising actual timber sales. The TE appraisal method predicts the value of timber (referred to as 'stumpage') through use of several independent variables developed from recent similar sales within Region 1 of the Forest Service (northern Idaho and western Montana). Since the information used is from actual bidding, current local market conditions, and production costs for logging and milling are reflected in the predicted rate.

Current fuel reduction, site preparation and planting costs were obtained from a fiscal year 2006 timber sale contract. Other costs such as road construction, road reconstruction, road maintenance and grass seeding were obtained using the Idaho Panhandle National Forests estimated average costs. The Finances section of the project file contains detailed documentation of cost estimates.

Costs for road construction and reconstruction, reforestation, resource protection, and other direct sale related costs are deducted from the expected stumpage value. The upgrade of existing arterial roads such as main travel and haul routes done to reduce long-term failure and erosion risks to the watersheds are included in reconstruction costs.

Financial Efficiency

Financial efficiency considers anticipated costs and revenues that are part of Forest Service monetary transactions. Present net value (PNV) is used as an indicator of financial efficiency and presents one tool to be used in conjunction with many other factors in the decision-making process. PNV combines benefits and costs that occur at different times and discounts them into an amount that is equivalent to all economic activity in a single year. A positive PNV indicates that the alternative is financially efficient.

Economic Efficiency

Economic efficiency uses the cost and revenue estimates included in the financial analysis and adds other economic costs and benefits that are not part of Forest Service monetary transactions. This analysis considers the quantifiable market and non-market benefits and costs associated with implementing each alternative. As with financial efficiency, a PNV is calculated to determine efficiency. An example of a non-market benefit or cost is an increase or decrease in recreation. A

value for recreation visitor use would be derived from local or regional studies. An economic efficiency analysis is not required (FSH 2409.18, 30), and would only be included in this analysis if it was a public issue and there are predicted changes to quantifiable non-market benefits or costs from the project.

Many of the costs and benefits associated with a project are not quantifiable. For example, the benefit to wildlife from habitat improvement or the cost associated with the degradation of visual quality from a project is not quantifiable. These costs and benefits are described qualitatively, in the individual resource sections of this document. Title 40, Code of Federal Regulations for NEPA (40 CFR 1502.23) indicates "For the purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are qualitative considerations."

Management of the forest is expected to yield positive benefits, but not necessarily financial benefits. Costs for various vegetation, recreation, wildlife, road and burning activities are based on recent experienced costs and professional estimates. Non-harvest related costs are included in the PNV analysis, but they are not included in appraised timber value.

Environmental Consequences

Project Salability

The estimation of project salability was based on a transaction evidence appraisal model, which took into account logging systems; timber species and quality; volume removed per acre; lumber market trends; costs for slash treatment; and the cost of specified roads, temporary roads and road maintenance. The predicted high bid (stumpage value) for each alternative is displayed in Table 3-8. The estimated high bid for Alternatives B, C, D and F indicate that the project is feasible. Supplemental project funding would only be required for included projects not associated with the timber harvest proposals. The revenue estimates from the salability analysis are used in the financial efficiency analysis discussed below.

Financial and Economic Efficiency

The financial efficiency analysis is specific to the timber harvest and ecosystem management activities associated with the alternatives (as directed in Forest Service Manual 2400-Timber Management and guidance found in the Forest Service Handbook 2409.18) Costs for sale preparation, sale administration, regeneration, and ecosystem restoration are included. All costs, timing, and amounts were developed by the specialists on the project's interdisciplinary team. The expected revenue for each alternative is the corresponding estimated stumpage value from the transaction evidence appraisal equation (Table 3-8). The PNV was calculated using PLATA, a program for economic analysis of long-term, on-the-ground resource management projects. A four percent discount rate is used over the five-year project lifespan.

This analysis is not intended to be a comprehensive benefit-cost or PNV analysis that incorporates a monetary expression of all known market and non-market benefits and costs that is generally used when economic efficiency is the sole or primary criterion upon which a decision is made. Many of the values associated with natural resource management are best handled apart from, but in

conjunction with, a more limited benefit-cost framework. These values are discussed throughout this document, for each resource area.

Changes to resources like fisheries and wildlife habitat have been measured using changes to habitat conditions and are not described in financial or economic terms for this project. See the fisheries and wildlife sections of this document. Recreation levels are not expected to change between action or no-action alternatives and were not included in the economic efficiency analysis.

Planning costs (NEPA) were not included in any of the alternatives since they are sunk costs at the point of alternative selection.

Table 3-8 summarizes the project feasibility and financial efficiency, including the estimated stumpage value, total revenue and PNV for each alternative. Because all costs of the project are not related to the timber sale, two PNVs have been calculated. One PNV indicates the financial efficiency of the timber sale, including all costs and revenues associated with the timber harvest and required resource protection measures. A second PNV includes all costs for each alternative, including desired ecosystem management projects that would occur in addition to the timber sale (Table 3-11).

Table 3-6 Financial Issues Indicators

Issue Indicator	Measurement Method
Present Net Value	Stumpage Value - Analysis, Implementation and Administration Costs

Table 3-7 Additional Features Used in Financial Analysis

Feature	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Net Volume (CCF)	0	26,770	27,214	14,384	0	24,922
Yarding systems used (% of volume)	N/A				N/A	
Tractor		25%	3%	5%		23%
Skyline		44%	15%	25%		41%
Helicopter		31%	82%	70%		36%
Avereage Diameter of Trees to be Harvested (inches)	NA	13.0	13.0	12.5	NA	12.9

Projects associated with timber sales in Alternatives B, C, D and F would include regeneration, site preparation, monitoring, road construction, reconstruction, decommissioning, and storage. Timber sale contracts, by law, can only be required to complete work that is associated with the harvest operations. Work such as road decommissioning can be required on a road that is used during timber harvesting, but segments of the same road that extend beyond the harvest unit can not be included in the sale contract. This work must be funded in some other manner. For economic efficiency, whenever possible harvest activities are configured to maximize road decommissioning work preformed by the timber sale purchaser. Activity costs are found in Tables 3-8 and 3-9 below.

A reduction of financial PNV in any alternative as compared to the most efficient solution is a component of the economic trade-off, or opportunity cost, of achieving that alternative. The no-action alternative would not harvest, plant trees, or take other restorative actions and, therefore,

incur no costs. As indicated earlier, many of the values associated with natural resource management are non-market benefits. These benefits should be considered in conjunction with the financial efficiency information presented here. These non-market values are discussed in the various specialists reports found in this document.

Where appropriate, the Forest Service can transfer money received from the value of the sale into "trust fund" accounts that can be used for sale area betterment. This type of funding in not guaranteed, since the value of timber and the cost of contractually required work can only be determined at the time of sale during the appraisal process.

The following table provides a summary of predicted values of contractually required work and trees to be harvested for each alternative, along with government expenses associated with the timber sale contract(s).

Table 3-8 Timber Sale Economic Efficiency by Alternative

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Total CCF	$0	26,770	27,214	14,384	0	24,922
Predicted High Bid $/CCF	$0	$111.41	$81.68	$73.77	$0	$107.03
Regeneration	$0	$98,060	$98,060	$65,510	$0	$88,290
Rx Burning	$0	$144,840	$144,840	$108,360	$0	$136,130
Noxious Weed Treatment	$0	$3,490	$1,540	$1,117	$0	$2,860
Gopher Baiting	$0	$12,280	$12,280	$8,200	$0	$11,060
TS System Road Construction	$0	$360,786	$0.00	$0.00	$0	$260,680
TS System Road Reconstruction	$0	$155,483	$155,483	$134,401	$0	$156,577
Temporary Roads	$0	$75,643	$0	$0	$0	$40,322
TS Road Decommissioning	$0	$6,180	$6,180	$23,760	$0	$25,320
Present Net Value (Timber sale)	**$0**	**$ 2,651,380**	**$1,976,100**	**$943,320**	**$0**	**$2,369,320**

Table 3-9 Miles of Road Decommissioning and Storage by Funding Source

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
TS System Road Decom and Storage	0.0	4.2	4.2	8.2	0.0	8.0
TS Temp Road Decom and Storage	0.0	9.1	0.0	0.0	0.0	6.1
Non-TS Decom and Storage	0.0	13.25	13.25	19.46	27.66	19.0

Table 3-10 Projects Funded by Other than a Timber Sale

Projects Funded Other than TS	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Road Decommissioning	$0	$27,095	$27,095	$77,510	$101,670	$72,210
Pre-commercial thin	$0	$96,890	$96,890	$96,890	$96,890	$96,890
Riparian Planting	$0	$4,250	$4,250	$4,250	$4,250	$4,250
Total Other Funding	**$0**	**127,190**	**127,190**	**175,670**	**198,900**	**170,570**

More detail on how costs were developed can be found in the economic and transportation sections of the project files.

Alternatives A and E

Direct and Indirect Effects

Since no timber harvesting would occur under these alternatives, there would be no effect on the efficiency of timber harvest proposals. Not managing the timber resource in this area may result in a loss of mature timber (of commercial size) to disease and insects, and may result in the loss of productivity over the long term. This indirectly relates to expected future revenues.

Both Alternatives A and E incurred planning costs, even if no timber cutting occurs. These alternatives would have a net loss to the government.

Costs incurred with watershed restoration (road obliteration and riparian planting), and vegetation restoration (pre-commercial thinning) development in Alternative E would have to be obtained. These funds are distributed based on priority at a national, regional and forest-wide basis. Watershed restoration work in Alternative E would create some employment opportunities locally and regionally.

Cumulative Effects

Past, present and reasonably foreseeable activities on National Forest System and other lands within the project area are not going to have an effect on the economic issues for these alternatives.

Alternatives B, C, D and F

Direct and Indirect Effects

Net stumpage calculations are made using a transaction evidence formula. The value of timber removed based on several cost variables, which can add or subtract from the timbers value. These variables include but may not be limited to the timber removal method; hauling distances; and costs for hauling timber, slash treatment, grass seeding, road construction, road reconstruction, road decommissioning, regeneration, and other environmental protection measures. Monitoring costs and overhead associated with KV and BD plans are additional factors used to calculate stumpage value.

Alternatives B, C, D and F would support or create employment opportunities for local and regional residents for timber sale, road, and watershed restoration work.

The difference between these alternatives and Alternative E is that some of the road decommissioning and storage would be completed by the timber sales, and other funding sources would not have to be used. Road decommissioning proposed in Alternative E cannot be funded with the sale of timber.

Below Cost Sales

Timber sales in Alternatives B, C, D and F appear to be positive net dollar value (see Table 3-8), which indicates that revenue generated is expected to exceed costs for contractual and other required fuel treatment, regeneration, road construction, and road decommissioning work included in the timber sale contracts. Sales associated with Alternatives B, C, D and F can be expected to sell. However, negative market swings may adversely affect the timber sales' salability.

The negative economic value shown for Alternative E is due to costs incurred for habitat restorations and improvement work without the benefit of off-setting timber sale revenue. While the PNV for Alternative E is negative, projects associated with this alternative are considered a positive benefit to the affected environment.

Table 3-11 Present Net Value - All Activities

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Present Net Value	**$0**	**$ 2,230,040**	**$ 1,556,050**	**$ 568,710**	**-$198,900**	**$1,928,600**
Cost Benefit Ratio	**0**	**6.29**	**4.70**	**2.52**	**0**	**5.36**

Table 3-12 Estimated NEPA Planning Costs

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Planning	$577,000	$577,000	$577,000	$577,000	$577,000	$577,000
NEPA supplementation Cost**	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000

** Including transportation planning, analysis and documentation (NEPA).*
*** Funding for NEPA updating in Fiscal Year 2006.*

Cumulative Effects

Many factors influence and affect the local economies, including changes to industry technologies, economic growth, international trade, and the economic diversity and dependency of the counties.

This project is not expected to add to any existing cumulative effect. However, the jobs and income associated with the action alternatives may bring the local economy some increased relative stability during the life of the project.

Fire and Fuels

Changes Between Draft SEIS and Final SEIS

Adjustments were made to the proposed fuels treatment acres between the Draft SEIS and the Final SEIS. The adjustments include substantially increased acres of lopping and decreased acres of grapple piling for all action alternatives. Reassessment of feasibility, accounts for the decrease in grapple piling acres. Acres removed from grapple piling were transferred into lopping, accounting for a portion of the increase in lopping acres. The balance of the increase in lopping acres results from a correction to an oversight in the previous EIS (ROD 2002) in which whole-tree yarding was deleted as a treatment of activity fuels generated by proposed commercial thinning and shelterwood preparation harvest units with non-groundbased yarding. Lopping was assigned as a fuel treatment in these proposed units to reduce the potential post-harvest fire intensity. Broadcast and jackpot burning acres have also increased for Alternatives B, C, and D.

Regulatory Framework

Forest Plan Direction

IPNF forest-wide management direction states "Provide efficient fire protection and fire use to help accomplish land management objectives" (USDA Forest Service, 1987).

Forest Plan fire management standards state that 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 affect fire occurrence, fire effects, fire management costs and fire caused changes in values." Management area standards define requirements for fire protection.

Prescribed fire follows Management Area standards to accomplish specific resource objectives, such as to manage wildlife habitat, meet silvicultural objectives as prescribed in the silvicultural prescription or other area objectives. Fire management is a support function integrated with and responsive to the management direction established in the Forest Plan. The use of fire is within predetermined criteria to meet specific management objectives.

Appendix F of the Forest Plan states: Fire is a natural force in the ecosystem of the IPNF. The effects of fires will be detrimental or desirable depending on when and where fires occur and nature of the fires relative to management objectives. Prolonged fire exclusion leads to changes in forest composition and distribution patterns, which can also have detrimental or desirable consequences. Ecological principals relative to fire must be integrated into fire use and protections requirements along with requirements for resource protection and efficiency. Fire use and protection standards included in each management area will:

1. Use prescribed fire where it is the most effective way to achieve ecosystem responses required for management objectives.
2. Reduce the total cost of land management by integrating fire protection and fire use in management direction.

Fire Management Plan

The Fire Management Action Plan (FMP) was developed and guided by Forest Plan standards. The standards state that fire will be used to achieve management goals according to direction in management areas. "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" (USDA Forest Service, 1987 – IPNF Forest Plan, pg II-38).

Forest Service Manual

Forest Service Manual 5130.2 states: "The objective of fire suppression is to safely suppress wildfires at a minimum cost consistent with land and resource management objectives and fire management direction as stated in fire management action plans." Minimum cost considerations usually lead to decisions of aggressive initial attack to keep fires small unless other less aggressive suppression responses to contain or confine wildfire are deemed more cost effective.

Idaho Forestry Act (IFA)-Fire Hazard Reduction Law (FHRL)

Idaho Code Title 38, Chapters 1 and 2 require harvest activities to conform to this act. This act requires the treatment of slash from timber harvest.

Analysis Area

The analysis area for the direct, indirect, and cumulative fire and fuels effects analysis is the Hidden Cedar Project Area (Vicinity Map).

Analysis Methods

The information used in this analysis is a combination of the available data, research material, literature, field reviews, and assessments. Diagnosis and analysis of stands within the Hidden Cedar Project Area were accomplished using stand summary data, basic stand data, stand component data, and stand activity data (Vegetation section).

Habitat types were used for the project planning and site-specific considerations in this environmental assessment. *Forest Habitat Types of Northern Idaho: A Second Approximation* (Cooper et al, 1991) outlines the classification and characteristics of the habitat types. *Fire Ecology of the Forest Habitat Types of Northern Idaho* (Smith and Fischer, 1997) and *Fire History on the Idaho Panhandle National Forest* (Zack and Morgan 1994) were also used to assess the current and historic fire regime of the project area.

Habitat types were grouped to facilitate landscape-level analysis and planning because of similar environments and vegetation characteristics such as productivity, disturbance regimes, stand dynamics, susceptibility to insect and disease, forest cover types, structural stages, and successional pathways. *A Biophysical Classification, Habitat Groups and Descriptions* (USDA, 1996) was used for this analysis.

Prescribed fire and fuels treatments are based on existing and desired stand conditions, the proposed harvest and regeneration activities, and the historic fire history of the analysis area. Proposed treatments were developed to facilitate the achievement of the desired condition over time. Considerations included stand composition, stand size class, stand structure, estimates of existing fuel loads, calculated predictions of potential fuel loads, and qualitative estimation of future fire effects based on the calculated potential fuel loading and literature review.

General guidelines to predicting slash fuel loadings are available through the photographic series Appraising Slash Fire Hazard in Idaho (Morgan and Shiplett, 1989) and may be utilized after timber harvest is complete to inform final determination of the necessary type and amount of fuel treatment to be implemented on a unit by unit basis.

BEHAVE, Fire Behavior Prediction and Fuel Modeling System was used to predict fire behavior given current, post harvest, and post harvest slash treatment conditions. Fire behavior characteristics such as rate of spread and fire intensity are predicted and utilized to plan and prioritize suppression efforts. Fuel models that describe current and post harvest slash conditions, developed by the National Forest Fire Laboratory (NFFL) were used as input for BEHAVE. Fuel loads are measured in tons per acre (project file (PF): SFF-1).

Affected Environment

Fire has been the primary natural disturbance process of the Hidden Cedar Project Area. Fire disturbance regularly occurred; and the plant, animal, and physical environments were adapted, modified and sustained by fire. Fire history studies indicate that periodic low-intensity and mixed-severity fires (25 to 80 years intervals) and stand-replacing fires (50 to 200 years intervals) occurred repeatedly at the timber stand scale over the past 500 years. Stand-replacement fires were typically very large, tens of thousands of acres (Quigley and Arbelbide 1997).

Successional development of Hidden Cedar Project Area habitat types produce high accumulations of natural fuel and typically overproduces biomass beyond the carrying capacity of periodic droughts. Fire was the process primarily responsible for elemental and nutrient recycling (Zack and Morgan 1994). Low-intensity fires occurred two to three times more frequently than stand-replacing fires. Low-intensity fire occurrence reduced the risk to stand-replacing fire by reducing surface fuels, ladder fuels and reducing drought sensitive tree species representation.

Current stand conditions generally have higher probability for stand-replacing fires than they did prior to active and successful fire suppression. The reduction of low- to mixed-severity fire occurrence enhances this trend (Zack and Morgan 1994).

Past and current forest management has included a strong wildfire exclusion policy, attempting to regulate a timber supply, increase human safety, and reduce resource losses. Fire suppression efforts have been largely successful to date in eliminating the frequent low-intensity fires. Larger and higher-intensity fires have been reduced by aggressive initial attack of small emerging fires. Fire control, however, cannot continue to be effective because of increasing fuels, the predictable occurrence of lightning and occasional multi-season/multi-year drought conditions. Wildfire suppression statistics of the western United States indicate that large, stand-replacement fire occurrence has greatly increased the last 20 years.

The Hidden Cedar Area has had effective fire suppression for at least the last 60 years. The St. Maries River Basin has not had a large stand-replacing fire since the 1930s. District fire records (SFF-1 and SFF-2) show that from 1950-2006 less than 30 lightning fires were suppressed on National Forest lands within the Hidden Cedar Project Area.

These fires were suppressed at small sizes: 19 fires were Class A fires (less than 1/4 acre), and nine were Class B fires (1/4 to 1 acre). Human-caused fires totaled 12 with 7 Class A and 5 Class B. All of the Class B fires were along the railroad tracks. The current large fire interval of the project area is not yet outside of the historic range of variability since the last large fire occurred approximately 60 years ago. However, continued fire suppression will result in a deviation from the historic range of variability. The effects of removing natural fire from the ecosystem since the 1930s has likely affected the ecosystem by jeopardizing long-term retention of early seral conifers and other early seral plants in a mosaic across the landscape. Fire exclusion has also most likely interrupted nutrient cycling, particularly on drier sites that have a greater probability of supporting fire spread.

Fire suppression cannot be expected to succeed at this rate indefinitely. The dynamic natural vegetation and fuel characteristics increase potential fire intensity levels in the absence of fuel reduction and stand maintenance or disturbance. As fire intensity levels increase, suppression actions become less successful.

There are approximately 33,000 acres in the project area (53% non-federal lands and 47% National Forest System lands). Currently, about 13% of the NFS lands within the project area have been treated over the last ten years. This leaves approximately 13,500 acres of federal lands that have increasing fuels because of past fire suppression. Of the 53% of non-federal lands nearly all of the acres have been logged, mainly with regeneration harvest (clearcuts, seed tree, and shelterwood) with associated fuel reduction. This has created substantial effective fuel breaks that would inhibit crown fire spread.

Table 3-13 displays the existing fire groups (Smith and Fischer, 1997) within the project area and the associated fuel models. Fuel Model 8 is the timber litter fuel model that burns with the least intensity due to minimal accumulation of dead-down fuel and a compact short needle conifer litter layer. Fuel Model 10 burns more intensely than the other timber litter models due to heavy loading of large dead-down fuels, branch wood, and twigs (Anderson 1982). Fuel Model 8 often includes a mosaic of fuel "jackpots", concentrations of dead-down fuels that will burn with greater intensity than the surrounding fuel matrix. The amount, distribution, and uniformity of "jackpots" increase as young mixed conifer stands (typically Fuel Model 8) age and progress through stem exclusion stages and seral progression. Fuel Model 10 becomes the prevalent fuel model after extensive mortality occurs within stands (Fire 6).

Table 3-13 Existing Fuel Conditions in Hidden Cedar Project Area (NFS land only)

Fire Group	Acres	Ave. Fuel Loading Tons/Acre	Fuel Model
Fire Group 2	338 Acres	1.9 to 16.1	Fuel Models 8 & 10
Fire Group 5	95 Acres	2.4 to 16.8	Fuel Models 8 & 10
Fire Group 7	557 Acres	1.3 to 14.8	Fuel Models 8 & 10
Fire Group 8	13,738 Acres	13.1 to 53.6	Fuel Models 8 & 10
Fire Group 9	338 Acres	0.7 to 38.6	Fuel Models 8 & 10
Unidentified	444 acres	unknown	unknown

Fire Behavior Factors

Fire behavior is primarily affected by three elements - fuels, weather and topography. The natural dynamic vegetation and fuel conditions of the project area eventually lead to stand-replacing fires when periodically favorable climatic conditions occur. Woody fuel accumulation through stand growth, limb pruning, mortality of short-lived seral species, and of long-lived seral species (in the absence of periodic low- to moderate-severity fire) can result in intense surface fires and crown fire initiation. Other fuel factors promoting crown fire are low foliar moisture content, continuous aerial extent of closed canopy and low live crown base height or ladder fuels. Seral stand development generally follows a pattern of increasing ladder fuels as shade-tolerant tree species grow underneath seral dominants unless low severity fire maintains a single-story structure. Ladder fuels reduce the effective ground-to-live crown base height thereby increasing the potential of surface fire to transition to crown fire. High stocking density supported during normally moderate summer moisture regimes can enhance low foliar moisture due to competition for available soil moisture during droughty summers. The vegetation characteristics that enhance crown fire potential were all somewhat ameliorated by low- to mixed-severity fire occurrence under natural conditions. Naturally occurring low- to mixed-severity fires across a substantial portion of the landscape have been eliminated by fire suppression efforts.

Environmental Consequences

Alternative A and E

Direct and Indirect Effects

Continued fire suppression in these alternatives would result in continued fuel buildup, increased fire behavior characteristics and increased fire suppression difficulties. This would increase the probability of severe wildfire and lead to further departure from historic disturbance patterns. Potentially large, severe, stand-replacing wildfire is the model of future conditions.

Road access for fire suppression would not be substantially affected relative to present levels of access.

Cumulative Effects

Alternative A and E would lead to fires with increased fire behavior, and would reduce the likelihood of successful initial attack by ground forces. Conditions that lead to crown fire would continue to get worse under Alternatives A and E and would lead to an increasing risk of large, stand-replacing fires.

Of the 13% of National Forest acres that have been treated in the past 10 years only 2% of those treatments would be effective barriers to high-intensity fire spread beyond 15 years because of continued fire suppression and subsequent increases in surface fuels under Alternatives A and E.

Activities on State and private lands such as timber harvesting, prescribed fires, cattle grazing and road construction have, in the past and would continue in the future, to directly reduced the potential for crown fire at the time and place in which they occur. This is also true of current timber sales and their associated activities on NFS lands as well as grazing and weed control. Activities associated with recreation can increase the risk of human-caused ignitions.

Alternatives B, C, D and F

Direct and Indirect Effects

Fuel modification is one way to enhance fire control efforts. Fuel modification treatments by prescribed fire, mechanical treatments, and timber harvest can reduce fuel loads and potential high-intensity burns, create fuel breaks and provide safety zones. Without fuel modification the trend toward more severe fire regimes would continue.

This ecosystem evolved with fire. Timber stand composition and structure development in absence of wildfire or vegetation management reduces stand resiliency to disturbance. Pre-settlement timber stands had a positive correlation between increased fire frequency and resiliency to fire, drought, and insect stresses. Low and mixed-severity fire events contributed to landscape-level vegetative heterogeneity and contributed to the long-term maintenance of early seral species within the landscape.

Timber harvest and wildfire potential

These alternatives include activity fuels reduction using prescribed fire, excavator piling, and hand piling and/or lopping. Fuel reduction activities usually occur within two years after harvest.

Prescribed burning would be conducted under conditions specified in a burn plan, and would follow design features (Chapter 2) and silvicultural prescriptions. Prescribed burning is intended to maximize resource benefits. Prescribed fires would be generally low-severity and moderate- to high-intensity burns for fire hazard reduction and/or site preparation for regeneration. Burning would occur when conditions are conducive to short-duration fires with little chance of escape. The result would be effective reduction of fine fuel loads resulting from harvest activities and subsequent fire hazard.

The proposed harvest and subsequent activity fuel reduction would reduce the probability and extent of stand-replacing fires within the treated stands. The proposed harvesting and fuel reduction activities would also facilitate the retention and establishment of long-lived, early-seral tree species.

Harvest activity maintains fire suppression access by contributing to maintenance of existing roads and by disrupting stand and landscape level horizontal and vertical fuel continuity. The least fire-prone sites after treatment would be those having regeneration harvests with subsequent site preparation/hazard reduction burning, and conifer regeneration. Regeneration harvests create a short-term increase (1 to 2 years) in fire hazard until the site preparation and hazard reduction burning is accomplished. Regeneration harvests in these habitat types may produce up to 30 tons/acres of fine fuel (less than 3 inches diameter). Burning generally occurs within two years of harvest. The burned harvest areas result in at least 20 years of effective change in fuel conditions, where the fine fuels may be reduced by up to 90% and larger fuels may be reduced by as much as 60% (SFF-2).

Fire behavior potential is less on treated sites than on untreated harvest areas and many unharvested/unburned areas. Regeneration harvest would create effective fuel breaks, affecting both surface fires and crown fires. Typically the overstory is substantially reduced in coverage and incapable of sustaining crown fire.

Timber harvesting on these sites reduces probable near-term accumulations of natural fuels. Harvest activities (without subsequent fuels reduction activities), as proposed in this project, would change NFFL Fuel Model 8 and/or 10 characteristics to Fuel Models 11, 12, or 13 (an increase in surface fuel loading). Subsequent fuel reduction treatments within one to two years such as piling and burning, jackpot burning, under burning, or broadcast burning would result in areas with fire behavior potential of Fuel Model 5, then Fuel Model 8 (a reduction from post-harvest fuel loading). Table 3-14 summarizes the relative differences in predicted fire behavior characteristics between Fuel Models 5, 8, and 10 under equivalent weather conditions.

Table 3-14 Fire Behavior by Fuel Model

Fuel Model	Rate of Spread (Chains/Hour)	Fireline Intensity (BTU/Feet/Sec)	Heat / Unit Area (BTU/Square Foot)
10	10	220	1,207
5	18	127	388
8	2	7	174

Direct effects on wildfire potential are analyzed in relation to the proposed harvest and hazard-reduction activities. Harvest activities may decrease or increase potential fire hazard depending on residual stand characteristics and combined pre-existing and activity-generated surface fuel loads.

Portions of harvest units where post-harvest fuel loads exceed acceptable levels may have one or more fuel reduction treatments prescribed. The analysis includes silvicultural treatments that propose site preparation/hazard reduction burning or that reduce fuels by lopping, hand piling, burning, and/or excavator piling.

Quick shrub growth and conifer regeneration reestablishes solar and wind sheltering of surface fuels and contributes high live fuel moistures, all of which reduce fire behavior potential. In the moist forest type, grass fuels, which have higher potential rates of fire spread than low shrub or litter fuels rarely dominate regeneration harvest areas (Anderson 1982).

Table 3-15 Summary of Fuels Treatment by Alternative

Fuels Treatment (Acres):	A	B	C	D	E	F
Jackpot/Broadcast Burning	0	210	260	174	0	186
Excavator Piling	0	533	312	157	0	468
Lopping	0	613	802	256	0	631
Hand piling	0	12	19	13	0	19
Total Treated	0	1,368	1,393	606	0	1,304

Research indicates that reduction of crown bulk density by pre-commercial thinning of the overstory reduces potential for active crown fire initiation and spread, especially when combined with low potential surface fire intensity (Scott, 1997). Pre-commercial thinning would occur on 324 acres in each of the action alternatives.

Underburns help maintain an open canopy and a high stand-level ground to live-crown base height by removing less fire resistant conifer species from the understory and within the overstory. Stand-replacing fires reduce crown fire potential for a period, but potential for high severity surface fire is later increased because of the high volume of dead-down fuel loading resulting from fire-related mortality (Scott, 1997).

Clearcut with reserves, irregular and group shelterwood, and shelterwood seed cuts all incorporate site preparation/hazard reduction burning and excavator piling and burning. They quickly establish effective fuel breaks within the landscape fuel complex. Not only would potential surface fire intensity be reduced on these sites by the hazard reduction burning, but also the large aerial breaks in forest canopy would result in a long-duration canopy fuel break, reducing potential crown fire spread. The landscape positions of the proposed harvests are strategically important in that they are primarily located on mid-slope south aspect positions, which is where the most extreme potential fire behavior typically occurs on wildfires.

Commercial thinning (CT) reduces potential fuel accumulation by promoting large tree growth and stand vigor, and by reducing ladder fuels associated with hemlock and true firs through preferential harvest selection of these species within the proposed treatment units. The fire resiliency of these stands would improve so long as the surface fuel hazard is not substantially increased by the harvest activities or is reduced after harvest activities are complete. CT reduces crown bulk density and can reduce potential crown fire initiation and spread when the associated potential surface fire intensity does not preclude the effects of crown bulk density reduction. Project design includes lopping, grapple piling, hand piling, broadcast burning, and/or jackpot burning to address potential increases in post-harvest surface fire intensity and/or severity (see Appendix A for type of fuels treatment associated with each unit).

Timber harvest would promote future fire use and fire suppression in the project area by affecting live and dead fuels in ways that are beneficial to fire management. The harvest openings with slash treatment would provide distinct reductions in potential fire behavior, which would provide tactical advantages in managing any kind of fire. Treated areas would act as long-term fuel breaks, providing perimeter control options for fire managers during wildland or prescribed fires. The thinning and partial cuts would increase possibilities of future prescribed fire application in these areas. Commercial thinning would pre-treat areas, mimicking low- to moderate-intensity fire effects on structure and composition and would reduce live fuel loadings to levels that are more advantageous to future stand maintenance and/or resilience to fire and other pathogens.

The proposed road decommissioning would not have a substantial effect on access for fire management activities.

Cumulative Effects

The cumulative effects of past harvest, fire suppression, and fuels reduction activities on Forest Service and other lands have been accounted for in the existing condition. The action alternatives would result in areas of effectively low surface and crown fire hazard that may act as a barrier to fire spread for fires originating down slope and/or up wind of individual treatment units within the project area or from locations outside the project area. For a listing of past, present, and reasonably foreseeable activities in the project area (i.e. grazing, timber harvest, etc.) see the beginning of Chapter 3. The action alternatives would reduce the potential for ignitions from any source to result in undesirable effects within the project area.

St. Maries River Basin (SMRB) Fuels Reduction Area 3 (South Clarkia Interface) is within the project area. Proposed activities within this project area would result in very similar effects on fuels, fire behavior, and fire effects as the proposed commercial thinning activities, including subsequent fuel reduction activities, within the Hidden Cedar Project. This project, because of it's small scale, would make a minor localized contribution to the cumulative reduction of potential large fire spread within the Hidden Cedar Project Area as a whole because of the individual project-level contribution to the landscape mosaic of vegetative structure and age class as described above.

Consistency with Forest Plan and Laws

Prescribed burning and mechanical treatment of activity fuels proposed in all action alternatives are consistent with direction in the Forest Plan and the Idaho Forest Practices Act. Continued fire suppression will be conducted in accordance with the guidance provided by the current IPNF Forest Plan and is therefore consistent with the Forest Plan for all alternatives.

Fisheries

Changes Between the Draft SEIS and the Final SEIS

Table 3-24 FSEIS shows 6.2 miles of stream functioning appropriately and 35.9 miles functioning at risk for Alternative F. The DSEIS showed 3.2 miles of stream functioning appropriately and 38.9 miles functioning at risk for Alternative F. The change is a result of proposing decommissioning and storage for Wood Creek Road 341 in Alternative F in the Final SEIS.

Under the Regulatory Framework section and the Compliance section, headings for Executive Order 11990, the Federal Water Pollution Control Act (Clean Water Act) and the Idaho Forest Practices Act were added to show the implications of these regulations on the fishery resource.

Changes Between the 2002 FEIS and this Final SEIS

- Under the Regulatory Framework section the number of IPNF Forest Plan fisheries standards which apply to this project has been changed from six to five due to the removal of the fry emergence standard from the IPNF Forest Plan. On June 2, 2005, the Forest Supervisor for the Idaho Panhandle National Forests signed a Decision Notice and Finding of No Significant Impact that amended the Forest Plan to modify or remove objectives, standards, and monitoring requirements pertaining to fry emergence success (IPNF 2005).

- Torrent sculpin is not addressed in the supplement because it has been removed from the Regional sensitive species list (SF-14).

- Road densities for the drainages of the project area have changed compared to the densities reported in the original Hidden Cedar EIS. These changes are due to several factors: road obliteration on National Forest lands, road construction on non-National Forest lands, and changes to road locations due to new information. In the original EIS Road Prescriptions A, B, C and Open were combined to determine road density, and for the supplemented EIS road density was calculated based on Road Prescriptions A, B, and Open. This change was due to additional road information which shows most of the Road Prescription C roads are in a stored condition and are hydrologically stable.

- The West Fork of the St. Maries had large woody debris added to sections of Forest Service managed lands in 2004. This project was proposed in the original Hidden Cedar EIS and the activity was approved under the Record of Decision for that document.

Regulatory Framework

Idaho Panhandle National Forests' Forest Plan: Five standards are listed in the Idaho Panhandle National Forests' Forest Plan (USFS 1987) and additional standards are described in the Inland Native Fish Strategy (USDA 1995 Inland Native Fish Strategy DN and FONSI) which are applicable to the fisheries resource.

The National Forest Management Act: The National Forest Management Act (NFMA) (1976) requires that a project or activity be consistent with the land management plan (36 CFR 219.8(e)).

NFMA requires monitoring of Management Indicator Species at the site-specific level and is addressed at 36 CFR 219.14(f).

Endangered Species Act: Section 7 of the 1973 Endangered Species Act (ESA) includes direction that federal agencies will not authorize, fund, or conduct actions that are likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitat.

Executive Order 11990: Section 1. (a} Each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

Sec. 5. In carrying out the activities described in Section I of this Order, each agency shall consider factors relevant to a proposal's effect on the survival and quality of the wetlands. Among these factors are:

> b) maintenance of natural systems, including conservation and long term productivity of existing flora and fauna, species and habitat diversity and stability, hydrologic utility, fish, wildlife, timber, and food and fiber resources; and….

Executive Order 12962: Executive Order 12962 (June 7, 1995) states objectives "to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities by: (h) evaluating the effects of Federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries and document those effects relative to the purpose of this order."

Clean Water Act: Federal Water Pollution Control Act (Clean Water Act) (33 U.S.C. 1251 et seq.) states, “Sec 101 (a) The objective of this Act is to restore and maintain the chemical, physical and biological integrity of the Nation’s waters.” The implementation of this Act is through the state of Idaho’s Water quality standards.

Idaho Forest Practices Act (IFPA) 38-1302 : “Policy of the State – purpose of the Act (1) Recognizing that federal, state and private forest lands make a vital contribution to Idaho by providing jobs, products, tax base and other social and economic benefits, by helping to maintain forest tree species, soil, air and water resources, and by providing a habitat for wildlife and aquatic life, it is the public policy of the state to encourage forest practices on these lands that maintain and enhance those benefits and resources for the people of the state of Idaho.” Rules which pertain to the IFPA, as related to fisheries, are found in IDAPA 20.02.01.030.07 (stream protection) and IDAPA 20.02.01.040.02.e.(i) (culvert installations on fish bearing streams).

Analysis Area

The primary named streams included in the analysis area are: the main stem of the St. Maries River, the West Fork of St. Maries, Bechtel, Blair, Cat Spur (and tributaries), Cedar, Christmas, Hidden,

Keeler, Long Slim, Mazie, Swede John, and Wood Creeks. The St. Maries River converges with the St. Joe River to make the St. Joe Basin.

The Hidden Cedar Project Area (32,916 acres) accounts for 11% of the St. Maries River watershed (312,500 acres); the St. Maries watershed is 28% of the St. Joe River Basin (1,128,359 acres).

The St. Joe River feeds into the southern portion of Coeur d'Alene Lake, which is also fed to the north by the Coeur d'Alene River. Coeur d'Alene Lake and its tributaries form the upper Spokane River Basin, which occurs, within the interior Columbia River Basin.

The cumulative effects area for fisheries resources is defined as the St. Maries River watershed from the confluence with Cedar Creek upstream, excluding the Middle Fork of the St. Maries River. This area was selected for fisheries resources because it contains all potential project activities and defines the largest watershed area that allows for the greatest level of resolution for determining a project's contribution to cumulative effects operating at various geographic scales. The Middle Fork was excluded because there are no proposed activities.

A discussion on the Ecosystem Context for fish relative to the Interior Columbia Basin, St. Joe Geographic Assessment Area, and the Hidden Cedar Project Area can be found in the project files, Fisheries Report.

Affected Environment

Analysis Methods

Fish Population

Fish species presence and distribution was determined based on a review of historical literature, electro-fishing surveys, snorkel surveys, spawning surveys and incidental sightings during habitat surveys (Fish 9 –11 and Fish 29 –42). Native bull trout (Salvelinus confluentus) and westslope cutthroat trout (Oncorhynchus clarki lewisi) have been selected as Management indicator species (MIS) for the fisheries analysis of this project. Rainbow trout are not native to the St. Joe River Basin (although they are stocked to supplement the fishable population) and therefore were not selected as MIS for this project. Burbot (Lota lota) and Interior Redband Trout (Oncorhynchus mykiss gairdneri) are included on the Regional sensitive species list for the Idaho Panhandle National Forests (SF-14), however these species do not naturally occur in the St. Joe Basin and are therefore not included as MIS for this project.

Current Habitat Condition

The existing conditions of the fisheries resources in the Hidden Cedar Area were established by utilizing professional interpretation of information from stream inventories conducted between 1992 and 2001, field reviews, historical records, aerial photographs, an analysis of watershed conditions, published scientific literature, contacts with IDFG and USFWS, and comprehensive knowledge of the fisheries resources in the St. Joe River Basin (Fish 9 –11 and Fish 29 –42). The District Fisheries Biologist validated aquatic habitat conditions during field reconnaissance surveys. Qualitative surveys were conducted in 2005 to determine if previous surveys continued to represent the current conditions (SF-17).

Existing conditions were evaluated for primary habitat components believed to be influencing the productive potential of the fisheries resources (*i.e.* MIS fish) within the cumulative effects area. These include water quality (*e.g.* stream temperatures), aquatic habitat quality, cover complexity, and riparian condition. Other selected features (such as substrate composition and channel stability) that can influence the status of fish habitat or fish populations in the Hidden Cedar Area were also considered.

Current Habitat Characteristics

Current habitat conditions are a result of the natural condition of a stream and the influences of past and present management activities on that stream. A description of past and present management activities and their potential influences are presented for each stream of the cumulative effects area. For each stream the District fisheries biologist and District hydrologist utilized professional judgment, combined with qualitative survey reviews, to determine the condition. Additional information is provided in Watershed, Chapter 3.

Stream Channel Conditions

Three parameters are associated with the characteristic "stream channel condition". They are: width to depth ratio, streambank condition, and floodplain connectivity. The following provides general criteria associated to each parameter (USFWS 1998).

- Width to depth ratio describes the cross-sectional shape of a stream channel. Narrow, deeper channels provide better habitat for fish.
  H = high: the channel is wide and shallow
  M = moderate
  L = low: channel is narrow and deep.
- Streambank condition describes the stability of the banks:
  G = Good: >80% of any stream reach has ≥90 % stability
  F= fair: 50-80% has ≥90% stability
  P= poor: <50% has ≥ 90% stability
- Floodplain connectivity:
  G = good: off–channel areas are frequently hydrologically linked to main channel, over-bank flows occur and maintain wetland functions, riparian vegetation and succession;
  M = moderate: reduced linkage of wetland floodplains and riparian areas to main channel, over-bank flows are reduced relative to historic frequency as evidenced by moderate degradation of wetland function and riparian vegetation/succession;
  P = poor: severe reduction of hydrologic connectivity between off-channel, wetland, floodplain area and riparian area; wetland extent drastically reduced; and riparian vegetation/succession altered significantly.

Flow/Hydrology

Flow data was estimated for the streams of the analysis area (see Water section).

Watershed Condition

- ***Sensitive landtype*** information was derived from a GIS layer based on soil surveys (Soils section).
- **Road density influence** was determined based on miles of road (road prescriptions; open, gated and barriered) by acres within the individual drainages. These road prescriptions were selected for the road density calculation because they have a potential to produce negative effects to the stream. The remaining road prescriptions, long-term storage and decommissioning, create hydrologically inert roads and reduce sediment loss and therefore are not included in the road density calculation (Switalski et al 2004, IPNF Forest Plan Monitoring Report 2004, page 94; USDA June 1996). The influence of road density to the fisheries resource was based on research conducted for the Interior Columbia Basin Ecosystem Management Project (ICBEMP) (Lee et al 1997). That research found that the "status of four non-anadromous salmonid species (which include bull trout and westslope cutthroat trout) are less likely to use moderate to highly roaded areas for spawning and rearing and if found are less likely to be at strong population levels" (Lee et al 1997 page 1347). Table 3-16 provides the ICBEMP definitions for road density ratings (Quigley et al 1996 page 67).

Table 3-16 Total Road Density Ratings

Rating	Very low	Low	Moderate	High	Extremely High
Densities	0.02-0.1 mi/mi^2	0.1-0.7 mi/mi^2	0.7 – 1.7 mi/mi^2	1.7 – 4.7 mi/mi^2	4.7 + mi/mi^2

- ***Encroaching road density*** and ***RHCA road density*** utilize the same rating system as total road density (Table 3-16).
- ***Riparian harvest*** was determined by overlaying harvest history information with riparian habitat widths. Riparian habitat widths are based on INFS categories: 300 feet for perennial fish-bearing, 150 feet perennial for nonfish-bearing, and 50 feet for intermittent.

  Good condition = riparian areas with less than 13% harvested in the last 15 years

  Moderate condition = riparian areas with between 13 and 33% harvested in the last 15 years

  Poor condition = greater than 33% of the riparian area harvested in the last 15 years (Biological Assessment: St. Joe River Basin/NF Clearwater 1998).
- ***Elevation*** was determined by use of a GIS map layer.

Water Quality

- **Stream temperature** data was collected on some streams using automated Onset temperature recorders. The criteria used for temperature are based on Idaho State criteria (Idaho DEQ 2005) and are shown in Table 3-17. A stream is considered to be temperature impaired if the temperature standard is exceeded greater than 10% of the specified time period (F-26). A stream is also considered to be temperature limited if the State of Idaho identifies temperature as a pollutant of concern and has developed a TMDL for that stream.

Table 3-17 Temperature Criteria Standards

Metric	Spring Salmonid Spawning	Bull Trout	
Dates	4/15 – 7/15	Juvenile 6/1-8/31	Spawning 9/1-10/31
Maximum Daily Maximum Temperature (MDMT)	13 °C		
Maximum Weekly (7-day Average) Maximum Temperature (MWMT)		13 °C	
Maximum Daily Average Temperature (MDAT)	9°C		9°C

- ***Sediment*** production is correlated to the number of stream crossing because a considerable amount of sediment is delivered from these locations (USDA, St. Joe River/NF Clearwater Basins BA, 1998)

  G = Good: fewer than 0.5 stream crossings per stream mile

  M = Moderate: between 0.5 and 1.0 stream crossings per stream mile

  P = Poor, if stream crossings exceeded 1.5 crossing per stream mile

  A stream is also considered to be sediment limited if the State of Idaho identifies sediment as a pollutant of concern and has developed a TMDL for that stream.

- **Chemical Contaminants / Nutrients** (USFWS 1998)

  L = low levels of chemical contamination from agricultural, industrial and other sources, no excess nutrients, no CWA 303d designated reaches

  M = moderate levels of chemical contamination from agricultural, industrial and other sources, some excess nutrients, one CWA 303d designated reach

  H= High levels of chemical contamination from agricultural, industrial and other sources, high levels of excess nutrients, more than one CWA 303d designated reach.

Habitat Access (USWFS 1998)

Culvert accessibility was evaluated based on Region 1 Passage Through Crossings Assessment (SF-19).

N = No man-made barriers present in watershed. Upstream and downstream fish passage at all flows.

P = Partial barriers: man-made barriers present in watershed do not allow upstream and/or downstream fish passage at base flows.

Y = Yes: man-made barriers do not allow upstream and/or downstream fish passage at a range of flows.

Habitat Elements

The description of the current habitat elements is based on quantitative surveys conducted in 1998, 2001 and 2002 according to procedures outlined in the Region 1 Fisheries Habitat Evaluation Handbook (FSH2609.23) or the R1/R4 methodology (Overton et al 1997), woody debris inventory, qualitative stream reviews (1996-2005), historical records, aerial photographs review, review of the

watershed report, and discussions with Idaho Department of Fish and Game (IDFG) and U.S. Fish and Wildlife Service (USFWS). All quantitative survey data, irregardless of age of data, remain valid based on recent qualitative reviews of the streams and lack of habitat altering events, with the one exception being Log Creek. A quantitative survey was conducted in Log Creek in 2004, results are discribed under the heading of Log Creek within this chapter (SF-15).

The status of the stream was determined based on a comparison of the existing condition to the reference condition. The reference condition represents the natural range of conditions. Current condition for each fish-bearing stream is assessed to determine how it is functioning. A stream is **functioning appropriately** when it maintains strong and significant native fish populations that are interconnected and promotes recovery of habitat to a status that provides self-sustaining and self-regulating populations. A watershed is **functioning at risk** when it provides for the persistence of native species but in more isolated populations and may not promote recovery of habitat without active or passive restoration efforts. A watershed is **functioning at unacceptable risk** when native species are absent from historical habitat, or are rare or being maintained at a low population level; although the habitat may maintain the species at this low persistence level, active restoration is needed to begin recovery. This is independent of the percentage of land managed by the Forest Service. Therefore, if a stream is functioning at unacceptable risk, the ability of the Forest Service to alter this determination is dependent on the amount of federally managed land in the drainage. See Table 3-20 for a summary of habitat condition for streams in the analysis area.

Limiting Factor Assessment

Potential limiting factors for aquatic ecosystems may be numerous (Everest and Sedell 1984; Orth 1987). Many discussions have been held between biologists from the USFS and Idaho Department of Fish and Game (IDFG) over the past several years concerning factors that limit fish populations in the St. Joe River Basin. The IDFG was contacted on April 6, 2000 to discuss fisheries resources in the Hidden Cedar Area. Results from field surveys support the professional consensus reached between biologists of the USFS and IDFG that stream habitat degradation and impaired water quality presently plays the most important role in population regulation by influencing carrying capacity and over-wintering survival (Sedell et al. 1988; McFadden 1969). Conferencing with the USFWS regarding bull trout has also supported these findings.

Existing Condition

Population Characteristics

Bull Trout

Bull trout population status reviews have found considerable reductions in the distribution and abundance throughout their historic range (USDA Forest Service 1996a, An Assessment of the Conservation Needs of Bull Trout; Rieman and McIntyre 1993). The primary cause for a decline of bull trout is believed to be impaired aquatic habitat conditions (Young 1995; Rieman and McIntyre 1993; Rieman and Apperson 1989).

Genetic analysis has shown bull trout populations in the St. Joe River system to be a unique stock though they are closely linked to the upper Columbia River clad - one of three major groupings of bull trout throughout the Columbia and Klamath River Drainages (Williams, unpublished). A 2005

study within Idaho suggests that "bull trout remain widely distributed and abundant in large stream networks throughout Idaho, and their abundance in general has been increasing for most areas over the past decade" (Idaho Fish and Game 2005). The IPNF Forest Plan monitoring reports (1998, 2000, 2002, 2003, and 2004) indicate that bull trout populations appear to be stable throughout most of northern Idaho (USDA Idaho Panhandle Forest Plan Monitoring and Evaluation Reports 1998, 2000, 2002 and 2003). However, in a status review of bull trout on the Idaho Panhandle National Forests, stocks from the St. Joe River system were considered to be at moderate risk of extinction (Cross 1992). Currently, bull trout are known to occupy habitat in the St. Joe River and occasionally stray up the St. Maries River during spring migration (Apperson et al. 1988). The historic range of bull trout includes the Hidden Cedar Area (Fields 1935), but they have not been detected in the project area in recent years.

Westslope Cutthroat Trout

Shepard et al 2005 concluded that "while the distribution and abundance of WCT have declined dramatically from historical levels, as a subspecies WCT are not currently at imminent risk of extinction….". Population status reviews of the westslope cutthroat trout (WCT) within the United States, determined that currently WCT occupy an estimated 59% of the historically occupied habitat and in Idaho populations occupy almost 95% of the historical range, although genetic status has not been determined by genetic testing (Shepard et al 2003 pg 17).

The Northern Region of the Forest Service lists the westslope cutthroat trout as a sensitive species (SF-14). IPNF Forest Plan monitoring reports (1998, 2000, 2002 and 2003) indicate that westslope cutthroat trout populations appear to be stable throughout most of northern Idaho.

Surveys in the Hidden Cedar Area show that westslope cutthroat trout continue to persist. Streams in the Hidden Cedar Area provide spawning and rearing habitat for migratory and resident westslope cutthroat trout, albeit at suppressed levels (survey data 1999, Averett and MacPhee 1971) (see Table 3-18).

Other Fish Species

Population surveys confirmed the presence of native shorthead sculpin (*Cottus confusus*), northern pikeminnow, and introduced brook trout in the Hidden Cedar Area. Other fish species native to the St. Joe River basin have access to fish bearing streams and may be present at various times of the year, including mountain whitefish, largescale sucker, longnose dace, and redside shiner.

Fields (1935) reported that stocking of exotic rainbow trout historically occurred in the West Fork St. Maries River during the early part of the century. Fish that are the product of cross hybridization between native cutthroat trout and exotic rainbow trout have been documented in the Hidden Cedar Area (Apperson *et al.* 1988). The Idaho Department of Fish and Game stocked catchable-size, sterile rainbow trout in the St. Maries River until 2002 (SF-16) and some of these fish may disperse to tributary streams in the area (Chip Corsi, personal communication). Native bull trout and exotic brook trout hybrids are also potentially present but have not been detected in the analysis area.

Table 3-18 Fish Distribution Based on Various Survey Methodologies

Stream Name	Survey Method[1]	Bull Trout	Westslope Cutthroat Trout	Brook Trout	Sculpin	Northern Pike Minnow (Squaw Fish)	Unidentified Species
Bechtel	E	n	**Y**	n	**Y**	**Y**	n
Blair[3]	E	n	**Y**	n	n	n	**Y**
Cat Spur[3]	E & H	n	**Y**	n	n	n	n
Cedar	H	n	**Y**	n	n	**Y**	n
Christmas	H	n	n	n	n	n	**Y**
Hidden	S & E	n	**Y**	**Y**[2]	**Y**	n	n
Keeler[3]	E	n	**Y**	**Y**	n	n	n
Kitten[3]	E& H	n	**Y**	n	n	n	n
Log	H	n	**Y**	n	n	n	n
Long Slim	S & E	n	**Y**	n	**Y**	n	n
Swede John	H	n	n	n	n	n	**Y**
WF St. Maries[4]	E	n	**Y**	**Y**	n	n	n
Wood	E	n	**Y**	**Y**	**Y**	n	n

Y indicates found, n indicates not found

[1] S = Snorkel survey, E = Electrofishing survey, H = Habitat Survey (incidental observation)

[2] Brook trout were not located in the upper survey reach.

[3]Electrofished by Idaho Department of Fish and Game (ID Fish and Game 2001).

[4]Electrofished by both US Forest Service and Idaho Department of Fish and Game

Existing Habitat Condition

The following tables and text display the issue indicators or measurable factors for each of the streams within the project area. The numbers listed in Table 3-20 were generated from GIS maps.

The information provided in the following table is the professional opinion of the District fisheries biologist and District hydrologist, based on field reviews of the streams (Fish 9 –11 and Fish 29 – 42). Kitten, Log and Long Slim Creeks are not included in the following table because no Forest Service activities are proposed in those drainages.

Table 3-19 Stream Channel Conditions

Stream Name	Width to Depth Ratio	Streambank Condition	Floodplain Connectivity
Bechtel	L-M	F-G	G
Blair	L-M	G	G
Cat Spur	M	F	M
Cedar	M	F	F
Christmas	L	F-G	G
Hidden	L-M	G	G
Keeler	L-M	G	G
Mazie / Swede John	L-M	F-G	G
WF St. Maries	M	P-F	G
Wood	L-M	G	G

The following is a summary of the information pertaining to water quality and habitat elements. Detailed information is located in the project file by watershed.

Bechtel Creek

Bechtel Creek is about 2.5 miles long. The upper 95% of the stream flows through NFS lands, the remaining (5%) at the mouth flows across private lands. The lowest reach of Bechtel Creek has erosion sources due to cattle grazing. Moving upstream the stream channel conditions improve. Banks become more stable, the size of woody debris increases. The majority of the habitat is run. This stream is considered "functioning at risk" due to cattle grazing on private lands and high road densities (Table 3-20).

Blair Creek

Blair Creek is about 4 miles long. The majority of the stream (92%) flows across non-NFS lands. The stream flows across NFS lands near the lower end of the drainage. Based on the size of the stream it is assumed that Blair Creek would provide spawning, rearing and over-wintering habitat. Blair Creek appears stable and contains plentiful amounts of woody debris. Although current conditions within the channel appear to be sufficient to maintain a native fish population, the extremely high road densities (Table 3-20), the poor rating for the number of stream crossings and a road within the riparian zone that parallels the stream in the lower end of the drainage, indicate this stream is "functioning at risk."

Cat Spur Creek

Cat Spur Creek is the largest subdrainage to the West Fork St. Maries in the project area. It is comprised of Cat Spur Creek, Log Creek, Kitten Creek, and several unnamed tributaries. Cat Spur Creek is a low gradient, meadow stream, which meanders through a well-developed floodplain for most of its length. Native westslope cutthroat trout utilize Cat Spur Creek for spawning, rearing, and over-wintering. Cat Spur Creek is identified in the Forest Plan as a high-value stream for fisheries resources.

Runs and pools dominate aquatic habitat. Although Cat Spur Creek provides important habitat for native salmonids within the watershed, the quality of the habitat is impaired. Aquatic habitat in Cat Spur Creek lacks the complexity usually associated with quality habitat. The stream has an abundance of algae which is likely the result of nutrient inputs from cattle grazing and the amount of direct sunlight reaching the stream.

Sediment input is one factor that continues to degrade the quality of aquatic habitat in Cat Spur Creek. Flood damage to roads in the Cat Spur Creek Drainage in 1996 increased sedimentation and exacerbated this process in Cat Spur Creek. The riparian conditions and activities along Cat Spur Creek are also influencing the quality of the aquatic habitat.

Riparian stands of western redcedar were cleared from the lower portion of the drainage prior to the 1930s. Cattle grazing along Cat Spur Creek perpetuates this reduction in the presence of Cedar. Channel stability is compromised in these areas resulting in bank sloughing and sediment production to the stream. The lack of trees in the riparian is also influencing stream shade and LWD recruitment. The scarcity of LWD in the stream is affecting habitat complexity. Road 361, pioneered in the 1930s, extends along the north side of Cat Spur Creek for approximately 1.6 miles

Table 3-20 Watershed Conditions and Habitat Access

Stream Name	Drainage Acres	% of Drainage NFS	% Sensitive Landtypes	Road Density[1]	Road Density Rating	Acres of Past Harvest in RHCA	% Acres in Rain-on-Snow Zone	Stream Crossings	Total Stream Miles	Stream Crossing/ Stream Mile	Physical Barriers*
Bechtel	1328	95	13	2.1	High	18	70	8	9.1	0.9	UK
Blair	1849	8	19	6.7	Extremely High	2	90	22	9.3	2.4	UK
Cat Spur	7675	47	30	4.1	High	25	95	23	20.8	1.1	UK
Cedar	2126	58	10	3.0	High	2	50	6	12.5	0.5	UK
Hidden	1677	97	16	3.4	High	51	98	31	17.2	1.8	Y
Keeler	2665	28	22	7.0	Extremely High	40	99	112	36.2	3.1	UK
Kitten	1523	22	27	6.3	Extremely High	3	95	25	8.0	3.1	UK
Log	2174	54	22	4.5	High	20	98	37	17.3	2.1	UK
Long Slim	2474	27	18	6.0	Extremely High	27	98	96	30.9	3.1	UK
Lower St. Maries	5373	34	11	5.8	Extremely High	135	99	62	30.6	2.0	UK
Mazie/ Swede John	1407	84	8	1.5	Moderate	28	85	9	11.1	0.8	Y
WF St. Maries	5245	48	7	4.1	High	93	50	58	41.1	1.4	UK
Wood	777	98	11	3.1	High	53	98	12	7.7	1.6	Y

1 Road density is based on open, gated and barriered road prescriptions

*Y = yes there are physical barriers, UK = unknown if there are physical barriers

of the five miles of stream length. This road reduces the productive potential of the riparian area, aids access to riparian areas for grazing, and contributes sediment to Cat Spur Creek. Cat Spur Creek is considered "functioning at risk" due to the impaired instream habitat conditions, high road densities (Table 3-20) and the influence of cattle grazing.

Cedar Creek

Cedar Creek is about 3.5 miles long and flows through NFS lands in the headwaters and at the confluence with the St. Maries River. Cedar Creek is a slightly entrenched, low-gradient stream with moderate sinuosity. The riparian zone historically had large trees that would have had a greater influence on fish habitat, but they were removed by logging. Currently the riparian zone is primarily alder and brush near the mouth and begins to include conifers about a half mile upstream. In-stream habitat is primarily deep runs and glides, with occasional pools formed by woody debris and meanders. Cattle and bulldozers crossing the channel have also influenced the stream. On private land, it appears heavy equipment was used to create a soil dam. Cedar Creek is considered "functioning at risk" due to the road density (Table 3-20), the effects created by cattle grazing, and the low quality of the instream habitat.

Christmas Creek

Christmas Creek is about 1.6 miles long. The middle section, 25%, of Christmas Creek flows through NFS lands. The remainder flows across mixed ownership. There is no defined channel at the confluence with the St. Maries River because the stream flow disperses among marsh habitat across the St. Maries River floodplain. There are two culverts along this stream which may be partial fish-migration barriers due to the distance between resting areas. One is at the main road crossing and the other is on a spur road. This stream is not discussed separately in the analysis of alternatives but is included in the Lower St. Maries analysis.

Hidden Creek

Hidden Creek is about 3.25 miles long and flows primarily through NFS lands, 97% of the stream length. Hidden Creek is assumed to be used for spawning, rearing and over-wintering habitat. The surveyed reach (lowest reach) of Hidden Creek has low habitat diversity and cover complexity. There are fewer numbers of pools and less large woody debris than recommended in INFS. The riparian zone is primarily open, becoming more timbered moving upstream. Road 498 parallels the stream for the majority of its length. The road is within the RHCA for approximately 2.5 miles and encroaches on the stream itself for about 0.4 miles, (based on GIS mapping). There are four road crossings and one railroad bridge on Hidden Creek. Hidden Creek is considered "functioning at risk" due to the low quality of in-stream habitat, a road within the RHCA, high road density and a poor rating for number of culverts (Table 3-20).

Keeler Creek

Keeler Creek is approximately 3.8 miles along. It flows through NFS lands at the confluence with the West Fork and in the headwaters. This comprises approximately 41% of the stream length, the remainder flows across Potlatch Corporation lands. Keeler Creek is assumed to be used for spawning, rearing and over-wintering habitat. The surveyed reach (lowest reach) of Keeler Creek has low habitat diversity and a fair amount of cover which is of poor quality. Large woody debris meets INFS guidelines. Substrate composition is primarily composed of sands, which are not

conducive to salmonid spawning. Road 765 was within the RHCA of Keeler Creek for approximately 2.62 miles, of this 0.2 miles directly encroached upon the stream channel. In 2000, this road was closed, i.e. culverts pulled; but fills still remain in place. The stream continues to pass through one culvert near the mouth: a concrete culvert, which is partially collapsed. This culvert is located on county road. Keeler Creek is considered "functioning at risk" due to the low quality of instream habitat, and the extremely high road densities (Table 3-20), with an associated high number (122) of stream crossings.

Kitten Creek

Native westslope cutthroat trout utilize Kitten Creek for spawning, rearing, and over-wintering habitat. There is a lack of quality over-wintering and rearing habitat for native salmonids which is limiting the carry capacity of Kitten Creek. Cover complexity in Kitten Creek is adequate. Riparian roads have a negative impact on Reach 2. The conditions of aquatic resources in Kitten Creek are unlikely to be influenced by any future federal actions because National Forest System land only occupies a small percentage (22%) of the sub-basin in the extreme headwater reaches. Kitten Creek is considered "functioning at risk" due to the low quality in-stream habitat, the extremely high road density, and the poor rating for number of culverts (Table 3-20)

Log Creek

Native westslope cutthroat trout use Log Creek for spawning, rearing, and over-wintering. NFS lands primarily occur in the middle and upper reaches. Surveys of the lowest reach identified low in-stream habitat diversity and poor pool development. Stream cover and cover complexity are adequate for the habitat conditions. An increase in large woody debris has occurred in Log Creek due to blowdown in recent years. Grazing influences the structure and composition of riparian vegetation along Reach 1. The substrate composition is more conducive to successful spawning toward the headwater reaches. Log Creek is considered "functioning at risk" due to the low quality of in-stream habitat, the influence of cattle grazing, the high road density, and the poor rating for number of culverts (Table 3-20).

Long Slim

Long Slim Creek is about 4.3 miles long and has National Forest System lands at its confluence with the West Fork of St. Maries and in the headwaters. Approximately 34% of the stream is on NFS lands, the remainder is Idaho State Department of Lands or Potlatch Corporation. Long Slim Creek is used by westslope cutthroat trout for spawning, rearing and over-wintering. The lower portion of Long Slim Creek, on NFS land, has dense riparian vegetation and has sand to small gravel-sized substrate. Long Slim Creek is considered "functioning at risk" due to low quality habitat, extremely high road densities, and the poor rating for number of culverts (Table 3-20).

Mazie Creek

Mazie Creek is about two miles long. The upper 56% of the stream flows through NFS lands, the remainder flows across private lands. Salmonids were observed in Mazie Creek but definitive species identification was not possible. Based on the use of other streams in the area, Mazie Creek is used assumed to be for spawning, rearing and over-wintering. Culverts under Highway 3 are low-flow migration barriers. Mazie Creek progresses from a low gradient, sandy/silty meadow-type stream in Reach 1 to a stream with sand/gravel substrate and an increasing amount of riparian

conifers in Reach 3. Instream habitat has very little diversity, a low percentage of pool habitat, and low-quality pool habitat. Mazie Creek is considered "functioning at risk" due to low quality habitat, and moderate road densities (Table 3-20).

Swede John (tributary to Mazie Creek)

Swede John Creek is about 2.7 miles long, which flows across NFS lands in the upper reaches of the stream, 73% of the stream length. The lower portion of the stream flows through private lands, 27%. Swede John is utilized by salmonids but it is uncertain as to the species. Based on the usage of other streams in the area, the size of the stream and the size of the fish observed, it is assumed that Swede John is used for spawning, and early rearing. The culvert under Highway 3 was determined to provide fish passage. Swede John is not discussed separately from Mazie Creek in the remainder of the document.

St. Maries River (Mainstem)

Approximately 8.1 miles of the St. Maries River is in the project area. It is primarily a low gradient, meadow stream that meanders through a well developed floodplain for most of its length. It provides spawning, rearing, and over-wintering habitat for native salmonids and other fish and serves as a migration corridor for non-resident fish using river tributaries. Small sections totaling about 27% of the main stem flow through NFS land. It is listed as a Water Quality Limited Water Body (303(d) list). Pollutants of concern are nutrients, habitat alternation and sediment. This section of the St Maries River is considered "functioning at unacceptable risk" due to the 303(d) listing, low quality of instream habitat, extremely high road densities, and the poor rating for the number of culverts (Table 3-20).

West Fork St. Maries River

The West Fork St. Maries River (hereafter called the West Fork) is primarily a low-gradient, meadow stream which meanders through a well-developed floodplain for most of its length. The West Fork has been listed as a Water Quality Limited Water Body (303(d) list). The pollutants of concern are temperature and sediment. The West Fork provides spawning, rearing, and over-wintering habitat for native salmonids (primarily westslope cutthroat trout) and other fish species. This stream also serves as a migration corridor for non-resident fish that utilize river tributaries. Only small sections totaling about 21% of the West Fork flow through National Forest land. The remainder flows through commercial timber company lands, state lands and private ownership. Although the West Fork provides important habitat for native salmonids, the quality of the habitat is impaired. Aquatic habitat lacks the complexity usually associated with quality habitat. Human activity has impacted riparian areas and negatively impacted in-stream habitat.

In 2004 large woody debris was added to a section of stream located on National Forest lands to increase diversity and quality of habitat. Riparian planting of conifers and willow were also accomplished in this section. Although these project improved the quality of instream habitat, overall the West Fork is still considered to be "functioning at unacceptable risk" due to the 303(d) listing, low quality habitat, high road densities, and impacts to the riparian zone.

Wood Creek

Wood Creek is about three miles long and flows primarily through NFS lands, 98%, with only a small portion on Potlatch Corporation and Idaho State lands near the mouth. Wood Creek is

assumed to be providing spawning, rearing, and over-winter habitat. In-stream habitat is good, although pool development is low. Riparian conditions are currently in a less desirable condition due to human activity. The culvert under Highway 3 is not a migration barrier, but the culvert under Road 341 is a low-flow migration barrier due to a vertical jump. Upstream of Highway 3 the channel continues to be an E channel type. The riparian zone is primarily grasses and forbs. Road 341 parallels the channel for the length of the road. Approximately 90% of the road is within 100 feet of the channel and approximately 20% is within 25 feet of the channel. Wood Creek is considered "functioning at risk" due to the road within the RHCA, the high road density, and the poor rating for the number of culverts (Table 3-20).

Summary

Based on the information provided in Table 3-19 and Table 3-20, as well as the descriptions provided for each individual stream, a condition for each stream was determined (Table 3-21). The definition for the categories in Table 3-21 are described under the section titled Analysis Method, Current Habitat Condition. Stream miles are based on GIS mapping.

Table 3-21 Miles of Stream by Habitat Condition

Stream Name	Functioning	Functioning at Risk	Functioning at Unacceptable Risk
Bechtel		2.5	
Blair		4	
Cat Spur		5	
Cedar		3.5	
Christmas		1.6	
Hidden		3.2	
Keeler		3.8	
Kitten		3	
Log		3.5	
Long Slim		4.3	
Lower St. Maries			8.1
Mazie		2	
Swede John		2.7	
WF St. Maries			9.5
Wood		3	
Total project area length		**42.1**	**17.6**

Environmental Consequences

Analysis Methodology

Past activity is described under "Affected Environment" above. These past activities contribute to the current condition of the area. Future foreseeable actions utilized in this analysis are listed in the beginning of Chapter 3.

The effects analysis focuses on the anticipated effects (by alternative) on the issues derived from the identification of the limiting factors (Table 3-22). Based on the fact that low carrying capacity and low over-wintering survival (improperly functioning habitats) are both limiting fish production in the Hidden Cedar Area, the issue is: How many miles of properly functioning fish habitat are there in the project area? The issue indicators are those identified in the bull trout consultation matrix developed by the U.S. Fish and Wildlife Service, and have variable influences on the issue and the limiting factors.

Table 3-22 Issue Indicators of Influences on Limiting Factors for Fish

Issue Indicator	Measurement Method
Population Characteristics	Population diversity, isolation, persistence (see Table 3-18)
Watershed Condition	Road density, riparian harvest, activity on sensitive landtypes, and activity within the ROS elevation (see Table 3-20)
Water Quality	Temperature, Sediment, Chemical Contaminants/nutrients (see drainage descriptions)
Habitat Access	Physical barriers (see Table 3-20)
Habitat Elements	Substrate embeddedness, large woody debris, pool frequency, large pools, off channel habitat, refugia (see drainage descriptions)
Stream channel conditions	Width to depth ratio, streambank condition, floodplain connectivity (see Table 3-19)
Flow/hydrology	Change in Peak/base flows

For example, over-wintering habitat is influenced by stream channel stability. A stream is described as stable if its cross-sectional geometry remains relatively constant over some time scale (Gordon et al 1992). Bisson and Sedell (1982) reported that where stream channels had become destabilized, riffles elongated and in many cases extended through former pool locations resulting in a loss of pool volume and effectiveness of large, stable debris as cover. They suggested that declines in older fish might have resulted due to their dependence upon deeper water habitat.

Over-wintering habitat is also influenced by the condition of the riparian zone. Large woody debris is a critical element for aquatic habitat diversity and complexity (Reeves et al. 1993). Over-wintering habitat (pools) is often created by large woody debris, which also provides cover and adds complexity to habitats; this increases habitat suitability. Activity in riparian areas influence the potential to recruit large woody debris to streams (Sedell et al. 1988). By altering the recruitment potential for large woody debris, riparian activity can alter the composition, diversity, and structural complexity of aquatic habitat (Bisson et al. 1987, Hicks 1990, Bilby and Ward 1991). Riparian conditions are considered during the analysis of effects on the fishery of the project area.

Other factors frequently discussed for streams are not analyzed for this project because they would not be influenced by the implementation of an alternative, are not the primary limiting factors for fish production, or can be correlated to the determination of effects for other factors, which are analyzed. The latter is true for the effects analysis of recreational fishing (both economics and experience). The viability of fish populations can be negatively affected by aquatic habitat degradation (Bisson and Sedell 1982). A decline in the fish population reduces the catch rate for

recreational anglers. This relationship provides the rationale, which allows a cumulative analysis of effects on the aquatic habitat to determine the potential for effects on the recreational fishing industry.

Geographic Information System (GIS) maps and associated spreadsheets were utilized to calculate road and harvest information for individual drainages (SF 1- 12)

Summary of Alternative Effects

Tables 3-22 and 3-23 provide summaries of the Forest Service contribution to cumulative effects for the proposed Hidden Cedar Project and the overall (all ownerships) cumulative effects. Table 3-23 displays the change to current condition from proposed activities by drainage by alternative. Table 3-21 gives the status of each stream in miles. It demonstrates the changes to the indicator "miles of properly functioning fish habitat" based on activities proposed.

Table 3-23 Trend of Fishery Condition

Stream	Current Condition	Hidden Cedar Project / Cumulative	Alternative					
			A	B	C	D	E	F
Bechtel	FAR	Hidden Cedar EIS	↔	↔	↔	↔	↔	↔
		Cumulative	↔	↔	↔	↔	↔	↔
Blair	FAR	Hidden Cedar EIS	↔	↔	↔	↔	↔	↔
		Cumulative	↔	↔	↔	↔	↔	↔
Cat Spur	FAR	Hidden Cedar EIS	↔	↔	↔	↔	↔	↔
		Cumulative	↔	↔	↔	↔	↔	↔
Cedar	FAR	Hidden Cedar EIS	↔	↔	↔	↔	↑	↔
		Cumulative	↔	↔	↔	↔	↔	↔
Hidden	FAR	Hidden Cedar EIS	↔	↔	↔	↑	↑	↑
		Cumulative	↔	↔	↔	↑	↑	↑
Keeler	FAR	Hidden Cedar EIS	↔	↔	↑	↑	↑	↑
		Cumulative	↔	↔	↔	↔	↔	↔
Kitten	FAR	Hidden Cedar EIS	↔	↔	↔	↔	↔	↔
		Cumulative	↔	↔	↔	↔	↔	↔
Log	FAR	Hidden Cedar EIS	↔	↔	↔	↔	↔	↔
		Cumulative	↔	↔	↔	↔	↔	↔
Long Slim	FAR	Hidden Cedar EIS	↔	↔	↔	↔	↔	↔
		Cumulative	↔	↔	↔	↔	↔	↔
Lower St. Maries	FUAR	Hidden Cedar EIS	↔	↔	↔	↔	↔	↔
		Cumulative	↔	↔	↔	↔	↔	↔
Mazie	FAR	Hidden Cedar EIS	↔	↔	↔	↑	↑	↔
		Cumulative	↔	↔	↔	↔	↔	↔
W Fork St. Maries	FUAR	Hidden Cedar EIS	↔	↔	↔	↔	↔	↔
		Cumulative	↔	↔	↔	↔	↔	↔
Wood	FAR	Hidden Cedar EIS	↔	↔	↔	↑	↑	↑
		Cumulative	↔	↔	↔	↑	↑	↑

Symbols used are:
FAR = Functioning at Risk
FUAR = Functioning at Unacceptable Risk
↔ the current condition of the stream (good or bad) does not change
↑ changes the current condition of the stream towards the preferred condition

Table 3-24 Cumulative Status of Stream Miles by Alternative

Status	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Functioning appropriately	0	0	0	**6.2[1]**	**6.2[1]**	**6.2[1]**
Functioning at risk	42.1	42.1	42.1	**35.9[1]**	**35.9[1]**	**35.9[1]**
Functioning at unacceptable risk	17.6	17.6	17.6	17.6	17.6	17.6

[1] *These numbers show an increase in the trend towards "Functioning Appropriately" and a reduction in the amount of streams "Functioning at Risk".*

Effects Common to All Alternatives

Table 3-25 lists the current and reasonably foreseeable activities, which are common to the No-Action Alternative and the five action alternatives. This table provides a summary of the direct and indirect effects from the individual activities. A detailed description of the effects of these activities is located in the project file. These activities and their effects were taken into consideration during the cumulative effects analysis for the individual drainages.

Table 3-25 Summary of Effects of Current and Reasonably Foreseeable Actions

Status	Activity	Direct/Indirect Effects	Comments
Ongoing Federal	Noxious Weeds	No	St. Joe Noxious Weeds EIS, Oct. 1999
	Power-line clearing and maintenance	Minimal if any	Primarily associated to tree felling
	Road maintenance	Minimal	Road Maintenance Programmatic BA 2004
	Mining – Bechtel Butte	No	No flowing water near
	Outfitter and Guides	No	Regulated by State fishing regulations, Programmatic BA 2004
	Cedar Creek Campground	Minimal	BA: St. Joe River Basin/NF Clearwater 1998. p 133
Ongoing Activity on both Federal and Non-Federal	Fire Suppression	Minimal, if any	Documented in the St.Joe River/NF Clearwater Basins BA, July, 1998
	Recreational Uses	yes	Primarily due to influence of roads
	Misc. gathering of forest products	yes	Primarily due to influence of roads
	Cattle grazing (private)	yes	Due to effects displayed by current practices
	Cattle grazing (USFS permit)	Minimal effects	Grazing activity can be modified through the grazing permit if standards are not being met.
	Unregulated Mining	yes	Effects limited in scope
	Operation and maintenance of	minimal	Incidental sediment generated is not expected to affect water quality

Status	Activity	Direct/Indirect Effects	Comments
	non-FS or joint transportation systems		because effects are temporary and it is intended to prevent substantial erosion (Water Report, p. 14).
	Biotic Factors (brook trout)	Yes	Influence will not be affected by selection of an action alternative
Ongoing Non-Federal	Timber management	yes	Related to road construction, and increased water yields, etc.
	Clarkia community and related business activity	yes	Potential to increase sediment to streams and loss of riparian vegetation
Reasonably Foreseeable on Federal	Mining – Cat Spur Creek	Minimal	Activity required to meet INFS standards and guidelines, and Clean Water Act
	St. Maries Fuels Treatment Area 3	Expected minimal	INFS standards and guidelines would be followed
	Pocket Gopher Control	No direct effects due to buffers. Indirect effects possible but unlikely	Expected effects are similar to those identified in the Pocket Gopher Control Project BA, 2002

Effects Common to All Action Alternatives

The following analysis is for Alternatives B, C, D, E and F. It describes the direct and indirect effects from activities that are common to all the action alternatives.

Effects Analysis By Drainage

The following section discusses the direct, indirect and cumulative effects for each alternative by individual stream.

Bechtel Creek:

Alternative A

Direct and Indirect Effects

No Forest Service activities are proposed under this alternative.

Cumulative Effects

Electro-fishing surveys did not locate brook trout upstream of the private lands, and electro-fishing surveys were not conducted on the non FS land. The influence of brook trout on this stream is uncertain because of the lack of information through the other lands. The majority of the ongoing activities (both Forest Service and non-Forest Service) have been determined to have no effect or very minimal effect on the fishery of Bechtel Creek. The two exceptions to this are the Fossil Bowl motorcycle course and the grazing activity on private lands. The motorcycle course crosses Bechtel Creek twice. This will continue to be a source of sediment to the stream. The grazing along the

lower sections of Bechtel Creek was identified during the stream survey as a source of stream damage. Based on the continuation of these activities and the lack of any rehabilitation work, it is expected that the trend for the fisheries of Bechtel Creek is to continue in a *"Functioning at Risk"* condition.

Table 3-26 Summary of Effects Common to All Action Alternatives

Activity	Direct/Indirect	Comments
INFS - Bufferstrips	Benefit	Reduces the risk of negative impacts to streams, especially temperature increases, retains future large woody debris, reduces sediment inputs (INFS,1995).
Timber Harvest	Ranges from no effect to negative effects, especially from increased water yields, change to peak flows, etc.	Dependent on the location, prescription, area, timing and harvest method, see individual drainage descriptions.
Road Construction	Ranges from minimal short-term, negative effects to long-term, negative effects. Increases in sediment from road construction negatively affect in-stream habitat by decreasing depth and number of pools and physical rearing space, increases subsurface flow, increases channel braiding, increased fine sediment covers spawning gravels.	Dependent on the location, extent and timing of road construction, see individual drainage descriptions. Implementation of INFS guidelines would reduce risk for negative effects (INFS, 1995).
Road Reconstruction	Ranges from short-term, negative impacts with long-term, positive impacts to long-term negative impacts.	Dependent on the type of reconstruction activity, the location, and extent and timing of activity. Implementation of INFS guidelines and BMPs would reduce the risk of negative effects.
Road Storage (Prescription C)	Short-term increases in sediment create short-term, negative impacts; long-term benefits from reduced risk of road failure; and reduced continuous minor inputs of sediment	IPNF Forest Plan monitoring report 2004 page 94, Switalski et al 2004, USDA June 1996
Road Obliteration (Prescriptions D and E)	Facilitates a more natural function although short-term increases in sediment create short-term, negative impacts; long-term benefits from reduced risk of road failure; and reduced continuous minor inputs of sediment	Extent of impacts are dependent on the location of the road, the number of culverts to be removed and the rate of revegetation (Johnson 1995, Switalski et al 2004)
Access Road Requests	See road construction	See road construction
Gopher Baiting	No direct effects due to buffers. Indirect effects possible but unlikely to occur.	Gopher Baiting BA, 1998
Precommercial Thinning	No effect short term, long-term benefit from increasing the rate of growth on remaining trees.	Extent of effects is dependant on location of thinning units. Reference St. Joe River/NF Clearwater Basins BA 1998.
Riparian Planting	Long-term benefit by reestablishing coniferous riparian zone	Associated benefits of future woody debris recruitment is best from conifers and cottonwoods.

Alternatives B and C

These alternatives would implement the same amount of activity therefore the effects would be the same in both alternatives.

Direct and Indirect Effects

As described in Table 3-26 there would be no direct or indirect effects associated with the implementation of pre-commercial thinning projects. The decommissioning of 0.7 miles of road would have no short-term effects because of its distance from stream, but in the long term there would be a benefit from that land becoming productive again.

Cumulative Effects

Activities analyzed in Alternative A would also occur in these alternatives, and the effects described in that alternative are also considered within these alternatives. The Forest Service activity would have a minor positive influence on the cumulative effects to the stream due to proper road storage however this is only a small portion of the road miles under Forest Service jurisdiction. Cumulatively Bechtel Creek would continue to be in a *"Functioning at Risk"* condition due to the activity on other lands and the lack of rehabilitation work.

Alternatives D, E and F

These alternatives would implement the same amount of activity therefore the effects would be the same in any of these alternatives.

Direct and Indirect Effects

As described in Table 3-25, there would be no direct or indirect effects associated with the implementation of pre-commercial thinning projects. The decommissioning of 0.9 miles of road would have no short-term effects because of the distance between these roads and any stream, but in the long term there would be a benefit from that land becoming productive again.

Cumulative Effects

Activities that were analyzed in Alternative A would also occur if one of these alternatives is selected therefore the effects described in that alternative are also considered within these alternatives. The Forest Service activity would reduce road densities which would be a beneficial, although minor, contribution to the cumulative effect on the stream. The activity on non-NFS lands near the confluence with the West Fork of the St. Maries River would likely continue to degrade the habitat of that section of stream thus it is unknown whether fish would migrate through that section to arrive at the more secure and higher quality habitat. Based on this information cumulatively Bechtel Creek would continue to *"Function at Risk."*

<u>Blair Creek:</u>

Alternative A

Direct and Indirect Effects

No Forest Service activities are proposed under this alternative.

Cumulative Effects

Ongoing activities are discussed in Table 3-25, and the majority of these activities were determined to either create no effect or very minimal effect. The exception is the effects of timber harvest and

road construction on non-NFS lands and grazing. State, private timber industry or private landowners manage the majority of the land (92%) in the Blair Creek Drainage. Grazing is only available on a small portion of the land and would have only minimal influence on stream conditions. Timbered lands cover a large portion of the area, therefore state and private timber harvesting could have a major influence on the stream. The effect of non-federal timber management activity was described in the section titled Ongoing Non-federal Activity. This activity was determined to have a potential risk for negative impacts to the aquatic environment. Based on these factors, the current extremely high road density (6.7 mi/mi^2), and the lack of rehabilitation work, it is determined that the cumulative trend for the fishery of Blair Creek is to continue in a *"functioning at risk"* status.

Alternatives B, C and F

These alternatives propose the same activities except there would be a small amount of road construction (0.4 miles for Forest Service activity and 0.3 miles for access request) in Alternatives B and F, and no road construction for Forest Service activity in Alternative C. Because the road construction is located near the ridge, does not cross any streams and would be put into a long-term storage following use, the effects from the three alternatives would be similar.

Direct and Indirect Effects

The effects of gopher baiting were discussed in the section titled Effects Common to All Action Alternatives. There would be no influence from that activity.

The use of bufferstrips would ensure that the timber harvest would have no direct negative effects on the aquatic ecosystem (see Effects Common to All Action Alternatives). Timber harvest would be minimal (39 acres or 2% of the drainage), therefore, there would be no change in water yield, timing of flow, or water quality (see Water section).

The new road constructed for Forest Service activity would create very minimal if any effects on Blair Creek because of its location near the ridge. The new road that would be constructed if access were granted would have a very minor risk of affecting the Blair Creek fishery. The road access would be short; and there are no stream crossings, therefore the risk of increased sedimentation would be reduced as compared to a road located in a more sensitive location.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if any of these alternatives were selected therefore the effects described for that alternative are also considered within these alternatives. The granting of access across National Forest System lands makes it possible for increased timber harvest and road construction on private lands (see discussion about effects of on-going non-federal timber management activity). There would be a small amount of additional road construction on private lands; but it would not cross any streams, therefore it would also produce very minor risk of sediment increases to the stream. The activities proposed on NFS lands are not expected to create a measurable difference within the stream channel. Therefore the Forest Service activities in this drainage would not contribute negatively to the cumulative effects. Considering the above factors in combination with the continued extremely high road density (6.7 miles/mi^2), the high percentage of non-federal lands, and the lack of rehabilitation activity, cumulatively Blair Creek would be maintained in a *"Functioning at Risk"* condition.

Alternatives D and E

Because these alternatives propose similar activities in the Blair Creek Drainage they are considered together.

Direct and Indirect Effects

The effects of gopher baiting were discussed in the section titled Effects Common to All Action Alternatives. There would be no influence from that activity.

The new road that would be constructed if access were granted would have a very minor risk of affecting the Blair Creek fishery. The road access would be short; and there would be no stream crossings, therefore the risk of increased sedimentation would be reduced as compared to a road located in a more sensitive location.

No timber harvest is proposed in Alternatives D and E.

Cumulative Effects

Forest Service activity would not contribute negative effects to the cumulative condition of Blair Creek. However, considering the above factors in combination with the continued high road density (6.7 miles/mi^2), the high percentage of non-federal lands, and the lack of rehabilitation activity, cumulatively Blair Creek would be maintained in a *"Functioning at Risk"* condition.

<u>Cat Spur Creek:</u>

Alternative A

Direct and Indirect Effects

No activities are proposed on NFS lands under this alternative.

Cumulative Effects

As described in Table 3-25, ongoing activities within this drainage would either have no effect or minor effects with a few exceptions: non-FS timber harvest and road construction and grazing. The presence of brook trout would also have no effect or very minor effect.

Non-NFS lands comprise about 53% of the area (excluding named tributaries), and there would be at least 0.5 miles of new construction in the Cat Spur Drainage in association with the access request. This new road construction would not include any stream crossings. The effect of timber management on non-federal lands was determined to have a risk for negative effects. Grazing activity has been determined to have the potential for negative effects.

Currently habitat within Cat Spur Creek is impaired. This condition would not change due to the activity proposed on non-NFS lands under Alternative A. Road densities would remain high (4.1 mi/mi^2). The trend for Cat Spur Creek would continue to be *"functioning at risk."*

Alternatives B, C, D, E and F

Proposed activity in the Cat Spur Creek Drainage is the same for all action alternatives therefore the effects would be the same.

Direct and Indirect Effects

There are no culverts associated with the road construction related to the access request (0.2 on FS and 0.3 miles on non-federal). The lack of culverts would prevent any barriers to accessing potential habitat and reduce the potential for sediment introduction. The road would be located near a ridge, which should prevent sediment created on the road from reaching the stream.

Cumulative Effects

Activities associated with Alternative A would also occur if any of these alternatives were selected, therefore the effects described for that alternative are also considered within these alternatives.

Currently habitat within Cat Spur Creek is impaired. This condition would not change due to the activity proposed under these alternatives. Road densities would remain high (4.0 mi/mi^2). The Forest Service activity proposed under these alternatives would not contribute negatively to the cumulative effects in this stream due to lack of direct and indirect effects. The cumulative trend for Cat Spur Creek would continue to be *"functioning at risk."*

<u>Cedar Creek:</u>

Alternative A

Direct and Indirect Effects

No Forest Service activities are proposed under this alternative.

Cumulative Effects

The effects of ongoing activities were described in the section titled Effects Common to All Alternatives. These activities were determined to have either no effect or very minor effect, with a few notable exceptions. Exceptions are: timber management and road construction on non-federal lands and grazing which all have the potential to impact stream environments. Any change to the condition of this stream would be due to the influence of activity on non-NFS lands.

Road densities continue to be high (2.9 miles/mi^2). This, in combination with the current condition of the stream, would maintain Cedar Creek in a *"Functioning at Risk"* condition.

Alternative B and C

Alternatives B and C propose the same amount of timber harvest, road reconstruction, road prescription changes, and gopher baiting. The only difference between the two alternatives is the amount of new construction: 2.6 miles in Alternative B and none in Alternative C. There will be a temporary increase in sediment in Alternative B because of the newly constructed road but this road will be put into long-term storage following use. The road prescription will result in a similar long-term effect from the two alternatives and will result in the same road density.

Direct and Indirect Effects

The effects of the gopher baiting were discussed in the section titled Effects Common to All Action Alternatives. There would be no influence from this activity. The implementation of bufferstrips would prevent timber harvest from having a direct effect on the fishery or aquatic environment. However, the extent of the harvest (8.4% of the drainage in regeneration harvest and 16% of the

drainage in commercial thin harvest) could indirectly affect water quality and quantity. Analysis of these units determined that water yield increases would likely create no effects to the channel (Water section, Environmental Consequences).

The construction of 2.6 miles of road could cause a short-term increase in sediment (Water section). After harvest activities are completed the roads would be stored, which would reduce the long-term effects of these roads. In addition, existing roads would be converted from barriered roads to roads placed in long-term storage. This conversion may create short-term increases in sediment to the stream but in the long term would reduce the potential for sediment inputs from these roads (Switalski et al 2004).

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered within this alternative.

The Forest Service activity proposed under this alternative would not contribute a consequential effect to the cumulative effects in this stream. The ongoing activities (including activity on non-federal lands), combined with the current condition of the stream and the moderately high road densities (2.8 mi/mi^2), indicate that Cedar Creek would remain in a "*functioning at risk*" condition.

Alternative D

Direct and Indirect Effects

The effects of the gopher baiting and road reconstruction were discussed in the section titled Effects Common to All Action Alternatives. The implementation of bufferstrips would prevent timber harvest from having a direct effect on the fishery or aquatic environment. The extent of the harvest (4% of the drainage in regeneration harvest and 4% of the drainage in commercial thin harvest) could indirectly affect water quality and quantity, however analysis of these units determined that water yield increases would likely create no effects to the channel (Water section, Environmental Consequences).

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered within this alternative.

The proposed Forest Service activities should not contribute negatively to the cumulative effects of the drainage. However, based on the effects of ongoing activities (non-FS and Forest Service), the current condition of the stream, and the moderately high road densities (2.5 mi/mi^2), it is expected that Cedar Creek would continue to be in a "*functioning at risk*" condition.

Alternative E

Direct and Indirect Effects

The effects of the gopher baiting were discussed in the section titled Effects Common to All Action Alternatives. There would be no influence from this activity.

Some roads would be converted from a gated or barriered status to a long-term storage or partially obliterated status. This may create short-term increases in sediment to the stream, but in the long term would reduce the potential for sediment inputs from these roads (Switalski 2004).

Cumulative Effects

Activities analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered within this alternative.

The proposed Forest Service activities should not contribute negatively to the cumulative effects of the drainage and would have a minor benefit due to the road storage. However, based on the effects of ongoing activities (non-FS and Forest Service), the current condition of the stream, and the moderately high road densities (2.5 mi/mi^2), it is expected that the cumulative condition of Cedar Creek would continue to be in a **"***functioning at risk***"** condition.

Alternative F

Direct and Indirect Effects

The effects of the gopher baiting and road reconstruction were discussed in Table 3-26.

The implementation of bufferstrips would prevent timber harvest from having a direct effect on the fishery or aquatic habitat. Analysis of these units determined that water yield increases would likely create no effects to the channel (Water section, Environmental Consequences).

The construction of roads would cause a short-term increase in sediment during construction. These roads, however, are located near the ridge and therefore do not cross any stream channel. Both road segments would be surfaced with gravel, and after harvest activities are completed the roads would be put into long-term storage, these treatments would reduce the long-term effects of these roads.

Cumulative Effects

Activities analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered within this alternative.

The proposed Forest Service activities should not contribute negatively to the cumulative effects of the drainage. However, based on the effects of ongoing activities (non-FS and Forest Service), the current condition of the stream, and the moderately high road densities (2.5 mi/mi^2), it is expected that Cedar Creek would continue to be in a **"***functioning at risk***"** condition.

<u>Emerald Creek:</u>

Alternative B, C and F

These alternatives include 2.34 miles of road reconstruction on NFS land outside of the project area. The road is located on the other side of the ridge from the Cedar Creek Drainage, within the Emerald Creek Drainage. This road reconstruction would have no impact on the Emerald Creek Drainage because of the large size of the Emerald Creek Drainage, location of the road, and the fact that the road already exists and is being used. Because it is an existing road there should not be any removal of vegetation and should have minimal amount of soil movement outside the original road prism.

Hidden Creek:

Alternative A

Direct and Indirect Effects

No Forest Service activities are proposed under this alternative.

Cumulative Effects

The effects of ongoing activities were described in the section titled "Effects Common to all Alternatives". These activities were determined to have either no effect or for a few activities very minor effect. These activities, which could cause negative effects include: non-federal timber harvest, road construction and grazing. The presence of brook trout would also have minor effect.

There is very little non-federal land (3%) within the Hidden Creek Drainage therefore non-federal timber harvest and road construction would have little influence on the condition of the stream. Grazing is occurring and can produce negative effects. Brook trout are present, at least in the lower end of the drainage, and therefore do have an effect on the native salmonid population.

The main influences on the condition of Hidden Creek are the presence of brook trout, high road density (3.4 mi/mi^2) and the lack of rehabilitation projects. The no action alternative would therefore result in the continuation of the current condition of **"***functioning at risk***."**

Alternative B

Direct and Indirect Effects

The effects of the gopher baiting and riparian planting were discussed in the section titled Effects Common to All Action Alternatives. There would be no negative impacts from these activities, and there should be long-term benefits from the riparian planting.

The implementation of bufferstrips would prevent timber harvest from having a direct effect on the fishery or aquatic environment. The harvest is estimated to produce an average percent water yield increase of 5.9. This small increase is not expected to cause a consequential channel morphologic change (Water section), thus there would be no change to fish habitat.

The new road construction (1.35 miles) in this drainage would likely include three stream crossing. The construction of these roads could cause indirect effects to fish habitat due to the potential for short-term increases in sediment during construction and installation of the culverts. Although road construction has the potential of generating sediment, the Water section does not report any negative effects from this road construction, therefore there would be no negative effects to fish habitat. Following the use of these roads, they would be stored which would reduce the long-term effects. They are not included in the determination of road density.

Approximately 0.9 miles of road in the drainage would be converted from an open, gated or barriered status to a long-term storage status. This may create short-term increases in sediment to the stream due to the removal of three culverts, but in the long term would reduce the potential for sediment inputs from these roads. Approximately 1.6 miles of road will be converted from gated to open management prescription. Roads which are open to traffic use have a greater potential for sediment generation than those which do not receive use (Luce et al 2001). This effect is not expected to have a measurable effect on the stream as indicated by the sediment reduction calculations reported in the Water section.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered within this alternative.

The Forest Service activity would not contribute negatively to the cumulative effects within Hidden Creek. However, cumulatively the combination of high road densities, the presence of brook trout and the minor amount of cattle grazing, would maintain Hidden Creek in a **"***functioning at risk***"** condition.

Alternative C

Direct and Indirect Effects

Gopher baiting, riparian planting, and timber harvest would be the same as Alternative B and are not expected to create negative impacts. No new road construction is associated with this alternative. There would only be a minor amount of road storage, therefore the potential for sediment generation is very low and only be short term associated with the road storage.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered within this alternative.

The Forest Service activity would not contribute negatively to the cumulative effects within Hidden Creek. However, cumulatively the combination of high road densities, the presence of brook trout and the minor amount of cattle grazing, would maintain Hidden Creek in a **"***functioning at risk***"** condition.

Alternative D

Direct and Indirect Effects

The effects of the gopher baiting and riparian planting were discussed in the section titled Effects Common to All Action Alternatives. There would be no influence from these activities.

The implementation of bufferstrips would prevent timber harvest from having a direct effect on the fishery or aquatic environment. Analysis of potential indirect effects to water quality determined that the harvest would not cause a significant channel morphologic change (Water section).

There would be an increase of 1.9 miles of road in the Road Management Prescriptions D and E. These prescriptions allow for the rehabilitation of subsurface flow continuity, reestablishment of infiltration and revegetation of the site. Included in this distance is the approximately 1.25 miles of the main Hidden Creek Road (Road 498). This segment of road lies along the middle reaches of Hidden Creek and is located within the RHCA. The removal of this road segment would include the removal of approximately five culverts. The road storage and culvert removals may create short-term increases in sediment to the stream but in the long term would reduce the potential for sediment inputs from these road segments. The removal of the Hidden Creek Road would also allow the stream full use of its floodplain and eliminate road induced constrictions. The removal of one of the culverts under this road would improve fish passage and would reduce the potential for failure of this culvert which is storing a large quantity of deposition. Approximately 1.4 miles of Road 498, within the RHCA along the lower reaches of the stream, would continue to be open, and

would continue to potentially supply sediment to the system. The removal of Road 498 would isolate several roads within the Emerald Creek Drainage. This would isolate culverts which reduces the potential for maintenance.

Cumulative Effects

Activities analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered within this alternative. Road densities would remain in the high category (3 mi/mi^2), however the removal of Road 498 and the riparian planting would improve long-term conditions for the stream channel. The combination of these factors, even with the presence of brook trout and the minor amount of cattle grazing, would show an improving trend toward a **"***functioning appropriately***"** condition for Hidden Creek.

Alternative E

Direct and Indirect Effects

The effects of the gopher baiting and riparian planting were discussed in the section titled Effects Common to All Action Alternatives. There would be no influence from these activities.

There would be an increase of 1.9 miles of road in the Road Management Prescriptions D and E. These prescriptions allow for the rehabilitation of subsurface flow continuity, reestablishment of infiltration and revegetation of the site. Included in this distance is the approximately 1.2 miles of the main Hidden Creek Road (Road 498). This segment of road lies along the middle reaches of Hidden Creek and is located within the RHCA. There would continue to be approximately 1.4 miles of open road within the RHCA along the lower reaches of the stream. The removal of this road segment would include the removal of approximately five culverts. The road storage and culvert removals may create short-term increases in sediment to the stream, but in the long term it would reduce the potential for sediment inputs from these roads. The removal of the Hidden Creek Road would also allow the stream full use of its floodplain and eliminate road induced constrictions. The removal of one of the culverts under this road would improve fish passage and would reduce the potential for failure of this culvert which is storing a large quantity of deposition.

The removal of Road 498, would isolate several roads within the Emerald Creek Drainage. This would isolate culverts which reduces the potential for maintenance.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered within this alternative.

Road densities would remain in the high category (3 mi/mi^2), however the removal of Road 498 and the riparian planting would improve long term conditions for the stream channel. The combination of these factors, even with the presence of brook trout and the minor amount of cattle grazing, would show an improving trend toward a **"***functioning appropriately***"** condition for Hidden Creek.

Alternative F

Direct and Indirect Effects

The effects of the gopher baiting and riparian planting were discussed Table 3-26. There would be no negative impacts from these activities, and there should be long-term, positive impacts from the riparian planting. The implementation of INFS bufferstrips would prevent timber harvest from

having a direct effect on the fishery or aquatic environment. Modeling indicates the harvest would cause a slight increase in water yield but this is not expected to create a consequential effect on the stream channel (Water section).

Three road segments would be constructed. One segment (0.81 miles) would be a temporary road which would be decommissioned after use. It would potentially cross one headwater stream. A second segment (0.54 miles) would be put into long-term storage after use. It would cross two headwater streams. The third segment (0.6 miles) would be put in road management prescription A (gated). This road potentially would have three stream crossings. The installation of culverts would create a short-term increase in sediment. These stream crossings would not create any barriers to migration, because they would not be located on fish-bearing streams. The gated road would add to the road density for the drainage but the other two segments would not be included in the density. The new road density for the drainage would be 3.2 mi/mi^2, which is still categorized as high density. Density does not, however, take into consideration the location of the roads which can have an influence on how road density effects the stream. The gating of the new road would reduce the amount of traffic using the road and thus reduce the amount of sediment which would be transported to the streams.

There would be an increase of two miles of road in the Road Management Prescriptions D and E. These prescriptions allow for the rehabilitation of subsurface flow continuity, reestablishment of infiltration and revegetation of the site. Included in this distance is the approximately 1.2 miles of the main Hidden Creek Road (Road 498). This segment of road lies along the middle reaches of Hidden Creek and is located within the RHCA. The removal of this road segment would include the removal of approximately five culverts. The road storage and culvert removals may create short-term increases in sediment to the stream, but in the long term it would reduce the potential for sediment inputs from these roads. The removal of the Hidden Creek Road would also allow the stream full use of its floodplain and eliminate road-induced constrictions. The removal of one of the culverts under this road would improve fish passage and would reduce the potential for failure of this culvert which is storing a large quantity of deposition. There would continue to be approximately 1.4 miles of open road within the RHCA along the lower reaches of the stream. This segment would continue to potentially supply sediment to the channel.

Cumulative Effects

The Forest Service activity would not contribute negatively to the cumulative effects within Hidden Creek. Although road densities would remain in the high category (3.2 mi/mi^2), the shifting of road miles from within the riparian zone to the uplands area has a greater benefit than the number indicates. This road work along with the riparian planting would improve conditions in the long term for the stream channel. The combination of these factors, even with the presence of brook trout and the minor amount of cattle grazing, would show an improving trend toward a "*functioning appropriately*" condition for Hidden Creek.

<u>Keeler Creek:</u>

Alternative A

Direct and Indirect Effects

No activities are proposed under this alternative.

Cumulative Effects

The effects of ongoing Forest Service activities are described in Table 3-25. These activities were determined to have either no effect or very minor effects. The exceptions to this are the timber harvest and road construction activities on non-NFS lands, road decommissioned on non-NFS lands, presence of brook trout, and grazing (ongoing and future). A large percentage of this drainage (72%) is under non-federal management therefore the activity on these lands has a large influence on the condition of the stream habitat and the fishery. It is assumed that timber harvest and road construction will continue to occur on these non-FS-managed lands. Timber harvest and road construction have the potential to create negative effects, as does grazing and the presence of brook trout (see Effects Common to All Alternatives). Based on the current condition of Keeler Creek and the above information it is determined that the trend for Keeler Creek would continue in a *"functioning at risk"* condition.

Alternative B

Direct and Indirect Effects

The type and amount of timber harvest in this alternative would not affect water quality or water quantity (see Water section). The new road construction on NFS lands would be primarily put into Road Management Prescription C (1.3 miles) following use, therefore they would not add to the road density for the drainage. There would be one stream crossing likely to intercept subsurface flow, but it would be outsloped and armored rather than receiving a culvert because this road would be eliminated after use (Beach, personal communication). The construction of these roads would create a short-term increase in sediment during the construction phase, and would disrupt runoff patterns. In the long term these roads would re-vegetate and would no longer be a sediment source.

There would be an increase in properly stored roads (2.8 miles) which includes the removal of at least three culverts. This activity could cause a short-term increase in sediment during the implementation, but in the long term it would decrease the potential for sediment reaching the stream.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered within this alternative. The implementation of road closures on roads managed by the Forest Service would result in a reduction in road density (6.3 mi/mi^2) compared to the current condition (7.0 mi/mi^2), however this is still considered to be in the extremely high category. The majority of road miles remaining in the drainage are under non-Forest Service jurisdiction (1.4 miles NFS compared to 25 miles non-NFS). The Forest Service activity would not contribute negatively to the cumulative effects in Keeler Creek. The primary influences in this drainage continue to be the effects from activity on other lands and the presence of brook trout. The trend for Keeler Creek is to continue to *"function at risk."*

Alternatives C, D and F

These three alternatives have essentially the same amount of activity. The only difference involves the type of road management prescription, but in all cases the road would not be included in road density calculations because the difference in prescriptions pertains to the extent of the road decompaction.

Direct and Indirect Effects

The type and amount of commercial timber harvest and pre-commercial thins in these alternatives would not affect water quality or water quantity (see Water section). Bufferstrips would be applied, therefore there would be no direct effects.

There would be an increase in properly stored roads (2.8 miles) which could cause a short-term increase in sediment during the implementation, but in the long term it would decrease the potential for sediment reaching the stream. The implementation method for Prescription D has a greater value in the long term to the drainage than Prescription C because work would be done to facilitate return to more natural function rather than just preventing hydrologic problems from the road.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered within this alternative. Approximately 1.4 miles of road storage would occur with the timber sale and the remainder, 1.3 miles would occur by other means. The implementation of road closures would result in a reduction in road density compared to the current condition, however road densities would remain high, 6.3 mi/mi^2.

The lack of new road construction, the reduction of drivable road on NFS lands to 1.4 miles and the lack of effect from the commercial thin result in the Forest Service activity not contributing negatively to cumulative effects on the stream and benefiting in the long term. The primary influences in this drainage continue to be the effects from activity on other lands and the presence of brook trout. The trend for Keeler Creek would be to continue in the *"function at risk"* condition.

Alternative E

Direct and Indirect Effects

There would be an increase in properly stored roads (2.8 miles) which could cause a short-term increase in sediment during the implementation but in the long term it would decrease the potential for sediment reaching the stream. The implementation method for Prescription D has a greater value in the long term to the drainage than Prescription C because work is done to facilitate return to more natural function rather than just preventing hydrologic problems from the road.

Cumulative Effects

Activities analyzed in Alternative A and their effects as described for that alternative are also considered within this alternative. The implementation of road decommissioning on roads managed by the Forest Service would result in a reduction in road density compared to the current condition, however road densities would remain high, 6.3 mi/mi^2.

The lack of new road construction, the reduction of drivable road on NFS lands to 1.4 miles and the lack of effect from the commercial thin result in the Forest Service activity not contributing negatively to cumulative effects on the stream and benefiting in the long term. The primary influences in this drainage continue to be the effects from activity on other lands and the presence of brook trout. The trend for Keeler Creek is to continue to *"function at risk."*

Kitten Creek:

Alternatives A, B, C, D, E, F

No activities are proposed in the Kitten Creek Drainage under any of the alternatives, therefore it would not be altered from the current condition. No further analysis was done.

Cumulative Effects

There are no proposed activities therefore there will be no change to the existing conditions which is *"function at risk"*.

Log Creek:

Alternative A

Direct and Indirect Effects

No activity is proposed under this alternative.

Cumulative Effects

The effects of ongoing Forest Service activities are described in Table 3-25. The majority of the activities were determined to have either no effect or very minor effects. The exceptions to this are the timber harvest and road construction activities on other lands, presence of brook trout and grazing (ongoing and future). These activities have all been determined to create a risk for negative effects. There would continue to be high road densities, numerous stream crossings, and the likely presence of brook trout. The stream would continue to be in a *"functioning at risk condition."*

Alternatives B, C, D, E, F

Direct and Indirect Effects

The only Forest Service activity in this drainage is the conversion of 0.5 miles of road from prescription C to prescription D. This will provide a small benefit to the drainage.

Cumulative Effects

Activities analyzed in Alternative A and the effects described for that alternative are also considered within these alternatives.

The Idaho Department of Lands would construct 2.0 miles of road within this drainage as a result of obtaining access and building road in the West Fork Drainage. This new road would have at least four stream crossings on state lands. The combination of new road construction and the lack of road removal increases the road density for this drainage. The road density is currently high and would become even higher. The construction of this road system also indicates that further timber harvest would be occurring in the drainage on state land.

The Forest Service is not contributing to negative cumulative effects and activity would have a very minor benefit. It is expected that Log Creek habitat would remain in a *"functioning at risk"* condition because of the combination of the high road density, the likelihood of the presence of brook trout in the system, and the assumed continuation of timber harvest on other lands.

Long Slim:

Alternative A

Direct and Indirect Effects

No activity is proposed under this alternative.

Cumulative Effects

The effects of ongoing activities were described in the section titled "Effects Common to all Alternatives". The majority of the activities were determined to have either no effect or very minor effects. The exceptions to this are the timber harvest and road construction activities on other lands, presence of brook trout and grazing (ongoing and future). These factors have all been determined to create a risk for negative effects.

It is expected that Long Slim would remain in a **"***functioning at risk***"** condition because of the combination of extremely high road density, the likelihood of the presence of brook trout in the system, and the assumed continuation of timber harvest on other lands.

Alternatives B, C, D, E, F

All action alternatives have the same amount of activity occurring in the Long Slim Drainage, therefore the effects would be the same.

Direct and Indirect Effects

These alternatives propose to convert 0.7 miles (14% of Forest Service managed roads) of open road to Road Management Prescription C. This prescription provides for the proper storage of this road. It would eliminate at least two stream crossings thereby reducing the potential for increased sediment introduction to the stream, and it would slightly reduce the road density. There would continue to be approximately 4.2 miles of Forest Service managed road miles within the drainage.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if any of these alternatives were selected, therefore the effects described for that alternative are also considered within these alternatives. The Forest Service activity of putting road into long-term storage in this drainage would be beneficial in the long term, and it would also be beneficial in the short term by limiting the increase in road density resulting from road construction on other lands.

The Forest Service activity would not contribute negatively to a cumulative effect on the stream and would have a very small beneficial effect. It is expected that Long Slim would remain in a *"functioning at risk"* condition because of the combination of this high road density, the likelihood of the presence of brook trout in the system, and the assumed continuation of timber harvest on private lands.

Mazie Creek:

Alternative A

Direct and Indirect Effects

No activity is proposed under this alternative.

Cumulative Effects

The effects of ongoing activities are described in Table 3-25. These activities were determined to have either no effect or very minor effect with the exception of road construction on other lands, grazing, and the presence of brook trout. These three factors were determined to have the potential to create negative impacts. Because of the combination of moderate road density, the likelihood of the presence of brook trout in the system, and the assumed continuation of timber harvest on other lands, it is expected that this drainage would remain in a *"functioning at risk"* condition.

Alternative B

Direct and Indirect Effects

The effects from pre-commercial thinning and gopher baiting were discussed in the section titled "Effects Common to All Action Alternatives." These activities were determined to have no effect on the aquatic environment.

There would be no direct effects attributable to the proposed timber harvest due to the application of INFS buffers, (see Table 3-26). Indirect effects dealing with water and sediment yields, changes to peak flow, and timing as a result of the harvest are addressed in the Water section of this chapter. That section states that for water yield "the low predicted increases would not cause a significant channel morphologic change," therefore in-stream fish habitat would remain in its current condition.

The new road (0.8 miles) constructed on NFS lands for Forest Service activity, includes two stream crossings. This road could create short-term increases in sediment during construction, use and the storage process. In the long term the road should not continue to contribute sediment because it would be put into long-term storage. Culverts would be removed, and the road would become revegetated. The Water report does not indicate any negative impacts from this activity.

The road construction associated with the access request (0.5 miles on NFS lands and less than 0.1 miles on non-NFS lands) would be put into Road Management Prescription A. This road management prescription would eliminate public use of the road, but the road would still be a non-vegetated surface with associated culverts in place. Therefore, this access road could be source of increased sediment to the stream during construction, during use, and after use. Granting the access request would increase the road miles on NFS lands, and on other lands. Road density would increase from the existing 1.5 mi/mi^2 to 1.8 mi/mi^2. Sediment yields are expected to be reduced when considering all activity proposed in this drainage (Water section).

The roads constructed for access to non-NFS lands would most likely be used to conduct timber management. However because the majority of the land in this drainage is under Forest Service management the activity on other lands has less of an influence on the condition of the stream.

There would be a minor change of 0.2 miles from Road Management Prescription C to Prescription D. Prescription D includes the recontouring of roads. This ground disturbance could, in the short term, increase the potential for sediment increases to the channel; but in the long term this activity would benefit the aquatic habitat by increasing infiltration and productivity of the site and by allowing the site to function in a more natural manner.

The identified migration barrier on Mazie Creek would not be corrected because it is located on a road that is not administered by the Forest Service.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered for this alternative.

The proposed Forest Service activity would not create additional negative cumulative effects; however, Mazie Creek would continue to be in a "*functioning at risk*" condition due to the low-quality habitat and the migration barrier.

Alternative C

Direct and Indirect Effects

The effects from pre-commercial thinning and gopher baiting were discussed in the section titled "Effects Common to All Action Alternatives." These activities were determined to have no effect on the aquatic environment.

Direct and indirect effects related to timber harvest would be the same as Alternative B. There would be no new road construction associated with activity proposed by the Forest Service. The road construction associated with the access request (0.5 miles on NFS lands and less than 0.1 miles on non-NFS lands) would be put into Road Management Prescription A. This road management prescription would eliminate public use of the road, but the road would still be a non-vegetated surface with associated culverts in place. Therefore this access road could be source of increased sediment to the stream during construction, during use, and after use. Sediment yields are expected to be reduced when all proposed activity is considered (Water section).

The roads constructed for access to non-NFS lands would most likely be used to conduct timber management. The majority of the land in this drainage, however, is under Forest Service management; so the activity on private lands has less of an influence on the condition of the stream.

There would be a minor change of 0.2 miles from Road Management Prescription C to Prescription D. Prescription D includes the recontouring of roads. This ground disturbance could, in the short term, increase the potential for sediment increases to the channel; but in the long term this activity would benefit the aquatic habitat by increasing infiltration and productivity of the site and by allowing the site to function in a more natural manner.

The identified migration barrier on Mazie Creek would not be corrected because it is located on a road that is not administered by the Forest Service.

Cumulative Effects

Activities analyzed in Alternative A and the effects described for that alternative are also considered for this alternative. The proposed Forest Service activity would not create additional negative cumulative effects. Mazie Creek fish habitat would continue to be in a "*functioning at risk*" condition, however, due to the low-quality habitat and the migration barrier.

Alternatives D and E

These two alternatives have the same activities therefore their effects would be the same.

Direct and Indirect Effects

Pre-commercial thinning and gopher baiting are the only silvicultural activities proposed in these alternatives. The effects from these activities were discussed in the section titled "Effects Common

to All Action Alternatives." These activities were determined to have no effect on the aquatic environment.

The road construction associated with the access request (0.5 miles on NFS lands and less than 0.1 miles on non-NFS lands) would be put into Road Management Prescription A (gated). This road management prescription would limit public use of the road; but the road would still be a non-vegetated surface with associated culverts in place, therefore this access road could be source of increased sediment to the stream during construction, during use, and after use. Sediment yields are expected to be reduced when all proposed activity is considered (Water section).

The roads constructed for access to non-NFS lands would most likely be used to conduct timber management. The majority of the land in this drainage is under Forest Service management; however, so the activity on other lands would have less of an influence on the condition of the stream.

There would be a change of 2.2 miles from Road Management Prescription C to Prescription D. Prescription D includes the recontouring of the road prism. This ground disturbance could, in the short term, increase the potential for sediment increases to the channel; but in the long term this activity would benefit the aquatic habitat by increasing infiltration and productivity of the site and by allowing the site to function in a more natural manner.

The identified migration barrier on Mazie Creek would not be corrected because it is located on a road that is not administered by the Forest Service.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if these alternatives were selected, therefore the effects described for that alternative are also considered for these alternatives. The proposed Forest Service activity would not create additional negative cumulative effects and would benefit from the road storage projects. Mazie Creek fish habitat would continue to be in a "*functioning at risk*" condition, however, due to the low-quality habitat and the migration barrier.

Alternative F

Direct and Indirect Effects

The effects from pre-commercial thinning and gopher baiting were discussed in the section titled "Effects Common to All Action Alternatives." These activities were determined to have no effect on the aquatic environment.

There would be no direct effects attributable to the proposed timber harvest due to the application of INFS buffers, (see Table 3-26). Indirect effects dealing with water and sediment yields, changes to peak flow, and timing as a result of the harvest are addressed in the Water Resources section of this chapter. It states that for water yield "the low predicted increases would not cause a significant channel morphologic change," therefore instream fish habitat would remain in its current condition.

The access request road, including one stream crossing, would be surfaced with gravel and be gated. This road potentially would increase sediment to the channel during construction, but the surfacing and the closure should in the long term reduce any sediment that might be produced. The road construction associated with the access request (0.5 miles on NFS lands and less than 0.1 miles on non-NFS lands) would be put into Road Management Prescription A (gated). This road management prescription would limit public use of the road, but the road would still be a non-

vegetated surface with associated culverts in place. Therefore this access road could be source of increased sediment to the stream during construction, during use, and after use. Sediment yields are expected to be reduced when all proposed activity is considered (Water section).

The roads constructed for access to non-NFS lands would most likely be used to conduct timber management. However, because the majority of the land in this drainage is under Forest Service management the activity on other lands has less of an influence on the condition of the stream.

There would be a minor change of 2.2 miles from Road Management Prescription C to Prescription D. Prescription D includes the recontouring of roads. This ground disturbance could, in the short term, increase the potential for sediment increases to the channel; but in the long term this activity would benefit the aquatic habitat by increasing productivity of the site, restoring subsurface flow patterns, reestablishing infiltration, and allowing the site to function in a more natural manner.

The identified migration barrier on Mazie Creek would not be corrected because it is located on a road that is not administered by the Forest Service.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if these alternatives were selected, therefore the effects described for that alternative are also considered for these alternatives.

The proposed Forest Service activity would not create additional negative cumulative effects; however, Mazie Creek would continue to be in a "*functioning at risk*" condition due to the low-quality habitat and the migration barrier.

<u>West Fork St. Maries:</u>

Alternative A

Direct and Indirect Effects

No activity is proposed under this alternative.

Cumulative Effects

The effects of ongoing activities were described in the section titled "Effects Common to all Alternatives." These activities were determined to have either no effect or very minor effect except for timber management and road construction activities on non-NFS lands, grazing, and the presence of brook trout. These were all determined to create the potential for negative effects.

It is expected that the West Fork would remain in a "*functioning at unacceptable risk*" condition because of the combination of the factors that caused the current 303d status, continued high road density, the presence of brook trout in the system, and the assumed continuation of timber harvest and road construction on non-NFS lands.

Alternatives B, C and F

These alternatives have the same harvest, road reconstruction, and access request activity. The only differences are that Alternative C has no new construction for Forest Service projects whereas Alternatives B and F have 0.32 miles of new construction. This new road would be put into long-term storage after use; therefore, it would not increase road density. Alternative F differs from Alternatives B and C in that one additional mile of existing barriered road would be put into

storage, thus producing a road density for Alternative F of 4.2 mi/mi^2 as compared to 4.3 mi/mi^2 in Alternatives B and C. This small difference in road density would not alter the status of the drainage: it would remain in the high-density category.

Direct and Indirect Effects

The effects from pre-commercial thinning and gopher baiting were discussed in the section titled "Effects Common to All Action Alternatives." These activities were determined to have no effect on the aquatic environment.

The harvest associated with these alternatives would not create any direct effects due to the implementation of INFS buffers. The harvest should create only minimal increases in water yield and would not have a negative impact on channel conditions (Water section), and therefore would not impact fish habitat.

The new road construction proposed is a combination of roads needed for activity on NFS lands and roads on NFS lands which are needed for non-Forest Service access. Approximately 0.3 miles of new road construction is proposed on NFS lands to accomplish Forest Service activity. This road construction includes one stream crossing. This activity has the potential to generate sediment to the stream in the short term. Measures employed to reduce the potential for sediment creation include surfacing the road with gravel and putting it into long-term storage following use.

Approximately 1.2 miles of road on NFS lands and 3.0 miles on other lands are proposed in association with the access request. At least eight stream crossings are associated with these road access miles. The road construction associated with the access request would be put into Road Management Prescription A. This road management prescription would limit public use of the road, but the road would still be a non-vegetated surface with associated culverts in place. Road density would increase from the existing 4.1 mi/mi^2 to 4.2 mi/mi^2 (Alternative F) or 4.3 mi/mi^2 (Alternatives B and C).

The conversion of gated or barriered roads into properly stored roads would create a short-term increase in sediment while work is being done, but in the long term it would benefit the drainage by returning the sites to more natural runoff patterns.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if these alternatives were selected, therefore the effects described for that alternative are also considered for these alternatives.

The proposed Forest Service activity would not create additional negative cumulative effects. The West Fork St. Maries would, however, continue to be in a "functioning at unacceptable risk" condition due to the combination of the factors that caused the current 303d status, continued high road density, the presence of brook trout in the system and the assumed continuation of timber harvest and road construction on non-NFS lands.

Alternative D

Direct and Indirect Effects

The effects from pre-commercial thinning and gopher baiting were discussed in the section titled "Effects Common to All Action Alternatives." These activities were determined to have no effect on the aquatic environment.

The harvest associated with this alternative would not create any direct effects due to the implementation of INFS buffers. The harvest should create only minimal increases in water yield and would not have a negative impact on channel conditions (Water section), and therefore it would not impact instream habitat.

Approximately 1.2 miles of road on NFS lands and 3.0 miles on non-NFS are proposed in association with the access request. There are at least eight stream crossings associated with these road access miles. The road construction associated with the access request would be put into Road Management Prescription A. This road management prescription would limit public use of the road, but the road would still be a non-vegetated surface with associated culverts in place. Road density would increase from the existing 4.1 mi/mi^2 to 4.3 mi/mi^2.

There would be an increase in properly stored roads which could cause a short-term increase in sediment during the implementation, but in the long term it would decrease the potential for sediment reaching the stream. Approximately 1.5 miles would be treated using a Prescription D method and approximately 1.1 miles would be Prescription C. The implementation method for Prescription D has a greater value in the long term to the drainage than Prescription C because work is done to facilitate return to more natural function rather than just preventing hydrologic problems from the road.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered for these alternatives.

The proposed activity on NFS lands would not contribute towards negative cumulative effects. However, because of the combination of the continued 303d status, high road density, the presence of brook trout in the system, and the assumed continuation of timber harvest on private lands it is expected that the West Fork St. Maries Drainage would remain in a **"***functioning at unacceptable risk***"** condition.

Alternative E

Direct and Indirect Effects

The effects of the pre-commercial thinning and gopher baiting were described in the section titled Effects Common to All Action Alternatives. There would be no influence from these activities.

Approximately 1.2 miles of road on NFS lands and 3.0 miles on non-NFS are proposed in association with the access request. At least eight stream crossings are associated with these road access miles. The road construction associated with the access request would be put into Road Management Prescription A. This road management prescription would limit public use of the road, but the road would still be a non-vegetated surface with associated culverts in place. Road density would increase from the existing 4.1 mi/mi^2 to 4.3 mi/mi^2.

There would be an increase in properly stored roads, which could cause a short-term increase in sediment during the implementation, but in the long term it would decrease the potential for sediment reaching the stream. Approximately 1.5 miles would be treated using a Prescription D method, and approximately 1.1 miles would be Prescription C. The implementation method for Prescription D has a greater value in the long term to the drainage than Prescription C because work is done to facilitate return to more natural function rather than just preventing hydrologic problems

from the road. There would continue to be approximately 9 miles of Forest Service managed road in a non-stored condition.

Cumulative Effects

The activity analyzed for this alternative includes ongoing Forest Service activity, activity on non-NFS lands, the influence of brook trout and the proposed activity. The effects of ongoing Forest Service activities were described in the section titled "Effects Common to all Alternatives". These activities were determined to have either no effect or very minor effect.

The proposed activity on NFS lands would not contribute towards negative cumulative effects; however, it is expected that the West Fork would remain in a **"***functioning at unacceptable risk***"** condition because of the combination of continued 303d status, high road density, the presence of brook trout in the system, and the assumed continuation of timber harvest on private lands.

<u>Wood Creek:</u>

Alternative A

Direct and Indirect Effects

No activity is proposed under this alternative.

Cumulative Effects

The effects of ongoing activities were described in the section titled "Effects Common to all Alternatives." Grazing and the presence of brook trout were determined to have the potential for negative impacts. Other activities were determined to have either no effect or very minor effect.

The existing high road density (3.1 mi/mi^2) combined with the presence of brook trout in the system and the lack of road rehabilitation would maintain Wood Creek in a *"functioning at risk"* condition.

Alternatives B and C

These alternatives have the same commercial harvest, pre-commercial thin, and road reconstruction. The only differences are that Alternative C has no new construction for Forest Service projects whereas Alternative B has 0.24 miles of new construction. These miles would be decommissioned after use, therefore they would not increase road density in the long term. Because these differences are small it is anticipated that the effects from both alternatives is similar and are displayed together.

Direct and Indirect Effects

The effects of the pre-commercial thinning, road reconstruction and gopher baiting were described in the section titled Effects Common to All Action Alternatives. There would be no influence from these activities.

The commercial harvest would have no effect on the aquatic environment because the activity is very limited and would utilize INFS buffers.

A short section of new road would be constructed which would require two stream crossings. This activity would create a short-term increase in sediment during construction. Following use the road would be decommissioned which again would create a short-term increase in sediment but in the long term would return the site to more natural function.

The conversion of gated or barriered roads into properly stored roads would create a short-term increase in sediment during the storage, but in the long term it would benefit the drainage by returning the sites to more natural runoff patterns.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if these alternatives were selected, therefore the effects described for that alternative are also considered for these alternatives.

The proposed activity on NFS lands would not contribute towards negative cumulative effects; however, it is expected that Wood Creek would remain in a **"***functioning at risk***"** condition because of the combination of the high road density and the presence of brook trout in the system.

Alternatives D and E

The same activities are proposed for both of these alternatives; therefore the effects would be the same.

Direct and Indirect Effects

The effects of the pre-commercial thinning and gopher baiting were described in the section titled Effects Common to All Action Alternatives. There would be no influence from these activities.

The conversion of open, gated, or barriered roads into properly stored roads would create a short-term increase in sediment during the storage; but in the long term it would benefit the drainage by returning the sites to more natural runoff patterns and reducing the potential for sediment inputs. Road density would be reduced from 3.1 mi/mi^2 currently to 1.4 mi/mi^2 following implementation of these alternatives.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if these alternatives were selected, therefore the effects described for that alternative are also considered for these alternatives.

Brook trout would still be present in the drainage and would therefore have a negative effect on the native salmonid population; however, the reduction in road density would allow the hydrology of Wood Creek to return to a more naturally functioning condition in the long term and would allow the in-stream habitat to improve over time thus trending the habitat to "*functioning appropriately*".

Alternative F

Direct and Indirect Effects

The effects of the pre-commercial thinning and gopher baiting were described in the section titled Effects Common to All Action Alternatives. There would be no influence from these activities.

The commercial harvest (15.8 acres) would have no effect on the aquatic environment because the activity is limited and would utilize INFS buffers.

A short section of road (0.24 miles) would be constructed to access Unit 36. This road would require one stream crossing which would create a short-term increase in sediment during construction. Following use the road would be decommissioned which may create a short-term increase in sediment when the culvert is removed.

The conversion of open, gated, or barriered roads into properly stored roads would create a short-term increase in sediment during the storage; but in the long term it would benefit the drainage by returning the sites to more natural runoff patterns and reducing the potential for sediment inputs. Road density would be reduced from 3.1 mi/mi^2 currently to 1.4 mi/mi^2 following implementation of these alternatives. The greatest benefit from road treatments comes from the decommissioning of the main Wood Creek Road 341. The Wood Creek road lies within 100 feet, and often within 25 feet, of the stream channel and therefore has a major influence of the channel primarily in terms of sediment input and stream shading.

Cumulative Effects

Activities which were analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered for this alternative.

Brook trout would still be present in the drainage and would, therefore, have a negative effect on the native salmonid population; however, the reduction in road density, especially the removal of the riparian road, would allow the hydrology of Wood Creek to return to a more naturally functioning condition in the long term and would allow the in-stream habitat to improve over time thus trending the habitat to "*functioning appropriately*".

Lower St. Maries River:

Alternative A

Direct and Indirect Effects

No activity is proposed under this alternative.

Cumulative Effects

The effects of ongoing activities were described in the section titled "Effects Common to all Alternatives." The majority of these activities were determined to have either no effect or very minor effect. The exceptions to this are the timber harvest and road construction (reasonably foreseeable new road construction would have two stream crossings) activities on non-NFS lands, Clarkia, other private businesses, presence of brook trout, and grazing (on-going and future). These factors have all been determined to create a risk for negative effects.

The Forest Service is not proposing any activity under this alternative therefore there would be no contribution to cumulative effects from Forest Service activity. The St. Maries River is currently listed as an impaired watershed. It is expected that this drainage would remain in a "*functioning at unacceptable risk*" condition because of continued high road density, the presence of brook trout in the system, and the assumed continuation of timber harvest on non-NFS lands.

Alternative B

Direct and Indirect Effects

The effects of pre-commercial thinning, road reconstruction, and gopher baiting were described in the section titled Effects Common to all Action Alternatives. There would be no influence from these activities.

The harvest associated with this alternative would not create any direct effects due to the implementation of INFS buffers. The harvest should create only minimal increases in water yield

and would not have a negative impact on channel conditions (Water section) and therefore would not impact instream habitat.

Approximately 2.1 miles of new road construction (eight segments) are proposed in association with Forest Service activity. One stream crossing is proposed for this new construction. Approximately two miles of this construction would be put into long-term storage (Road Management Prescription C), and approximately 0.1 miles would be temporary road that would be completely recontoured. These treatments and the surfacing of approximately 0.6 miles of road would reduce the potential for sediment generation. The new road construction would not increase the road density for the drainage because the roads would be stored after use. This storage would allow for a more normal function of the drainage.

Approximately 0.3 miles of road would be constructed in association with the road access request. Of this distance less than 0.1 miles would be on NFS lands. Following use the road would be gated. This road management prescription would limit public use of the road, but the road would still be a non-vegetated surface. The road would not cross any streams, therefore it should have a minor influence on the aquatic environment. This road construction would cause a slight increase in the road density for the drainage.

The conversion of open, gated, or barriered roads into properly stored roads would create a short-term increase in sediment during the actual work, but in the long term it would benefit the drainage by returning the sites to more natural runoff patterns. Road density would be reduced from 5.8 mi/mi^2 to 4.9 mi/mi^2, but this density is still considered to be extremely high.

Cumulative Effects

Activities analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered for this alternative.

Proposed Forest Service activity within the Lower St. Maries River area is not expected to create negative impacts to the aquatic habitat.

Proposed Forest Service activities within tributaries to the St. Maries Drainage are not expected to create impacts to the St. Maries fish habitat.

The Forest Service proposed activity under this alternative would not contribute negatively to the cumulative condition of the St. Maries River. However, the St. Maries River is currently listed as an impaired watershed by the State of Idaho. It is expected that this drainage would remain in a **"***functioning at unacceptable risk"* condition because of factors which caused the 303d listing on this stream, in combination with continued extremely high road density, the presence of brook trout in the system, grazing, and the assumed continuation of timber harvest and road construction on non-NFS lands.

Alternative C

Direct and Indirect Effects

The effects of pre-commercial thinning, road reconstruction, and gopher baiting were described in the section titled Effects Common to all Action Alternatives. There would be no influence from these activities.

The harvest associated with this alternative would not create any direct effects due to the implementation of INFS buffers. The harvest would create only minimal increases in water yield and would not have a negative impact on channel conditions (Water section), and therefore would not impact in-stream habitat.

The new road construction proposed under this alternative is needed for activity on non-NFS lands but would cross NFS lands. This is a minor amount of road (0.3 mi/mi^2) which would not include any stream crossings. The road built for this access request would not be revegetated following use, but because it is a small section of road which does not cross any streams it would have minor influence on the aquatic environment.

The conversion of open, gated, or barriered roads into properly stored roads would create a short-term increase in sediment during the actual work, but in the long term it would benefit the drainage by returning the sites to more natural runoff patterns. Road density would be reduced from 5.8 mi/mi^2 to 4.9 mi/mi^2, but this density is still considered to be extremely high.

Cumulative Effects

Activities analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered for this alternative.

Proposed Forest Service activity within the Lower St. Maries River area is not expected to create negative impacts to the aquatic habitat.

Proposed Forest Service activities within tributaries to the St. Maries Drainage are not expected to create impacts to the St. Maries fish habitat.

The Forest Service proposed activity under this alternative would not contribute negatively to the cumulative condition of the St. Maries River. However, the St. Maries River is currently listed as an impaired watershed by the State of Idaho. It is expected that this drainage would remain in a **"***functioning at unacceptable risk"* condition because of continued extremely high road density, the presence of brook trout in the system, grazing, and the assumed continuation of timber harvest and road construction on non- NFS lands.

Alternatives D and E

The same activities are proposed for both of these alternatives with two minor exceptions. Alternative D includes two acres of harvest and 0.82 miles of road reconstruction, whereas Alternative E does not include these activities. Because of the small size of these activities and because of their locations they are not expected to create noticeable effects.

Direct and Indirect Effects

The effects of pre-commercial thinning, road reconstruction, and gopher baiting were described in the section titled Effects Common to all Action Alternatives. There would be no influence from these activities.

The conversion of open, gated, or barriered roads into properly stored roads would create a short-term increase in sediment during the storage process, but in the long term it would benefit the drainage by returning the sites to more natural runoff patterns and reducing the potential for sediment inputs. This conversion would reduce road density within the drainage from 5.8 mi/mi^2 to

4.7 mi/mi^2. Although this reduction is an improvement, road density would remain in the extremely high category.

Cumulative Effects

Activities analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered for this alternative.

Proposed Forest Service activity within the Lower St. Maries River area is not expected to create negative impacts to the aquatic habitat.

The St. Maries River is currently listed as an impaired watershed. The proposed activity on NFS lands would not contribute towards negative cumulative effects. This lack of effects from the Forest Service activity would not change the current condition of the channel; and combined with continued high road density, the presence of brook trout in the system and the assumed continuation of timber harvest and road construction on private lands it is expected that this drainage would remain in a **"***functioning at unacceptable risk"* condition.

Alternative F

Direct and Indirect Effects

The effects of pre-commercial thinning, road reconstruction, and gopher baiting were described in the section titled Effects Common to all Action Alternatives. There would be no influence from these activities.

The harvest associated with this alternative would not create any direct effects due to the implementation of INFS buffers. The harvest would create only minimal increases in water yield and would not have a negative impact on channel conditions (Water section), and it therefore would not impact instream habitat.

Approximately 1.9 miles of new road construction (seven segments) are proposed in association with Forest Service activity. One stream crossing is proposed for this new construction. Approximately 1.8 miles of this construction would be put into long-term storage (Road Management Prescription C), and approximately 0.1 miles would be temporary road that would be completely recontoured. These treatments and the surfacing of approximately 0.3 miles of road would reduce the potential for sediment generation. The new road construction would not increase the road density for the drainage because the roads would be stored after use. This storage would allow for a more normal function of the drainage.

Approximately 0.3 miles of road would be constructed in association with the road access request. Of this distance less than 0.1 miles would be on NFS lands. The road would be gated following use. This road management prescription would limit public use of the road, but the road would still be a non-vegetated surface. The road would not cross any streams, therefore it would have a minor influence on the aquatic environment. This road construction would cause a slight increase in the road density for the drainage.

The conversion of open, gated, or barriered roads to properly stored roads would create a short-term increase in sediment during the storage, but in the long term it would benefit the drainage by returning the sites to more natural runoff patterns. Road density would be reduced from 5.8 mi/mi^2 to 4.7 mi/mi^2, but this density is still considered to be in the extremely high category.

Cumulative Effects

Activities analyzed in Alternative A would also occur if this alternative were selected, therefore the effects described for that alternative are also considered for this alternative. Proposed Forest Service activity within the Lower St. Maries River area is not expected to create negative impacts to the aquatic habitat. Proposed Forest Service activities within tributaries to the St. Maries Drainage are not expected to create impacts to the St. Maries fish habitat.

The Forest Service activity in this drainage, including the tributaries in the cumulative effects area would not add negatively to the cumulative effects. It would provide some positive influence by reducing the road density, correcting fish passage barriers on roads managed by the Forest Service, planting riparian areas, and adding woody debris to the West Fork stream channel. Although there would be improvements due to these activities, based on the current condition, continued high road density, the presence of brook trout in the system, continued grazing, and the assumed continuation of timber harvest on other lands, it is expected this drainage would remain in a **"**functioning at unacceptable risk**"** condition. See Appendix F – Fisheries: Sensitive Species Biological Evaluation for a summary of effects on the sensitive fish species.

Compliance with Standards and Laws

IPNF Forest Plan and Inland Native Fish Strategy (INFS)

Compliance with the IPNF Forest Plan and INFS Guidelines apply to activity implemented or authorized by the Forest Service.

Standard #1 and Standard #2 (as replaced by INFS): This standard would be met in Alternatives B and C, D, E, and F because the alternatives meet riparian management objectives.

Standard 3 does not apply to this project because none of the streams identified in that standard are located in this project area.

Standard 4 would be met. New road construction would provide for fish passage and known passage problems on Forest Service roads would be corrected.

Standard 5 was met. The information contained in this report uses fisheries surveys to coordinate activities with other resources. Several projects have been identified in this document that would benefit the fishery when they are implemented.

Standard 6: The intent of this standard is being met due to the extensive review of the stream systems and the implementation of standards described in INFS.

National Forest Management Act (NFMA)

All action alternatives would meet NFMA requirements by meeting the standards, objectives, and guidelines of the Forest Plan which requires maintaining and improving habitat of management indicator species.

Endangered Species Act (ESA)

None of the alternatives would jeopardize the continued existence of bull trout, the listed species that historically was found in the project area (Appendix F Biological Assessment).

Executive Order 11990

None of the alternatives would damage wetlands, and riparian dependent resources, such as the fishery, would be protected through the implementation of INFS bufferstrips.

Executive Order 12962

All alternatives would maintain habitat and thus would not affect the fishery potential, which in turn would not reduce the potential for recreational fishing opportunities.

Federal Water Pollution Control Act (Clean Water Act) (33 U.S.C. 1251 et seq.)

All alternatives would meet the Clean Water Act objective of restoring or maintaining biological integrity as described in the analysis of alternatives.

Idaho Forest Practices Act (FPA) 38-1302

All alternatives would meet the FPA purpose of "… providing a habitat for wildlife and aquatic life, …" as described in the analysis of alternatives.

Forest Vegetation

Changes Between the Draft SEIS and the Final SEIS

Table 3-32, Treated Acres by Stand Size Class Groups, was added to this section in order to clarify information as requested during the 45-day comment period.

Introduction

The forest vegetation of northern Idaho displays strong diversity in both composition and structure. This diversity is attributable to climate, geology, and disturbance patterns (insects, disease, fire history and extreme weather events). These elements combine to create some of the most varied and productive forest communities found in the Inland Northwest. The most dominant vegetative feature of the northern Idaho forests is trees. The major tree species growing in this area include western hemlock, mountain hemlock, western red cedar, grand fir, Douglas-fir, western larch, western white pine, lodgepole pine, ponderosa pine, subalpine fir, and Engelmann spruce.

This section addresses the purpose and need for vegetation treatment. The forest vegetation in the Hidden Cedar Project Area will change through the interaction of plant succession and the influence of disturbances (both natural and human disturbance). Forest vegetation across the landscape will be impacted by these changes. This analysis focuses on the composition, structure, patterns and processes which affect change to forests expressed by the tree component but recognizes that associated layers of vegetation are important parts of the plant communities in the area.

Regulatory Framework

The regulatory framework providing direction for the management of forest vegetation is provided through the *National Forest Management Act* and the *Forest Plan for the Idaho Panhandle National Forests* (USDA Forest Service, 1987).

NFMA provides for balanced consideration of all resources. The Forest Plan, in compliance with NFMA, establishes Forest-wide management direction, goals, objectives, standards and guidelines for the management for forest vegetation and plant communities.

Direction concerning implementation of NFMA and the Forest Plan can be found in Forest Service Manuals (FSM) and Handbooks (FSH), as well as various written communications from the Forest Service's Washington Office, Regional Office and the Supervisor's Office for the Idaho Panhandle National Forests.

Analysis Area

Since the original Hidden Cedar Environmental Impact Statement was developed, several court decisions have been issued, new aerial photography has become available, updates to stand delineation and data bases have occurred, new stand exam data was gathered, and previously planned projects were completed. As a result, a review of the Hidden Cedar Project and the updating of data with the most current information were completed. The projects which have been completed related to the vegetation condition for this updated analysis are the Dutch Cat Timber Sale, the Merry Creek progeny test, and approximately 291 acres of pre-commercial thinning and pruning. The data for vegetation in this analysis was updated, and current information is displayed in this analysis.

The analysis area for the forest vegetation resource is the Hidden Cedar Analysis Area and includes approximately 32,957 acres with approximately 15,438 acres under USDA-Forest Service jurisdiction. The remaining approximate 17,519 acres are under private, State or other ownership (see Vicinity Map, M-1).

Analysis Methods

The information used in this forest vegetation section is a combination of the available data, research material, literature, assessments and field reviews. Vegetation attributes such as forest cover type, stand size class, as well as habitat group and other information were compiled from the Timber Stand Management Record System (TSMRS) and the FSVeg data base. In addition, field reviews were conducted during the original process of diagnosis and analysis to verify site conditions. Proposed harvest units were reviewed in the field by the silvicultural forester. Copies of the information used in the analysis are found in the project file (Veg-1, 3, 4, 6, 7, 8, 9, 10, 14, 29, 31 and SOG-4, 7, and 9). New stand exams were accomplished in 2005 to update data for this project (project file (PF): SOG-9), and the updated stand data was used in this analysis.

Large-scale context for the terrestrial vegetation and landscape ecology was provided by the *Integrated Scientific Assessment for the Interior Columbia Basin (*Quigley et al, 1996) and the St. Joe Geographic Area assessment titled, *Toward a Forest Ecosystem Approach: An Assessment for*

the St. Joe Area (IPNF, 1997). This information and the objectives described under the purpose and need section of this document, as well as the IPNF Forest Plan, were used in evaluating the Hidden Cedar Project area's existing condition for forest vegetation and comparing it to the landscape and desired forest stand conditions.

Forest stands were reviewed for current insect and disease activity, current production (growth rates), productive potential, regeneration potential, species composition and stand structure. Areas unsuitable for timber production were not considered for vegetation treatment. In addition to field reconnaissance, determining reforestation potential involved review of the reforestation indices for the District and the analysis area. These indices display our ability to regenerate these sites within a period of five years as required under NFMA (project file (PF): Veg-25 and SVEG-2).

Forest stand treatment needs were identified by a silvicultural forester based on insect and disease activity and potential, existing vegetation conditions and desired stand conditions identified by target stands. Desired stand conditions were developed which are ecologically compatible with the site, as well as the current and historic disturbance patterns and successional pathways of the landscape vegetation. These desired stand conditions are also based on the IPNF Forest Plan management area direction for the sites. See management area direction in Table 1-1. Treatment needs were based on a comparison of the existing stand condition to the target condition and the alternative actions that would move the existing condition toward the target condition over time. Consideration included stand composition, especially the condition and amount of long-lived early seral species and stand structure, and the potential of the stand to provide mature stand structures with large trees in the future.

Documentation for the target stands, site-specific stand data and stand diagnosis is in the project file (Veg-7, 9, 10, 14, 27, 28 and SOG-9). A description of the features of various silvicultural systems and their effects are included in the Forest Plan and Forest Plan FEIS.

Affected Environment

Habitat types were used for the project planning and site-specific considerations in this environmental assessment. *Forest Habitat Types of Northern Idaho: A Second Approximation* (Cooper et al, 1991) outlines the classification and characteristics of the habitat types. This information was used for stand-level diagnosis and analysis.

Specific field determined habitat types and phases can be found in the St. Joe District's TSMRS (Timber Stand Management Records System) and FSVeg data bases. Additionally, habitat types were grouped to facilitate landscape-level analysis and planning. Habitat type grouping aggregates habitat types that fall within similar temperature and moisture environments. As a result of similar environments and vegetation characteristics, the habitat group can be used to describe similar productivity, fire and other disturbance regimes, stand dynamics, susceptibility to insect and disease, forage and cover potential, rare plant potential, cover types, structural stages and succession pathways. *A Biophysical Classification, Habitat Groups and Descriptions* (USDA, 1996) was used for this analysis. The Hidden Cedar Analysis Area includes six of the forest habitat type groups described in that document. The relative distribution of the habitat type groups occurring in the project area is displayed in Table 3-27, and is characterized in the subsequent description. Habitat groups indicate the potential natural vegetation within the area.

Table 3-27 Distribution of Habitat Types on NFS in Hidden Cedar Analysis Area

Habitat Group	Potential Vegetation	Temperature and Moisture	% Area
2	Dry Forest	Moderately Warm and Dry	2
4	Moist Forest	Moderately Warm and Moist	4
5	Moist Forest	Moderately Cool and Moist	90
6	Moist Forest	Moderately Cool and Wet	3
7	Cool Forest	Cool and Moist	1
8	Cool Forest	Cool and Moist	<1

Habitat Group 2 is primarily at lower elevations on south and southwest aspects. This group makes up a Dry Forest Potential Natural Vegetation Group and occurs over approximately two percent of the Hidden Cedar Project Area.

Habitat Type Groups 4, 5 and 6 are primarily found on lower and mid-slope elevations throughout the Hidden Cedar Project Area. Habitat Type Group 4 corresponds to the more moist grand fir habitat type series. It generally occurs on the more southern exposures on the low and mid slope level. Habitat Type Groups 5 and 6 correspond to the western redcedar and western hemlock habitat type series, which are generally present on the other aspects on low and mid-elevation slopes. These three groups are highly diverse, and nearly all conifer species in northern Idaho can occur in these groups. They can be characterized as the sites where western white pine has the capability to thrive and represent a major component of forest stands. It is also where western larch is most productive and capable of growing to large diameter trees sooner than in other habitat type groups. These three groups make up a Moist Forest Potential Natural Vegetation Group and occur over 97 percent of the Hidden Cedar Analysis Area.

Habitat Type Groups 7 and 8 are generally located on the higher elevations slopes and ridges within this area. They correspond to the subalpine fir and mountain hemlock habitat type series. These two groups make up a Cool Forest Potential Natural Vegetation Group and occur over less than two percent of the area.

Forest Composition

Throughout the Interior Columbia River Basin, there has been a decline in shade-intolerant early-seral species and an increasing dominance of shade-tolerant species (Quigley et al, 1996). This same trend is seen at a step down in scale in Idaho. Table 3-28 displays the trend away from potentially long-lived early seral species (white pine (WP), western larch (L) and ponderosa pine (PP)) and towards more shade-tolerant and shorter-lived species grand fir (GF), subalpine fir (SAF), spruce (S), lodgepole pine (LP), Douglas-fir (DF) (O'Laughlin et all, 1993) from 1952 through 1987 in Idaho.

Table 3-28 Species Composition Changes in Idaho

Idaho Forest Type	WP	PP	GF/SAF	S/ L/ Other	LP	DF
% Change 1952-1987	-60%	-40%	+60%	+30%	+38%	+15%

In stepping down to the St. Joe River Basin we find a similar major decline in long-lived early seral species, particularly western white pine, western larch and ponderosa pine (IPNF, 1997).

There are ecological implications of changes in forest composition. Western larch, ponderosa pine and white pine are fire adapted, relatively drought resistant and more root disease resistant than

other species, and are capable of dominating the forest stands from establishment to 350 years (Shiplett and Neuenschwander, 1994). Additionally, they are capable of producing tall trees of large diameter that serve important ecological functions. Western hemlock and grand fir are two of the more moisture demanding tree species. They are highly stressed during drought. The increase of these drought sensitive species at levels substantially higher than historical levels creates increased risk of large scale insect and disease outbreaks during periodic droughts.

Western hemlock and grand fir are also less adapted to surviving fires than more seral species. As stand composition shifts to greater proportions of fire susceptible species there is an increase in the risk of higher mortality when fires do occur.

Grand fir and Douglas-fir are highly susceptible to root diseases. Conversion of forests to these more shade-tolerant and disease-prone species has contributed to an increase in the incidence of losses and damage associated with Armillaria root disease (Byler and Zimmer-Grove, 1991). Historically, root pathogens acted more as a thinning agent. Increased dominance of these more susceptible species can change the relationship of root pathogens from one of thinning to a major disturbance agent in forest stands and across the landscape.

Lodgepole pine is a relatively short-lived seral, especially in the moist forest sites of northern Idaho. Conversion from white pine, western larch and ponderosa pine forest types to Douglas-fir, grand fir, lodgepole pine and western hemlock types trends these sites not only to a reduced species composition, but also subsequent potential increases in the risk of probable loss when disturbances such as fire, insect outbreaks, drought, etc. do occur. An increased risk of loss effects both the stand and landscape scales. Table 3-29 displays the current stand composition (defined by the forest type of the species with the greatest basal area represented in the stand) for the historic and the current stand composition for the St. Joe River Basin. It also displays the trend in forest composition in this project area.

Table 3-29 Forest Type Changes in the St. Joe River Basin and Hidden Cedar Project Area

Forest Type	PP	WP	WL	DF	GF/ WH	C	LP	SAF/MH/ ES/ WBP
St. Joe Historic Forest	4.3%	24.1%	16.7%	9.4%	9.7%	7.8%	7.1%	20.9%
St Joe Current Forest	2.9%	2.2%	4.8%	22.3%	32.6%	4.3%	14.4%	16.3%
Hidden Cedar Project Current Forest	<1%	6%	4%	20%	52%	10%	6%	1%

PP = ponderosa pine *DF = Douglas-fir* *C = western redcedar* *MH = mountain hemlock*
WP = western white pine *GF = grand fir* *LP = lodgepole pine* *ES = Engelmann spruce*
WL = western larch *WH = western hemlock* *SAF = subalpine fir* *WBP = whitebark pine*

There have been corresponding increases in the shorter-lived seral species such as lodgepole pine and Douglas-fir, and in the more shade-tolerant grand fir and western hemlock. Historic records of the St. Joe National Forest show much higher acreages of forest cover types in white pine, ponderosa pine and western larch than occur today for this area. The early timber inventory methods were plots distributed over large blocks of ground and were not tied to individual stands as done today. The differences in methodology of these timber surveys makes it difficult to do a direct comparison to today's inventories, however, the data does indicate a shift away from the long-lived early seral species and towards lodgepole pine, Douglas-fir, grand fir and hemlock.

Past timber harvest often focused on removal of the largest-sized trees and the most market valuable species. The large, dominant, more valuable western white pine, western larch and ponderosa pine were preferentially removed over other size classes and species. Large dominant western redcedar was also removed due to its market value. This practice reduced the contribution these species made to the individual stand composition, as well as their contribution to the analysis area and general landscape.

With the advent of effective fire suppression over the last 60 years, we have essentially eliminated the primary natural thinning agent which encouraged retention and effective regeneration of intolerant early seral species, and subsequently encouraged increased representation of the more shade-tolerant, less fire-adapted species over time. The result of essentially eliminating natural fire has also reduced site preparation which provided appropriate seed bed for germination and establishment of natural regeneration of early seral species. Additionally, the lack of fire has allowed increased stand densities and the natural establishment of more shade-tolerant species such as grand fir, hemlock and Douglas-fir. As these species occupy the site, they increase shading and other competitive conditions, which generally exclude adequate establishment of the less shade-tolerant early seral species such as western larch and ponderosa pine.

The accidental introduction of the exotic white pine blister rust (*Cronartium ribicola*) decimated the white pine component, which was historically a major stand component. Western white pine has a natural rust resistance of less than ten percent (10%), and as a result, there has generally been a loss of ninety percent (90%) or more of the western white pine throughout this analysis area and over the landscape in general.

The combined effects of these elements resulted in substantial reductions in the representation of these long-lived, intolerant seral species in the overstory, and a substantial reduction in seed source to provide for natural regeneration of these species.

The reduced amount of thinning with subsequent increased establishment of more shade-tolerant species has resulted in an increase in competition and a loss of adequate sites to encourage germination and effective establishment of early serals that may have originated from an already reduced seed source.

Forest Structure

Forest structure refers to the vertical, horizontal and other spatial characteristic patterns of various components over time. Structure classifications of forest vegetation can be used to reflect processes which operate across landscapes and their component stands. Throughout the Interior Columbia River Basin there has been substantial reduction of older forest structures compared to historic structures (Quigley et al, 1996). Over approximately the last 100 years this reduction ranges from 27 to 60 percent from historic levels, depending on the forest type.

During this same period, large residual trees and snags have decreased by about 20 percent. The *Assessment for Ecosystem Management of the Interior Columbia River Basin* indicates that forest composition and structures have become more homogeneous compared to historic conditions. Within the St. Joe River Basin, as well as within the Hidden Cedar Analysis Area, there has been a shift from historic conditions to a more homogeneous structure and species composition. Late seral structures (forests dominated by large, late-seral species including grand fir, western redcedar and western hemlock) and early-seral structures (forests dominated by shade-intolerant, early-seral

species including ponderosa pine, lodgepole pine, western larch, western white pine and Douglas-fir) have been declining. There has been an increase in mid-seral structures dominated by grand fir and Douglas-fir, which have become contiguous and created a more homogeneous landscape.

When comparing the structural change within the St. Joe River Basin from mean historical vegetation to the current condition, there are indications of a reduction in large diameter trees, large snags and stands dominated by large old trees (IPNF, 1997). There has been a reduction of stands typified by an old open overstory of large early-seral species with an understory of mixed species of varying shade tolerances. There has been an increase in stands typified by small and medium-sized young trees. These stands are generally more uniform in structure and more densely stocked compared to historic conditions. The primary causal factors influencing this shift have been the commercial harvest of the older and larger overstory, and the efficiency of fire suppression reducing the incidence and extent of mixed severity fires. This same trend in structure change is probably more pronounced on private lands within the St. Joe River Basin and private lands within this project area. This is primarily due to extensive harvest of larger, older, more marketable trees as influenced by the management objectives of the landowners.

Current and historic forest structures, based on size-class groupings, within the St. Joe River Basin are presented in Table 3-30. Also, the current forest structure for the Hidden Cedar Analysis Area, located within the St. Joe River Basin, is also presented in Table 3-30. There is a trend away from mature/old and old growth forest structure, toward smaller trees (IPNF, 1997).

Acres in the shrub/seedling/sapling size class are predominantly the result of past regeneration harvests. These areas do have some residual larger trees and snags, however, they are generally under-represented in these past harvest units. Stands which fall into the pole/small/medium sawtimber size class are generally densely stocked with trees where canopies are closed, or nearly closed, and little light reaches the plant communities in the understory. These stands are experiencing competition for growing space (Oliver and Larson, 1996) and are developing under strong competition. Many of these stands have relatively small trees for their age and are more susceptible to drought and damage or destruction by wildfire, insects and diseases.

Table 3-30 Size Class Distribution for the St. Joe River Basin and the Hidden Cedar Area

Forest Structure	Shrub/Seed /Sapling	Poles/Small /Medium	Mature/ Large/OG
St. Joe Basin (all lands) - Mean Historic Vegetation	20%	35%	45%
St. Joe Basin (all lands) - Current Vegetation	28%	50%	22%
Hidden Cedar Area (NFS Lands) - Current Vegetation	14%	70%	16%

Stands that are allocated as old growth and old growth recruitment currently meet or are expected to meet in the near future the draft minimum criteria for old growth habitat for Region 1 of the Forest Service. Past natural disturbances, primarily wildfire, appear to be the reason that the number of old growth stands having large, old trees are relatively limited on National Forest lands in the Hidden Cedar Area. Stand ages in this area are almost entirely less than 120 years of age. White pine blister rust has also had a large effect on reducing the amount of large trees in this landscape. Logging in the early 1900s over much of this area may have removed the mature and old component structure of stands; which if not harvested might be old growth today if they had also survived past wildfire or other major disturbances.

Stand structures in the Hidden Cedar Project Area include a few stands that have an open overstory of moderately old, large trees with an understory of younger, smaller trees. These stands appear to be the result of a mixed-severity fire that killed 20 to 80 percent of the previous stand. The relic trees from the previous stand are often western larch, Douglas-fir, western redcedar, and a few scattered ponderosa pine. This stand structure would be more common if not for the past logging practices. In many stands in this analysis area, large stumps of mostly western larch, white pine, western redcedar and ponderosa pine are found below the dense canopies of pole and small sawtimber stands. These larger trees and snags were logged for their high value in the past. This type of harvest has led to both a more homogeneous stand structure and a decrease in the diversity of tree species within these stands and the reduction of these larger size classes and species as stand components within the analysis area. Many of the stands in this analysis area have a weakly developed three age-class structure and canopy level observed during field reconnaissance.

These stands are trending towards multi-storied structure. The historical condition in this analysis area was generally even-aged, one- and two-storied stands of moderate to large area.

Stand structures on land other than National Forest in the Hidden Cedar Area and the St. Joe River Basin are believed to be even more homogeneous and have less large wood than occurs on National Forest lands. Additionally, very little old growth structure is believed to exist on lands other than National Forest. Stand structures in these areas are expected to be maintained in the two smaller size classes (Shrub/Seedling/Sapling and Pole/Small/Medium Sawtimber) in the future by the timber management associated with these ownerships.

The apparent decrease in the amount of large trees; large snags; and stands of mature, large timber and the subsequent increase of the smaller size-class stands has ecological effects. For instance, species that associate with younger stands benefit and those that associate with older stands and larger trees suffer a loss of habitat.

Historically, the landscape of the St. Joe River Basin included openings. These openings ranged in size from small openings of only a few acres, to large openings ranging in size from several hundred acres to greater than a thousand acres in size. The smaller openings were generally the result of low-intensity fires, losses to endemic levels of insects and disease, and localized wind or snow events. The larger openings in the forest were generally created by wildfire. A series of large fires around 1830 burned nearly half of the St. Joe Basin. These fires were not all stand-replacing fires, however, they did create large openings and killed large acreages of forest. The large fire of 1910 burned over half of the St. Joe Basin. The Coeur d'Alene Basin fire study showed that over the last 450 years there was one major stand replacing fire episode somewhere in the basin every 19 years (Zack and Morgan, 1994). Fire created openings in the Hidden Cedar Analysis Area. Records show that there were mixed-severity fires within this analysis area in 1919, 1922 and 1931 (Veg-15). These fires involved acreages from a few hundred acres to greater than a thousand acres. Due to fire suppression and other activities, the majority of openings created since the 1930s have been created by timber harvest activities, as well as losses due to insects and disease.

The combined effects of these elements have resulted in a substantial reduction in the mature and large tree component. There is a substantial reduction in both the vertical and horizontal structure and an increase in homogeneity within the project area. Along with the general reduction in the size class of stands, there has been a general increase in the relative stand densities (trees per acre) and a reduction in the average tree size and age within stands from historic levels. As a consequence, the

risk of large area losses to fire, weather events, insects, disease and other major natural disturbances is increasing compared to historical conditions.

Vegetative Conditions Related to Past Harvest

Much of the land managed by the Forest Service in the Hidden Cedar Analysis Area was acquired in the early to mid 1930s. Few records relating to timber harvest and other management activities are available for that period; however, there is evidence of some early activity such as very old stumps and remnants of skid roads that indicate that some harvest did occur prior to the 1940s. This early activity may have been related to salvage activity and removal of specific products such as large western larch, western white pine, ponderosa pine, Douglas-fir and western redcedar.

Historical records show that numerous post and pole permits, salvage sale contracts as well as timber sale contracts were issued within this analysis area since 1942. The more intensive timber management contracts were not prevalent until the early 1960s. Approximately 5,699 acres (37 percent) of the approximate 15,438 acres of National Forest System lands have received some type of commercial timber harvest from 1962 to the present. Of this, approximately 50 percent (2,845 acres) was regeneration harvest (2,236 acres clearcut, 547 acres seed tree and 62 acres shelterwood seed tree), 31 percent was commercial thinning including some individual tree selection, 11 percent was sanitation/salvage, and 8 percent was liberation/improvement harvest. These figures include that portion of the Dutch Cat Timber Sale located <u>within</u> this analysis area. This timber sale was initially disclosed as a future activity; however, it has been completed.

Timber harvest data related to ownership other than Forest Service within this analysis area is generally not available. Through review of aerial photos and other information, it is estimated that a substantial percentage (greater than 50 percent) of non-NFS land has received some form of commercial timber harvest.

Environmental Consequences

<u>Alternative A</u>

<u>Direct and Indirect Effects</u>

Forest Composition

As presented earlier, there has been a decline in shade-intolerant, early-seral species and an increasing dominance of shade-tolerant species within the Hidden Cedar Project Area. For this area and the associated potential vegetation, these early seral species are identified as western white pine, western larch and on the more dry sites ponderosa pine. Lodgepole pine and Douglas-fir are also regarded as seral species on certain habitats within this analysis area. One of the needs identified in the purpose and need for action for this proposed project is to encourage species composition towards more historic conditions. This includes encouraging establishment of long-lived serals of western larch, western white pine and ponderosa pine. The retention of existing long-lived serals is also important to meeting this purpose and need for action.

Alternative A, which proposes no stand treatment, would maintain the existing condition and trends of the forest stands which are proposed for treatment in the other alternatives. This existing

condition includes a continued decrease in the percent composition of western white pine, western larch and ponderosa pine within the forest stands.

The loss of white pine is primarily the result of white pine blister rust infections causing mortality. White pine blister rust will continue to infect and kill all or most of the remaining naturally occurring white pine as well as the natural regeneration resulting from these existing seed sources.

Natural resistance to blister rust is generally less than ten percent and available natural seed sources in the Hidden Cedar Project Area is relatively low and decreasing as mature white pine continue to die from blister rust infection and other factors. White pine is currently a minor component (less than five percent) in the forest stands considered for treatment in this assessment and would continue to decrease under Alternative A.

The percent composition of western larch, currently approximately four percent, in the forest stands considered for treatment in this proposal would decrease with Alternative A. The development of western larch is related to its intolerance of shade. Western larch is the most shade-intolerant species in its range and the most resistant to fire (Fiedler and Lloyd, 1995). To regenerate, western larch needs fire or other major disturbance to provide appropriate seed bed conditions (Schmidt and Shearer, 1995) for effective germination and establishment. To survive in the stand, larch must maintain a dominant position in the canopy. When stocking is high, even dominant larch trees can be severely suppressed in both height and diameter growth.

Historically, low- and mixed-severity fires favored larch by thinning out some of the competition (Arno and Fischer, 1995). Alternative A proposes no commercial harvest to encourage retention and/or establishment of western larch within the project area. The current policy to suppress all fires in this area would continue. As a result, the composition of western larch would depend on the survival of existing trees. Due to the severe intolerance of western larch to shading it does not effectively compete once its position in the canopy is not dominant. In the absence of fire or other thinning agents (natural or human-caused) the more shade-tolerant species would continue to develop and compete with the western larch. In areas where root rot or other forest pathogens are performing a thinning effect, some retention of larch, if present, is expected. In those areas, however, the natural regeneration would continue to be the more shade-tolerant species and thus the impact of competitive trees would continue, and little long-range benefit in retention of western larch is expected. The live crown ratio of existing western larch would generally reduce over time due to both abrasion and shading from the more shade-tolerant species, resulting in decreased diameter and height growth. The existing western larch in the stands considered for treatment in other alternatives is demonstrating a current decline in live crown and growth rate. In the absence of fire or other thinning agents, this decline is expected to continue and over time western larch would be substantially reduced or even eliminated from these stands under Alternative A.

Ponderosa pine has historically dominated a relatively small percentage (four to five percent) of both the project area as well as the St. Maries and St. Joe River Basins. It generally dominated stands on drier sites typified by dry rocky ridges and on south or west aspects. It was, however, a minor component over much of the area being present on drier inclusions of larger stands and as co-dominants established at the same time as the surrounding trees.

Ponderosa pine, like western larch, is shade-intolerant and relatively fire-resistant. In the absence of fire or other thinning agents the more shade-tolerant species would continue to develop and compete with the ponderosa pine as it does with western larch. Competition for growing space

from the more shade-tolerant species is expected to decrease the growth and vigor of the ponderosa pine in these stands. This component would be reduced or potentially be eliminated from these stands.

Current conditions have resulted in much higher proportions of the more shade-tolerant species, especially the grand fir and Douglas-fir forest types, than historically existed in the area. This trend is expected to continue with Alternative A, which would not include timber harvest while current fire-suppression policies continue.

This alternative would result in decreased numbers of western white pine, western larch and to a lesser extent ponderosa pine in the forest stands considered for treatment in this environmental assessment.

Under Alternative A, stand composition is expected to change over time with a continued reduction in the existing component of long-lived, early-seral species and a continued increase in more shade-tolerant mid- and late-seral species. As a result of this shift in species composition, the risk of insect and disease losses in stands would increase. These increased losses would be expected from the existing diseases and insects in these stands (*Armillaria melia, Echinodontium tinctorium, Phaeolus schweinitzii* and *Dendroctous pseudotsugae, Scolytus ventralis*).

This shift in stand composition to more shade-tolerant species, predominantly grand fir, Douglas-fir and hemlock, would also increase the risk and extent of loss from fire. These species are less adapted to surviving fire than are the more shade intolerant seral species. As these more fire-sensitive species increase as a percent of stand composition, the risk of losing entire stands increases should fire occur.

Forest Structure

Alternative A would result in no direct management induced changes to forest structure.

Indirectly, forest structure would change with time in stands in the project area. Forest stands in this project area can generally be classified as stands where the canopy is moderately closed, trees are crowded (heavily stocked), live crowns are generally small to medium and declining in both crown width and height.

In the majority of the stands the trees are competing for growing space. Competition would result in a decline in the western larch and western white pine over time. Both diameter and height growth is decreasing, and stands are experiencing an increase in susceptibility to disease and insect attack. The small- and medium-size classes are the dominant stand components in these stands. Although growth rates are declining, these stands are expected to continue development towards the mature/large-size class, but would experience little change in vertical and horizontal homogeneity within the next 25 to 30 years.

Forest cover types are determined by the species with the greatest percent composition (by basal area) in the stand. Within this proposal area, approximately 73 percent of the acres are in Douglas-fir, grand fir, western hemlock and subalpine fir forest types.

Douglas-fir and grand fir contribute from 15 to 97 percent, and average 50 percent, of the composition of the stands in this project. These species are the most susceptible to root disease of all the native forest trees in northern Idaho. The majority are in the cedar/hemlock habitat types. A

study on the Coeur d'Alene River Basin (Matthews, 1995) simulated effects of root disease on mature stands of Douglas-fir and grand fir cover types on these habitat types. Reductions of stand basal area were significant (net decline over 100 years), mean diameters never exceeded nine inches over a 50-year period (without root disease it exceeded 14 inches) and canopy closure decreased from 75 percent to 45 percent and did not regain 75 percent closure for a period of approximately 80 years. This would indicate the effects severe root disease can have on these habitat types. Crown closure, average diameters and other stand characteristics recover over time when western redcedar and hemlock become predominant components. This recovery process may take up to 100 years to occur.

The occurrence of root disease is currently at endemic levels within the project area. With declining growth and vigor, these stands are expected to have increasing effects of root disease. Increased mortality from root disease and other agents can be expected in the larger-sized, more susceptible trees. This would create small openings due to losses of individual and small groups of medium and large trees throughout the project area. These openings would regenerate with shade-tolerant species. As we lose the larger trees over time, the vertical structure in these stands would be reduced, as well as mean tree size. Over time, this would create a more homogeneous structure, one with fewer crown classes, within the individual stands as well as for the project area in general. As a result, over the next 30 to 50 years, these stands are expected to decrease in mean diameter and decrease in canopy closure resulting from individual tree and small group mortality. This could potentially extend the time needed for these stands to achieve a large/mature size class.

Cumulative Effects

Forest Composition and Structure

Alternative A of this project would cumulatively maintain the current composition trends on the National Forest System lands in this analysis area. The number and extent of western larch, western white pine and ponderosa pine would continue to decrease on almost all National Forest lands in the area. The number and extent of grand fir, western hemlock, Douglas-fir and western redcedar would continue to increase. An exception to this would be those areas that were previously reforested and/or pre-commercially thinned to promote early-seral species composition.

The effects of Alternative A on species composition would only differ by the incremental changes on National Forest System lands.

The effects of Alternative A on structure would be an incremental reduction of seral species on National Forest System lands. Over the next 25 to 30 years, stands throughout the project would continue to grow bigger trees and move towards larger size classes in the absence of disturbance of fire or other disturbance agents. Due to species composition and the expected increases in the incidence of root disease and insect damage, this trend towards larger tree size is expected to begin a subsequent decline as a result of mortality. Over the longer term, vertical stratification and horizontal differentiation may also be expected to decline by only incremental amounts.

On private and state land within the analysis area, the decrease of shade-intolerant, long-lived early seral species and the increase of shade-tolerant species is expected to occur more rapidly due to the continued harvest of stands which contain western larch, white pine and areas with ponderosa pine. These harvested areas have historically had little site preparation and planting to favor long-lived, early-seral species. This historical pattern has changed in recent years, with substantial increases in

site preparation and planting to assure rapid reforestation and improved species composition when regeneration harvests are applied on these other ownerships.

The management practices on lands other than National Forest System lands historically favored the removal of larger-sized, older trees where intermediate stand treatments were applied, and regeneration harvests were generally applied in mature or overmature stands of larger trees. This trend is expected to continue on these other ownerships. It is anticipated that the stand structures will continue to be predominantly in the brush/seedling/sapling and pole/small/medium size classes, and not much area would develop to the large mature/old growth size class on these state and private ownerships. The effects on this analysis area resulting from management of state and private lands are expected as only incremental changes in forest composition and structure.

Tables 3-31 and 3-32 summarize the effects of the proposed action on vegetation in the analysis area.

Table 3-31 Comparison of Vegetation Components on NFS Lands by Alternative

Measurement Parameters	A		B		C		D		E		F	
Composition:	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Long-lived, early-seral tree species; PP/WL/WP forest types	1,661	11	1,959	13	1,959	13	1,851	12	1,661	11	1923	12
Stand structure:												
Brush-seedling sapling	2,147	14	2,375	15	Same as Alt B		2,288	15	Same as Alt A		2,339	15
Pole-small-medium	10,756	70	10,537	68			10,624	69			10,573	68
Mature-large	1,684	11	1,675	11			1,675	11			1,675	11
Old Growth (allocated within the analysis area)	851	6	851	6			851	6			851	6
Stand density (Acres)												
Reduction in stand density	0		1,129		1,154		461		0		1,101	
Improve growing conditions for overstocked seedling/sapling stands	0		324		324		324		324		324	

Table 3-32 Treated Acres by Stand Size Class Groups

Treated Acres by Stand Size Class Groups					
Alternative	**Seed/Sapling**	**Pole/Small/Med.**	**Mature/Large**	**Old Growth**	**Total**
A	0	0	0	0	0
B	324	1,113	255	0	1,368
C	324	1,120	273	0	1,393
D	324	480	126	0	606
E	324	0	0	0	324
F	324	1,096	208	0	1,304

Alternative B

Direct and Indirect Effects

Forest Composition

The commercial thinning and shelterwood preparatory treatments (1,042 acres) in Alternative B would maintain and/or increase the percent of the early seral species in stands proposed for treatment in this alternative. There would be a slight increase in early seral representation, predominantly western larch, on approximately 827 acres where these species are present but are a minor stand component. On an additional 70 acres, through retention of the existing seral component and reduction in the more shade-tolerant species, the forest type is expected to change from grand fir/Douglas-fir to western larch. Approximately 145 acres of western larch forest type would be maintained in that forest type in the long term through preferential removal of species other than western larch and western white pine.

The shelterwood seed cuts and clearcut w/reserves in Alternative B would regenerate 181 acres currently occupied by grand fir and Douglas-fir with potentially long-lived seral species, primarily western larch and western white pine. Openings as a result of these proposed treatments would range from six acres to 40 acres in size. This would result in an increase of 181 acres of potentially long-lived, early-seral species through artificial regeneration.

In the group shelterwood and irregular shelterwood treatment units (129 acres), approximately 42 acres would receive a regeneration harvest. This treatment would develop small openings ranging from three to five acres in size distributed throughout the harvest units and would be regenerated with predominantly western larch and western white pine. An additional estimated 87 acres would receive commercial thinning with retention of early serals, where present. These units would remain in grand fir or Douglas-fir forest types, but the percent of early seral species would be maintained in the thinned areas and would increase for the units overall due to reforestation activities in the openings.

In the shelterwood removal cut unit, approximately 16 acres would have a portion of the remaining overwood removed. This unit is expected to have approximately five acres of regeneration needs which would be planted to early seral species (western larch and western white pine). On the remaining 11 acres the existing component of early seral would be retained, but the stand will remain in Douglas-fir forest type.

These proposed stand treatments have a relatively low potential to increase the current incidence of root and stem decays within treatment areas. Due to expected improvement in growth and vigor in areas of intermediate harvest treatments and the increased representation of more seral species, the impact of root and stem decays is expected to remain at or near current endemic levels. The risk of stand loss to insects and other diseases is expected to remain at endemic levels as a result of increased representation of long-lived, early-seral species in the areas proposed for treatment under this alternative.

Under Alternative B and the other action alternatives 324 acres of existing plantations are proposed for pre-commercial thinning. Stand composition for these stands is currently early seral, predominantly western white pine and western larch. Through selective thinning, the early seral component would be maintained on these acres.

Forest Structure

Alternative B would directly change forest structure on all proposed harvest units. The change in structure in proposed commercial thin and shelterwood preparatory treatment units would reduce stand density by 30% to 50% (averaging 40%) and open the canopy cover by a corresponding amount. This harvest treatment would remove smaller trees and favor retention of larger diameter and more vigorous trees. This treatment would increase individual tree growth and vigor. This would result in developing mature/large-sized trees over a shorter time frame than would be expected with no treatment. The vertical structure would have less variation as a result of the removal of smaller tree classes. Additionally, stand density and crown closure would be reduced. These stand characteristics would increase over time following this proposed activity. These intermediate harvest activities would affect up to 1,042 acres. These treatments would not directly change stand size class due to few trees currently in the large/mature size class currently present in these stands.

The areas proposed for group shelterwood and irregular shelterwood harvests would directly change structure of the stands. Vertical structure decreases and horizontal structure increases when openings are created in homogeneous stands. In total this activity would create approximately 42 acres of openings, ranging in size from two acres to five acres in size, scattered throughout the units. These openings would be regenerated with predominantly seral species (western larch and western white pine), and would become brush/seed/sapling size class. The remaining 87 acres within these proposed units would have the same effects as discussed for commercial thinning and shelterwood preparatory treatments above.

The areas proposed for shelterwood seed cut and clearcut with reserves would directly change structure of 181 acres within the analysis area. This treatment would result in two-aged stands with the larger reserved trees scattered throughout the treatment area as an overstory above the planted and naturally regenerated new age class. The larger trees would remain the dominant structure in these stands. These treatments would directly change stand size class in as much as the primary size class would shift from the pole/small/medium size class to the brush/seedling/sapling size class. These treatments would decrease the vertical structure and increase the horizontal structure on 181 acres through creation of openings (ranging in size from six acres to 40 acres) in the existing homogeneous stand density.

The area proposed for the shelterwood removal cut would directly change elements of stand structure on approximately 16 acres. Removal would be from the larger mature overstory currently overtopping a layer of well-established saplings and poles. Vertical structure would be reduced through the removal of approximately 40% to 50% of the existing overstory. Horizontal structure would increase only slightly from this treatment. This stand would remain two-storied, even-aged and would not change in stand size class.

These proposed stand treatments have a relatively low potential to increase the current incidence of root and stem decays within treatment areas. Due to expected reduction in stand densities and subsequent improvement in growth and vigor in harvest treatment areas, the impact of root and stem decays is expected to remain at, or near, current endemic levels. The risk of stand loss to insects and other diseases is expected to remain at endemic levels as a result of reduced stand densities and subsequent improvement in growth and vigor creating conditions where trees are less stressed and better able to resist attack or infection.

The precommercial thinning activities (approximately 324 acres) would not directly affect forest structure. These stands would remain in the brush/seedling/sapling size class after this treatment.

Alternative C

Direct and Indirect Effects

Forest Composition

The direct and indirect effects of Alternative C on forest composition would be the same as described in Alternative B, except for the commercial thinning and shelterwood preparatory treatments. In this alternative, these treatments would involve approximately 1,067 acres. These treatments would maintain and/or slightly increase the percent of the early-seral component on approximately 852 acres where these species are present but are a minor stand component. On an additional 70 acres, through retention of the existing seral component and reduction in the more shade-tolerant species, the forest type is expected to change from grand fir/Douglas-fir to western larch. Approximately 145 acres of western larch forest type would be maintained in that type longer into the future due to preferential removal of species other than western larch and western white pine. All other direct and indirect effects would be the same as discussed for Alternative B.

Forest Structure

The direct and indirect effects on forest structure of harvest proposals in Alternative C would be the same as described in Alternative B, except for the commercial thinning and shelterwood preparatory treatments. For Alternative C these treatments would be the same as Alternative B, but would affect 1,067 acres. All other direct and indirect effects would be the same as discussed for Alternative B.

Alternative D

Direct and Indirect Effects

Forest Composition

In Alternative D the commercial thinning and shelterwood preparatory treatments (444 acres) would maintain and/or increase the percent of the early serals in stands proposed for treatment in this alternative. There would be a slight increase in early seral representation, predominantly western larch, on approximately 329 acres where these species are present but are a minor stand component. On an additional 49 acres, through retention of the existing seral component and reduction in the more shade-tolerant species, the forest type is expected to change from grand fir/Douglas-fir to western larch. Approximately 66 acres of western larch forest type would be maintained in that type for the long term due to preferential removal of species other than western larch and western white pine.

The clearcut with reserves in Alternative D would regenerate 122 acres currently occupied by grand fir and Douglas-fir with potentially long-lived seral species, primarily western larch and western white pine. Openings as a result of these proposed treatments would range from six acres to 40 acres in size. No shelterwood seed cuts are proposed in this alternative. This would result in an increase of 122 acres of potentially long-lived, early-seral species through artificial regeneration.

In the group shelterwood units for Alternative D, approximately 19 acres would receive a regeneration harvest. This treatment would develop small openings ranging from three to five acres in size distributed throughout the harvest units and would be regenerated with predominantly western larch and western white pine. An additional estimated 21 acres would receive commercial thinning with retention of early serals, where present. These units would remain in grand fir or Douglas-fir forest types, but the percent of early seral species would be maintained in the thinned areas and would increase for the units overall due to reforestation activities in the openings. No irregular shelterwood treatments are proposed in this alternative. No shelterwood removal treatments are proposed in this alternative. All other direct and indirect effects would be the same as discussed for Alternative B.

Forest Structure

Alternative D would directly change forest structure on all proposed units. The change in structure in proposed commercial thin and shelterwood preparatory treatment units would reduce stand density by 30% to 50% (averaging 40%) and open the canopy cover by a corresponding amount. This harvest treatment would remove smaller trees and favor retention of larger diameter and more vigorous trees. This treatment would increase individual tree growth and vigor. This would result in developing mature/large-sized trees over a shorter time frame than would be expected with no treatment. The vertical structure would be reduced as a result of removal of smaller tree classes. Additionally, stand density and crown closure would be reduced. These stand characteristics would increase over time following this proposed activity. These proposed harvest activities would affect up to 444 acres. These treatments would not directly change stand size class due to few trees in the large/mature size class currently present in these stands.

The areas proposed for group shelterwood harvests would directly change structure of the stands. Vertical structure decreases and horizontal structure increases when openings are created in the existing homogeneous stands. In total this activity would create approximately 19 acres of openings, ranging in size from three acres to five acres, scattered throughout the units. These openings would be regenerated with predominantly seral species, and would become brush/seed/sapling size class. The remaining 21 acres within these proposed units would have the same effects as discussed for commercial thinning and shelterwood preparatory treatments above.

The areas proposed for clearcut with reserves would directly change structure of 122 acres within the analysis area.

This treatment would result in two-aged stands with the larger reserved trees scattered throughout the treatment area as an overstory above the planted and naturally regenerated new age class. The larger trees would remain the dominant structure in these stands. These treatments would directly change stand size class in as much as the primary size class would shift from the pole/small/medium size class to the brush/seedling/sapling size class. These treatments would decrease the vertical structure and increase the horizontal structure on 122 acres through creation of openings (ranging in size from six acres to 40 acres) in the existing homogeneous stand density.

All other direct and indirect effects would be the same as discussed for Alternative B.

Alternative E

Direct and Indirect Effects

Forest Composition and Structure

No commercial treatments are proposed under Alternative E, and there would be no direct or indirect effects related to commercial activity in this alternative. Direct and indirect effects would be the same as described under Alternative A.

The proposed precommercial thinnings (324 acres) are, however, included in this alternative proposal. The direct and indirect effects for the precommercial thinning proposal are the same as discussed under the other action alternatives.

Alternative F

Direct and Indirect Effects

Forest Composition

The commercial thinning and shelterwood preparatory treatments (1,052 acres) in Alternative F would maintain and/or increase the percent of the early serals in stands proposed for treatment in this alternative. There would be a slight increase in early seral representation, predominantly western larch, on approximately 837 acres where these species are present but are a minor stand component. On an additional 70 acres, through retention of the existing seral component and reduction in the more shade-tolerant species, the forest type is expected to change from grand fir/Douglas-fir to western larch. Approximately 145 acres of western larch forest type would be maintained in that forest type long term through preferential removal of species other than western larch and western white pine.

The shelterwood seed cuts and clearcut w/reserves in Alternative F would regenerate 157 acres currently occupied by grand fir and Douglas-fir with potentially long-lived, seral species, primarily western larch and western white pine. Openings from these proposed treatments would range from six acres to 40 acres in size. This would result in an increase of 157 acres of potentially long-lived, early-seral species through artificial regeneration.

In the group shelterwood and irregular shelterwood treatment units (79 acres), approximately 30 acres would receive a regeneration harvest. This treatment would develop small openings ranging from three to five acres in size distributed throughout the harvest units and would be regenerated with predominantly western larch and western white pine. An additional estimated 49 acres would receive commercial thinning with retention of early serals, where present. These units would remain in grand fir or Douglas-fir forest types, but the percent of early seral species would be maintained in the thinned areas and would increase for the units overall due to reforestation activities in the openings.

In the shelterwood removal cut unit, approximately 16 acres would have a portion of the remaining overwood removed. This unit is expected to have approximately five acres of regeneration needs which would be planted to early seral species. On the remaining 11 acres the existing component of early seral would be retained, but the stand would remain in Douglas-fir forest type.

These proposed stand treatments have a relatively low potential to increase the current incidence of root and stem decays within treatment areas. Due to expected improvement in growth and vigor in areas of intermediate harvest treatments and the increased representation of more seral species, the impact of root and stem decays is expected to remain at, or near, current endemic levels. The risk of stand loss to insects and other diseases is expected to remain at endemic levels as a result of increased representation of long-lived, early-seral species in the areas proposed for treatment under this alternative.

Under Alternative F and the other action alternatives 324 acres of existing plantations are proposed for pre-commercial thinning. Stand composition for these stands is currently early seral, predominantly western white pine and western larch. Through selective thinning, the early seral component would be maintained on these acres.

Forest Structure

Alternative F would directly change forest structure on all proposed units. The change in structure in proposed commercial thin and shelterwood preparatory treatment units would reduce stand density by 30% to 50% (averaging 40%) and open the canopy cover by a corresponding amount. This harvest treatment would remove smaller trees and favor retention of larger diameter and more vigorous trees. This treatment would increase individual tree growth and vigor. This would result in developing mature/large-sized trees over a shorter time frame than would be expected with no treatment. The vertical structure would be reduced as a result of removal of smaller tree classes. Additionally, stand density and crown closure would be reduced. These stand characteristics would increase over time following this proposed activity. These intermediate harvest activities would affect up to 1,052 acres. These treatments would not directly change stand size class due to few trees currently in the large/mature size class currently present in these stands.

The areas proposed for group shelterwood and irregular shelterwood harvests would directly change structure of the stands. Vertical structure is decreased and horizontal structure is increased by creating openings in the existing homogeneous stands. In total this activity would create approximately 30 acres of openings, ranging in size from two acres to five acres, scattered throughout the units. These openings would be regenerated predominantly with seral species, and would become brush/seed/sapling size class. The remaining 49 acres in these proposed units would have the same effects as the commercial thinning and shelterwood preparatory treatments above.

The areas proposed for shelterwood seed cut and clearcut with reserves would directly change structure of 157 acres within the analysis area. This treatment would result in two-aged stands with the larger reserved trees scattered throughout the treatment area as an overstory above the planted and naturally regenerated new age class. The larger trees would remain the dominant structure in these stands. These treatments would directly change stand size class in as much as the primary size class would shift from the pole/small/medium size class to the brush/seedling/sapling size class. These treatments would decrease the vertical structure and increase the horizontal structure on 157 acres through creation of openings (ranging in size from six acres to 40 acres) in the existing homogeneous stand density.

The area proposed for the shelterwood removal cut would directly change elements of stand structure on approximately 16 acres. Removal would be from the larger mature overstory currently

overtopping a layer of well established saplings and poles. Vertical structure would be reduced through the removal of approximately 40% to 50% of the existing overstory.

Horizontal structure would increase only slightly as a result of this treatment. This stand would remain two-storied, even-aged and would not change in stand size class.

These proposed stand treatments have a relatively low potential to increase the current incidence of root and stem decays within treatment areas. Due to expected reduction in stand densities and subsequent improvement in growth and vigor in harvest treatment areas, the impact of root and stem decays is expected to remain at, or near, current endemic levels. The risk of stand loss to insects and other diseases is expected to remain at endemic levels as a result of reduced stand densities and subsequent improvement in growth and vigor creating conditions where trees are less stressed and better able to resist attack or infection.

The precommercial thinning activities (approximately 324 acres) would not directly affect forest structure. These stands would remain in the brush/seedling/sapling size class after this treatment.

Alternative B, C, D E, and F

Cumulative Effects

Forest Composition Resulting from Stand Treatments (Alternatives B, C, D, F)

On National Forest System (NFS) lands the contribution of long-lived seral species to stand composition is expected to increase. This would be the result of preferential removal of species other than long-lived seral in intermediate treatment activities and reforestation activities that preferentially select and maintain long-lived early serals within the stands.

On ownerships other than Forest Service, the contribution of long-lived seral species is expected to be static or potentially decrease. This is the result of preferential removal of these species due to market value. During reforestation activities the preferential selection and maintenance of long-lived seral species has not been as intensive on other ownerships as on NFS lands.

Cumulatively, only a slight incremental increase in the contribution of long-lived seral species is expected to result from vegetation management activities within this analysis area.

Forest Structure Resulting from Stand Treatments (Alternatives B, C, D, F)

On NFS lands the tree and stand size classes in intermediate harvest areas are expected to increase due to retention of larger tree classes combined with improved growth and vigor of trees and stands. In areas receiving regeneration treatments the tree and stand size classes are expected to decrease due to removal of overstory trees. In areas proposed for precommercial thinning the tree and stand size classes are expected to increase over time due to improved growth and vigor resulting from treatment.

Intermediate harvest activities on ownerships other than Forest Service are expected to occur. On intermediate harvest areas the tree and stand size classes are expected to increase, but at a lesser extent than on National Forest System (NFS) lands. This is due to management policies that preferentially remove the larger tree classes. The effects of regeneration and timber stand improvement activities on these ownerships would be similar to those on NFS lands.

Cumulatively, only a slight incremental increase in tree and stand size class resulting from vegetation management activities within this analysis area is expected.

The vertical structure complexity is expected to decrease, and horizontal structure complexity is expected to increase on both NFS lands and other ownerships within this analysis area. This is due to removal of tree classes (vertical structure) and creation of openings (horizontal structure) related to various management activities. Both of these structural elements would increase in complexity over time. Cumulatively, the decrease in vertical structure and increase in horizontal structure for the analysis overall would be slight, or incremental.

Published research discloses that forest management activities can exacerbate impacts of insects and disease above endemic levels, and those impacts may continue for long periods of time. Because of that concern, a literature review was accomplished related to insect and disease response to management activities, especially root and stem decays. These studies reveal both potential benefits and risks related to management activities in stands when dominated by susceptible species. In reviewing numerous studies, the general recommendations for long-term management were to:

- promote a mixed species composition which includes strong representation of shade intolerant long-lived early seral species,
- promote improved growth and vigor to enhance abilities to resist or survive insect attack or disease infection,
- minimize damage to boles and root systems during management activities to minimize the opportunities for attack and infection.

Some studies discourage intermediate treatments, and recommend that no entries be made until the stand can be reestablished (regeneration harvest) with less susceptible species. Other studies promote stand management for long-term improvements, but provide precautionary activities to minimize the risk of promoting long-term, negative results. Specific to this analysis area, proposed treatment stands dominated by root and stem decay susceptible species (grand fir, Douglas-fir and western hemlock) were reviewed for current levels and the potential for increasing the incidence of root and stem decays. A review of existing stand data (project file (PF): Veg-10, Veg-12, SOG-9) for the type and extent of insect and disease activity was accomplished. An on-site stand reconnaissance and diagnosis was done in each potential treatment stand (PF: Veg-28, Veg-29) which included observations of existing insect and disease, including the level of root and stem decays. Experience in this local area historically has shown only a small increase in the incidence of root and stem decays following intermediate stand treatment activities. As a result of this review and analysis, root and stem decays are expected to have only a slight increase in intermediate treatment areas, remain at low (endemic) levels in regeneration treatments, and small to moderate increases in untreated areas on all ownerships within this analysis area. Losses from insects and diseases other than root/stem decays are expected to decrease on all ownerships due to improved growth and vigor resulting from management activities. An exception to this is losses to western white pine due to blister rust, which is expected to continue at or near the current rate. The effects of insects and disease would be a slight decrease in tree/stand size class and vertical structure, and a slight increase in horizontal structure resulting from proposed management activities. This is primarily due to the improvements in stand growth and vigor, and improvement in species composition throughout the analysis area. Cumulatively, the effects of insects and disease on vertical and horizontal structure, as well as tree/stand size class would be incremental.

Cumulative Effects on Vegetation from Other Activities

(Alternatives B, C, D, E, F)

Aggressive suppression of wild fires is expected to continue. As a result, the trends in stand structure and composition related to the absence of fire are also expected to continue. The rate of change influenced by the lack of wildfires is relatively slow over time, resulting in expected incremental cumulative effects on the vegetation resource over time. Prospecting and exploration for garnets will involve removal of some trees and would minimally disturb other vegetation. This activity would have no cumulative effect on vegetation.

Field survey and other data gathering would not impact vegetation and would have no cumulative effects on the vegetation resource.

Weed control would impact populations of noxious weeds, but would not impact trees and other general vegetation in this analysis area. No cumulative effects on the coniferous vegetation resource are expected from weed control.

Public activities, primarily related to various recreational activities, are expected to have only slight direct and indirect effects, and no cumulative effects on the vegetation resource. Examples of this type of activity are berry picking, hiking, hunting, wood gathering and similar activities.

Transmission line, railroad and forest road maintenance activities are repetitive and ongoing. These activities generally keep these facilities in a relatively static condition and little to no change occurs over time. As a result, no cumulative effects on the vegetation resource are expected.

Potential road construction impacts structure through incrementally decreasing vertical structure, and incrementally increasing horizontal structure. Cumulatively, this activity is expected to have only slight, or incremental, effects on the vegetation resource for this analysis area.

Current and potential permitted grazing impacts are minimal throughout this analysis area. Isolated minor grazing damage, either from feeding or trampling, has been seen or noted in the existing plantations and regeneration areas on NFS lands. Cumulatively, this activity is expected to have no or very slight, incremental effects on vegetation.

Consistency with Forest Plan and Laws

Specific goals, objectives and standards for timber management are described in the Forest Plan on pages II-2, II-8 and II-32. All alternatives are consistent with these guidelines. All action alternatives comply with Appendix A, Summary of Timber Information and Vegetation Management, providing direction for silvicultural practices on the Idaho Panhandle National Forests. The activities described for the action alternatives are consistent with this direction.

Proposed management activities are designed to improve stand health and vigor, and maintain or enhance species composition and stand structure. This would minimize risk of stand loss from forest insects and disease as well as reduce risk of stand loss to weather, fire or other disturbances.

All proposed openings are within size limitations directed by NFMA and the Forest Plan. Openings would be naturally or artificially regenerated. Review of regeneration indices for the District and the analysis area display adequate ability to regenerate these openings within the five-year period as

directed in NFMA and the Forest Plan (VEG-25, SVEG-2). As part of this analysis, stands proposed for a regeneration treatment were determined to have reached culmination of mean annual increment or are at risk due to reducing growth rates and increasing mortality rates from insects or disease (PF: VEG-28 Stand Diagnosis Matrix; VEG-29 Stand Reconnaissance).

All proposed vegetative treatments integrated other resource needs through design development during alternative development and analysis.

All proposed vegetative treatments are on lands suitable for timber production. Harvest systems were evaluated (PF: VEG-28 Stand Diagnosis Matrix; VEG-29 Stand Reconnaissance), and the optimal treatment methods for meeting the purpose and need were proposed.

Heritage Resources

In accordance with the National Historic Preservation Act of 1966, as amended, this documents the procedures used in identifying and evaluating heritage resources within the Hidden Cedar Project Area. The Idaho Panhandle National Forests (IPNF) Forest Plan requires systematic heritage resource inventory prior to ground-disturbing activities and the preservation of significant heritage resources in place whenever possible. The IPNF Forest Plan also requires consultation with the State Historic Preservation Officer to determine significance of historic properties. This site evaluation process is outlined in the Programmatic Agreement among the United States Department of Agriculture, Forest Service, Northern Region, The Advisory Council on Historic Preservation, and the Idaho State Historic Preservation Officer regarding Cultural Resources Management on Region 1 National Forests in the State of Idaho. This includes consultation with Native American groups to determine if sites of religious or cultural significance are in the area.

The analysis area for heritage resources is the project area of the Hidden Cedar Project. The project area has been systematically surveyed for heritage resources through eighteen previously proposed projects. Four areas in the Hidden Cedar Project were reexamined for this supplement based on information obtained during field review. These surveys and known and newly discovered sites have been documented and recorded in past and current inventory reports. In addition to field surveys, historic records, maps, and photos were reviewed for confirmation of known sites and to possibly identify new sites. Site information is exempt from mandatory disclosure pursuant to the Freedom of Information Act, 5 USC 552(b)(5). Additional surveys for any newly discovered sites would be documented in accordance with established Forest procedures. There has been adequate inventory coverage on all potential impact areas within the project area.

Most of the National Forest portion of the project area is on what is called “acquired lands,” which means there were other landowners prior to the land being acquired for the National Forest. With most of the project area being within one mile of a major river and travelway, there has been a great deal of development and many activities. Euroamerican settlement increased with the construction of the railroad between St. Maries and Bovill in the early 1900s. Land management involved settlement, agriculture, logging, tree planting, fire protection, building roads and trails, range allotments for cattle and sheep and blister rust control. The community of Clarkia became an important center and “jump – off” point. Most sites identified within the project area date to the historic period and are related to turn of the century settlement, railroad construction, logging, and

Forest Service (fire protection, Civilian Conservation Corp camps and blister rust control) activities. There are no known prehistoric sites.

Alternative A

Direct, Indirect, and Cumulative Effects

There are no direct, indirect or cumulative effects expected with the No-Action Alternative.

Alternatives B, C, D, E, and F

Direct, Indirect, and Cumulative Effects

The proposed action alternatives include timber harvest, road reconstruction and road construction. All ground-disturbing activities can potentially affect heritage resources. The preferred method for conservation of these resources is avoidance, and this is planned for the action alternatives. One heritage resource (a segment of the old wagon road between Bovill and Clarkia) would be crossed twice by new road construction. A project is considered to have an adverse effect when the effect diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling or association. An analysis of the proposed crossings of the wagon road concluded that the action would have no adverse effect to the Bovill to Clarkia Road. The features of the road that make it significant would not be altered or destroyed by the proposed road construction or timber sale activities.

There is potential for finding additional sites during project implementation. If additional sites are discovered, the sites would be inventoried and then protected if found to be of historic significance. The decision to avoid, protect, or mitigate impacts to these sites would be in accordance with the National Historic Preservation Act. The timber sale contract provision *C6.24 # Protection of Cultural Resources* would be included in the timber sale contract to ensure protection of heritage sites located during project implementation. With site avoidance being the method to preserve heritage resources and the effects on the Bovill to Clarkia Wagon Road confined to two short segments, the proposed actions are basically the same as no action in terms of effects to the heritage resource. There are no expected direct, indirect or cumulative effects to significant heritage resources with implementation of the action alternatives. No potentially significant effects have been identified.

Consistency with the Forest Plan and Laws

Systematic inventory and reports are complete for this project area, the Idaho Historic Preservation Office and Native American groups have been given the opportunity to comment. The area of potential effect included areas of previous projects that were inventoried for heritage resources. In accordance with the Programmatic Agreement among the United States Department of Agriculture, Forest Service, Northern Region (Idaho), The Advisory Council on Historic Preservation, and the Idaho State Historic Preservation Officer regarding Cultural Resources Management on National Forests in the State of Idaho and the related Site Investigation Strategy 2001 of the Idaho Panhandle National Forests no further inventories were carried out. The project was discussed with representatives of the Coeur d'Alene Tribe during a meeting on March 24, 2006. All alternatives comply with the National Historic Preservation Act and the Idaho Panhandle National Forests Forest Plan.

Minerals

Regulatory Framework

Minerals land management goals as identified in the Forest Plan are to provide opportunities for mineral exploration and development in compliance with laws and regulations. The Management Areas where minerals of interest lie are Management Areas 1, 4 and 5. There are no specific standards identified for these management areas; however, all of these management areas are compatible with potential minerals development.

Analysis Area and Methods

The analysis area for minerals is the project area as defined in Chapter 1. The minerals overview was developed by reviewing files and on-site visits. The analysis period is five years.

Affected Environment

There has been limited mining activity in the Hidden Cedar Project Area due to the underlying mica schist geology in several drainages (Wood, Hidden and Cat Spur Creeks) and Bechtel Butte. There are industrial quality garnet sands and/or gem quality faceting and star garnets known to be in these areas. These minerals are on NFS land that has been "acquired" under the authority of the Weeks Law of 1911. Acquired lands are open to prospecting and development only through prospecting permits and leases authorized by various minerals leasing laws.

Over the years, there has been unauthorized public digging (i.e. without permits of any kind) in the search for garnet gemstones on Bechtel Butte and within Cat Spur and Wood Creeks.

There have been recent (last five years) prospecting permits for garnet gemstones on Bechtel Butte (current, on-going) and in a tributary of Cat Spur Creek (previous and reasonably foreseeable at beginning of Chapter 3). Currently, there is Preference Rights Lease for garnet on Bechtel Butte. These are ongoing activities.

Environmental Consequences

Alternative A

Direct, Indirect Effects

The No-Action Alternative would have no direct or indirect effects on the minerals resource.

Cumulative Effects

No cumulative effects would occur from the alternative for this project to the minerals resource. Unauthorized digging for gemstones would likely continue to occur under all alternatives.

Alternatives B, C, D, E, and F

Direct and Indirect Effects

The proposed alternatives include vegetation management, road building and/or road removal. All of the action alternatives may create temporary conflicts between land management activity – related traffic and traffic associated with mining. There would be no direct or indirect effects on the minerals resource from implementation of any of the action alternatives. Proposed road changes would not affect access for current permitted mineral activities.

Cumulative Effects

No cumulative effects would occur from the alternatives for this project to the minerals resource. Unauthorized digging for gemstones would likely continue to occur under all alternatives.

Consistency with the Forest Plan and Laws

All of the alternatives would be within Forest Plan Standards for minerals, i.e. they would not preclude minerals development.

Noxious Weeds

Changes Between the 2002 FEIS and this FSEIS

The changes to the Hidden Cedar Project did not affect the analysis for noxious weeds. The changes in estimated timber harvest and miles of road construction and obliteration are slight. The largest change in estimated timber sale acreages is a decrease of four acres in Alternative C with smaller changes in the other alternatives. The general proportion of logging systems and prescriptions is very similar, and the change in estimated acres does not change analysis conclusions from the original project (project file (PF): SB-1). Differences in road construction between the two projects can generally be measured in tenths of a mile except for Alternative F (2.3 fewer miles). Differences in road decommissioning range from two fewer to three more planned miles depending on the alternative.

Regulatory Framework

Direction regarding the development and coordination of programs for the control of noxious weeds, and evaluation of noxious weeds in the planning process is found in federal legislation, regulations, and policy.

The National Forest Management Act (1976) has a goal of providing of a diversity of plant and animal communities and established the disclosure requirements for proposed noxious weed control activities on NFS lands. The Idaho Panhandle National Forests, Forest Plan (1987) and Forest Service Manual (Chapter 2080, as amended, 1995) prioritize weed treatments and state that noxious weeds will be controlled with an integrated pest management approach. In addition, the Idaho Panhandle Forest Plan and the Federal Noxious Weed Act of 1974 as amended require cooperation with State, local, and other federal agencies in managing and controlling noxious weeds. The state of

Idaho also requires landowners to control weeds on their property under the Noxious Weed Act, Title 22, Chapter 24 Idaho Code.

Analysis Area

The geographic scope of analysis for noxious weeds in this project is the Hidden Cedar Project Area. This is the largest area upon which a meaningful analysis can be done. Effects from proposed activities within the project area would be difficult to isolate from effects due to unrelated activities elsewhere. Discussion of these unrelated effects would not provide meaningful information about proposed project effects. Weed populations may expand beyond the project area boundary, but this is not expected to occur to any great extent within the time scale of the project. However, should it occur, the threat posed by expansion is minimal because much of the disturbed habitat outside of the project has already been colonized by weeds.

Analysis Methods

The St. Joe Noxious Weed Project FEIS (USDA 1999) lists 34 undesirable species that can be targeted for treatment and their level of infestation on the St. Joe Ranger District (PF: NW-1). Disturbed areas often translate into potential weed habitat. Weed species are adept at colonizing recently disturbed areas particularly if light levels increase. Once established, species can grow and spread quickly and effectively exclude native vegetation from the site. Timber harvesting can impact large areas of land, making them suitable for weed establishment. Burning may also promote weed spread under certain conditions for some species by reducing the density and competitiveness of native species and allowing for weed establishment (Hobbs and Huenneke 1992). On average, road construction/ reconstruction results in 5.6 disturbed acres per mile (PF: NW-2).

Affected Environment

Noxious weeds are plant species that have been officially designated by federal, state or county officials. The Federal Noxious Weed Act of 1974 defines a noxious weed as "a plant which is of foreign origin, is new to, or is not widely prevalent in the United States, and can directly or indirectly injure crops or other useful plants, livestock or the fish and wildlife resources of the United States, or the public health" (P.L. 93-629). The Idaho Noxious Weed Law definition is any exotic plant species that is established or that may be introduced in the State, which may render land unsuitable for agriculture, forestry, livestock, wildlife, or other beneficial uses and is further designated as either a State wide or County wide noxious weed (Idaho Code 24 Chapter 22). Both federal and state definitions pertain primarily to competition with commodity land uses, although weeds also impact non-commodity resources such as water quality (Lacey et al. 1989), wildlife (Rice et. al. 1997) and natural diversity (Forcella and Harvey 1983, Tyser and Key 1988, Williams 1997).

Historic Condition

Historically, it can be assumed that there were no noxious weeds within the project area. The weeds included in the St. Joe Noxious Weed Project FEIS (USDA 1999) for treatment on the St. Joe Ranger District originate in Europe and Asia. Before widespread human disturbance, travel, and commerce seed sources were not available for these plants. The first recorded sightings of any species on the St. Joe Ranger District's noxious weed list occurred in 1895, 1907, and 1929 in Shoshone, Latah, and Benewah Counties respectively (PF: SB-8). Human disturbance was minimal prior to the turn of the

century (see Heritage Resources, Chapter 3). Early in the 1900s settlement began to increase which may explain the appearance of weeds.

Existing Condition

The St. Joe Geographic Assessment (USDA 1997) indicates that weeds within the project area are likely present in recently disturbed areas and roads. The full extent of weed infestations within the project area is unknown. Inventories completed for the St. Joe Weed EIS (USDA 1999) indicate populations of spotted knapweed (*Centaurea biebersteinii*), meadow hawkweed (*Hieracium pratense*) and sulphur cinquefoil (*Potentilla recta*) within the project area. Houndstongue (*Cynoglossum officinale*) and oxeye daisy (*Leucanthemum vulgare*) have also been noted in more recent visits to the project area. In the Dutch and Anthony drainages spotted knapweed and St. John's wort (*Hypericum perforatum*) are well established on Road 1486. Cat Spur Creek is heavily infested with St. John's wort.

Weeds were treated at various locations within the project area manually and through herbicide spraying in 1998 1999, 2002, 2003, 2004 and 2005. Biological control agents were released in the project area in 2001.

The St. Joe Geographic Assessment (USDA 1997) contains an appendix that classifies the ecological condition for certain landscape areas. The Hidden Cedar Project Area is mostly contained within Landscape Analysis Area (LAA) 12 (West Fork of the St. Maries River) but also has a portion within LAA 11 and LAA 13. All three of these areas are designated as having established weed populations throughout the LAA with no realistic opportunity for changing broad landscape pattern (PF: SB-9).

Environmental Consequences

Alternative A

Direct and Indirect Effects

Under this alternative, weed populations may decline in some areas as canopy cover increases. Populations would persist longer along the roads due to more frequent disturbances and higher light levels for longer periods than in surrounding forest stands. Here they would provide a seedbank that could spread the species along the road system. Overall, weed numbers would likely increase very gradually due to transport of weed seeds and activities on other ownerships. However, such an expansion is not likely to be noticeable or to become a threat to other natural resources in the area within the time frame of the project.

Cumulative Effects

Cumulative effects are the result of past present and future activities on all ownerships within the area. The cumulative effects discussion under the action alternatives is pertinent to Alternative A as well. Current and reasonably foreseeable projects such as grazing, timber harvest, road construction and garnet digging may result in the creation of new habitat for noxious weeds. However, some of these activities are very small in scale and all have or will have features to control the spread of noxious weeds. Gopher control is not a ground-disturbing activity and would have no effect on weed populations.

The St. Joe Noxious Weed Control Project EIS (1999) identifies the grazing allotments (Emerald, Cat Spur, Keeler and Merry Creek) as potential treatment areas. Weed control activities within these areas will be scheduled as funding and other priorities allow. Weeds may also be treated in areas not specified in the St. Joe Noxious Weed Control Project EIS (1999) by following the adaptive management strategy outlined within that document. Activities on state and private land in the future are uncertain. Private access requests will likely result in approximately 7.5 miles of new road construction in the area (5.5 miles on other lands and two miles on National Forest lands). It is also assumed that timber harvest will occur in the area on private and state lands. The extent of noxious weed control activities on private land in the area is unknown at this time.

Since approximately 40% of the project area is federally managed, lack of weed control and prevention measures by others may contribute to weed expansion. Overall, the effect of all activities is expected to result in the gradual increase in weed numbers within the area over time, especially if control methods are not employed.

Effects Common to All Action Alternatives

Direct and Indirect Effects

The direct effect of ground-disturbing activities on noxious weeds is to increase the area available for weed colonization. The greatest potential for the establishment of weeds comes from activities that disturb the soil to the greatest extent. In this respect new road construction, road obliteration, skid trails, log landings, and timber harvests have the highest potential to create suitable weed habitat. Road reconstruction, reconditioning, and storage impact already disturbed areas and so would not create new potential habitat. Timber harvest prescriptions and methods differ in the extent to which they might promote noxious weed colonization. In general, the smaller the openings created and the less work done in the remaining stand, the smaller the opportunities for weed colonization. In this respect, commercial thinning (CT), shelterwood preparatory cuts (SW1), group shelterwood cuts (GSW), and irregular shelterwood cuts (SW) would pose the lowest risk of spreading weeds, while shelterwood seed cuts (SW2), and clearcuts (CC) would pose the highest. Shelterwood removal cuts (removal of remaining seed trees) does not pose much of a risk in that it does not increase canopy openings, few trees are left to harvest, and the majority of the ground disturbance in the stand has already happened. Ground-based yarding may promote the spread of weeds more than any other yarding method due to the greater extent of ground disturbance and use of machinery. Proposed design features such as washing logging equipment prior to work on site, keeping skid trails to a minimum, skidding over slash, and seeding certain skid trails would help to minimize these effects. Cable yarding would have an intermediate effect, and helicopter yarding would have the least effect due to level of ground disturbance of the three methods.

To reduce the availability of colonization sites for weeds, all obliterated roads and landings off of specified roads would be seeded with certified weed-free mixes the year of obliteration**.** Any mulching agents would also be certified noxious weed free. In addition, all off-road logging and construction equipment would be cleaned prior to entering the project area in order to remove noxious weeds (Design Feature 4).

Indirect effects of project activities could be the possible establishment of new weed populations or the expansion of existing populations. Effects associated with weed population enlargement may include declines in the palatability or abundance of wildlife and livestock forage, declines in native plant diversity, reductions in the aesthetic value of the landscape, encroachment upon rare plant

populations and their habitats, potential reductions in soil stability and subsequent increases in erosion (Lacey 1989), and an overall decline of ecosystem health. The potential for the spread of existing noxious weeds and the introduction of new species exists for all alternatives.

Established weed populations along right-of-ways and water courses on National Forest lands may provide a source of seeds for infestation of other ownerships (and vice versa). The possibility for weed establishment can be roughly correlated to the amount of ground-disturbing activity and increases in light levels that would take place. The potential for weed spread would be less with the No-Action Alternative than for the action alternatives, but existing populations would probably continue to spread due to seed transport by vehicular traffic, cattle, wildlife, and other natural dispersal methods. Major haul roads would be sprayed prior to timber harvest in order to decrease the opportunity for the transport of weeds (Design Feature 4A).

Site preparation and planting will occur in areas where timber harvest has already taken place and are not expected to result in the creation of additional new weed habitat.

Gopher control is not a ground-disturbing activity and would have no effect on weed populations.

Riparian planting and associated fencing would not result in the creation of new weed habitat.

Pre-commercial thinning would result in an increase in light levels reaching the forest floor; however, it is not a ground-disturbing activity and is not expected to create additional weed habitat

Cumulative Effects

Current infestations of noxious weeds are a result of past and current activities in this area. Other federal projects that would affect this area include the proposed project, timber harvest, grazing, and garnet digging and testing. Any ground-disturbing activities associated with these projects may result in the creation of new habitat for noxious weeds. Design criteria exist to limit the spread of weed seed and establishment of new populations, but are not expected to halt such spread completely.

The St. Joe Noxious Weed Control Project EIS (1999) identifies the grazing allotments (Emerald, Cat Spur, Keeler and Merry Creek) as potential treatment areas. Weed control activities within these areas will be scheduled as funding and other priorities allow. Weeds may also be treated in areas not specified in the St. Joe Noxious Weed Control Project EIS (1999) by following the adaptive management strategy outlined within that document. Activities on state and private land in the future are uncertain. Private access requests will likely result in approximately 7.5 miles of new road construction in the area (5.5 miles on other land and two miles on National Forest lands). It is also assumed that timber harvest will occur in the area on private and state lands. The extent of noxious weed control activities on private land in the area is unknown at this time.

Even under the No-Action Alternative of the Hidden Cedar Project, weed populations are expected to remain stable at best. Other federal activities have built-in features to control the spread of noxious weeds. However, given that the majority of land in the area is not in federal jurisdiction, lack of weed control and prevention measures by others may contribute to weed expansion. The overall effect of all activities is expected to result in the gradual increase in weed numbers within the area over time if control methods are not employed. Such increases may not be discernable within the time frame of this project, and will vary depending upon the extent of disturbances.

Alternative B

Direct and Indirect Effects

The proposed project activities would result in a greater potential for weed spread as compared to the No-Action Alternative, due to the degree of ground disturbance (see Table 3-33). Design features are expected to minimize this threat. However even with associated weed control methods, weed species may colonize post-disturbance areas, although the extent may be small.

Alternative C

Direct and Indirect Effects

The amount of timber harvest would be greatest under this alternative. However, only an additional 25 acres of harvest, all of it commercial thinning, would be done as compared to Alternative B. In addition, over 80% of timber harvest would be done using helicopter yarding as compared to approximately 30% in Alternative B (see Table 3-33). This would create less ground disturbance compared to that alternative. There is also less road construction associated with this alternative than with Alternative B (see 3-34). Overall, the degree of ground disturbance under this alternative should be less than that of Alternative B in spite of the slight increase in thinning acres, given the differences in yarding and reductions in road work.

Alternative D

Direct and Indirect Effects

This alternative includes less clearcutting and over half as much less timber harvest overall than either Alternative B or C. The proportions of harvest done by the differing yarding methods are comparable to Alternative C, with approximately 70% of timber harvest being accomplished by helicopter yarding. There would be the same amount of new road construction but substantially more road obliteration than in Alternatives B and C (see Table 3-34). However, the increase in the amount of these higher-risk activities is more than offset by the overall reduction in timber harvest, and should result in less potential new habitat being created than in Alternatives B and C.

Alternative E

Direct and Indirect Effects

No timber harvest would occur under this alternative, but in all other respects, it would be the same as Alternative D (Table 3-34). Of all action alternatives, this one may potentially create the least new habitat for noxious weeds and contribute the least to cumulative effects.

Alternative F

Direct and Indirect Effects

Most timber harvest would be through timber prescriptions other than clearcut or shelterwood seed cut in both Alternative B and F (see Table 3-34), and the total acres of timber harvest are 5% less than Alternative B (Table 3-33). Alternative F has 5% more acres to be harvested by helicopter, and 2% and 3% less to be harvested by ground-based and cable yarding respectively than does Alternative B (Table 3-33). Alternative F proposes 7% less miles of new road constructed and 50% more road obliteration (Table 3-34). The extent of activities proposed under Alternative F would

result in a slightly smaller potential for weed spread as compared to Alternative B due to the reductions in the amount of ground disturbance.

Table 3-33 Approximate Acres Impacted by Each Harvest Prescription and Method

		Approximate Acres			
Alt.	**Prescription**	**Helicopter**	**Ground-Based**	**Cable**	**Total**
B	Commercial thin	305	250	271	826 (60%)
	Shelterwood preparatory cut	48	23	145	216 (16%)
	Shelterwood seed cut	0	6	33	39 (3%)
	Shelterwood removal cut	0	1	15	16 (1%)
	Irregular shelterwood cut	0	25	48	73 (5%)
	Group shelterwood cut	55	2	0	57 (4%)
	Clearcut w/ reserves	22	34	84	140 (10%)
	Total	430	341	596	1,367 (99%)
C	Commercial thin	790	12	49	851 (61%)
	Shelterwood preparatory cut	130	8	78	216 (16%)
	Shelterwood seed cut	0	6	33	39 (3%)
	Shelterwood removal cut	16	0	0	16 (1%)
	Irregular shelterwood cut	73	0	0	73 (5%)
	Group shelterwood cut	55	2	0	57 (4%)
	Clearcut w/ reserves	80	17	43	140 (10%)
	Total	1144	45	203	1,392 (100%)
D	Commercial thin	280	6	37	323 (53%)
	Shelterwood preparatory cut	42	6	73	121 (20%)
	Group shelterwood cut	40	0	0	40 (7%)
	Clearcut w/ reserves	61	17	42	120 (20%)
	Total	423	29	152	604 (100%)
F	Commercial thin	359	238	238	835 (64%)
	Shelterwood preparatory cut	48	20	148	216 (17%)
	Shelterwood seed cut	0	6	33	39 (3%)
	Shelterwood removal cut	0	1	15	16 (1%)
	Irregular shelterwood cut	0	9	13	22 (2%)
	Group shelterwood cut	57	0	0	57 (4%)
	Clearcut w/ reserves	9	25	82	116 (9%)
	Total	473	299	529	1,301 (100%)

Acres were rounded to nearest whole number which resulted in some small discrepancies.

Alternative F has about 91 fewer acres of harvest (16 acres of commercial thinning, 51 acres of irregular shelterwood cut, and 24 acres clear cuts with reserves) as compared to Alternative C. Timber harvest would be done more equally across harvest methods in Alternative F as compared to the nearly 80% helicopter harvesting proposed in Alternative C (Table 3-33). There would be more road construction with this alternative than in Alternative C (see Table 3-34). Based on the Hidden Cedar Roads Analysis, approximately 5.6 acres/mile would be disturbed by road construction on average. This would result approximately 34 additional acres being disturbed by road construction in Alternative F than in Alternative C. Some of these road acres would then be put into storage or

obliterated. Overall, the degree of ground disturbance under this alternative may be comparable to that of Alternative C given the reductions in timber harvest but increases in road construction.

Alternative F has approximately 697 more acres of timber harvest as compared to Alternative D (Table 3-33). Approximately 70% of all timber harvest in Alternative D would be done by helicopter, and only 5% would be done by ground-based yarding, in contrast to the 36% helicopter and 23% ground-based yarding in Alternative F.

Alternative F would also have nearly 25% more road construction than Alternative D. Compared to Alternative D, Alternative F would result in a much greater potential for weed colonization and expansion due to the larger amount of ground disturbance.

The creation of new weed habitats and probability of weed transport would be much smaller in Alternative E compared to Alternative F due to a lack of timber harvesting and lesser road construction.

Table 3-34 Approximate Acres or Miles of Ground Disturbance on NF System Lands

Activity	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
CC and SW2 (acres)	None	156	156	120	None	132
CT, SW, SW1, & GSH (acres)	None	1172	1197	484	None	1130
Road construction (miles)*	None	11.1	2	2	2	8.1
Road obliteration-full and partial (miles)	11	13	13	27	27	26

**Includes access request on FS lands, new and temporary construction (See Chapter 2).*

Consistency with Forest Plan and Laws

According to the Idaho Panhandle Forest Plan (1987) direction, infestations of many noxious weed species, including spotted knapweed, meadow hawkweed, and goatweed are so widespread that control would require major programs that are not possible within expected budget levels (Forest Plan, p. II-7). Forest Plan direction is to "provide moderate control actions to prevent new weed species from becoming established" and to treat noxious weeds with an integrated pest management approach. Alternatives B, C, D, E, and F would meet the intent stated in the Forest Plan for moderate control, through the implementation of design features (Chapter 2). Any weed control within the project area shall be done in accordance with the principles of integrated pest management, which is also consistent with the Forest Plan. The No-Action Alternative would also meet the intent of the Forest Plan by not creating new habitat for the introduction of noxious weeds. All alternatives comply with other laws.

Old Growth

Changes Between the Draft SEIS and the Final SEIS

In order to address a comment from the public (Appendix E) the Final SEIS includes an analysis of allocated old growth in relation to open roads.

Introduction

This section addresses the current allocated old growth related to the Hidden Cedar Analysis Area. This analysis involves three Old Growth Management Units (OGMUs) on the St. Maries portion of the St. Joe Ranger District (Maps M-21, M-22, M-23, M-24). Those three old growth management units (OGMU 1, 9 and 14) are used as the analysis area for old growth related to this project.

Regulatory Framework

The regulatory framework providing direction for the management of forest vegetation, including old growth, is provided through the *National Forest Management Act* and the *Forest Plan for the Idaho Panhandle National Forests* (USDA Forest Service, 1987).

NFMA provides for balanced consideration of all resources. It requires the Forest Service to plan for diversity of plant and animal communities. The Forest Plan, in compliance with NFMA, establishes Forest-wide management direction, goals, objectives, standards and guidelines for the management of forest vegetation and plant communities.

Direction concerning implementation of NFMA and the Forest Plan can be found in Forest Service Manuals (FSM) and Handbooks (FSH), as well as various written communications from the Forest Service's Washington Office, Regional Office and the Supervisor's Office for the Idaho Panhandle National Forests.

More specifically, direction in the Forest Plan (page II-5) states that "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. To obtain the desired distribution, the IPNF will be managed to maintain approximately 5 percent of each old-growth unit as old growth where it exists." As part of a Forest-wide process the District(s) identified stands meeting old growth criteria. Stands were then allocated to old growth management to comply with Forest Plan standards.

The Forest Plan standards related to old growth are found in the Forest Plan (page II-29). Forest Plan standard *10a* incorporates the definitions of old growth developed by the Regional Old Growth Task Force, documented in *Old-Growth Forest Types of the Northern Region* (Green et al, 2005). In compliance with Forest Plan old growth standard *10a*, the validation process for the Hidden Cedar Project used the definitions as outlined in this Regional old growth guide (project file (PF): SOG-2). Compliance with standards *10b-i* is discussed later in this report.

Analysis Area and Methods

Old growth analysis is for the total area in Old Growth Management Units (OGMUs) that are totally or partially within the project area. The old growth analysis area for the Hidden Cedar Project

includes OGMU 1, 9 and 14 (St. Maries, 04). This is appropriate for this project because the project area involves all of OGMU 1, and portions of OGMU 9 and 14.

The original old growth analysis for the Hidden Cedar Project was incorporated as part of the wildlife report and analysis. This project was reviewed as a result of the availability of new aerial photography and stand exam data, updates to stand delineation and data bases, and completion of previously approved planned projects. The updated and new data was used in this supplemental report.

While reviewing the older existing stand data for the allocated old growth, as well as stands proposed for treatment, some questions arose for how well the older data represented the stands. As a result, a photo analysis of historic photos (project file (PF): SOG-4) was completed and a validation process (PF: SOG-3) was developed and implemented to gather new exam data during 2005. The project file also contains components referenced in that process write-up and/or used during the analysis process (SOG-5, SOG-6, SOG-7 and SOG-8). The validation documentation for individual stands, using the most recent data available, is found in the project file (SOG-9). This includes all stands within the three OGMUs in this project identified as allocated old growth. This process and the associated data and methods discussed above were used to determine current compliance with Forest Plan direction related to old growth.

All acres used in this report, and associated project file documents, should be considered **approximate** due to such factors as rounding, scale of analysis, delineation and procedural variance between resources evaluating old growth. These differences are insignificant related to evaluating the current status of old growth in this project.

The assessment of proposed treatment stands involved a review and comparison of the data found in the original project file (Veg-9, 10, 12 and 29) with the new stratified sample stand data (PF: SOG-9). This new data validated the original analysis which disclosed that the stands proposed for treatment did not meet criteria for allocated old growth.

Various special use codes are used to identify <u>allocated old growth</u>. Code 2 are stands that meet minimum criteria for allocated old growth and also meet criteria used to identify ancient cedar definitions. Code 9 are stands that are retained in the old growth allocation that have been field examined and meet the minimum criteria or were previously identified by an interdisciplinary team as old growth. Code 10 are stands retained in the old growth allocation which were photo identified as likely to meet minimum criteria, but <u>not</u> field verified. Code 11 are stands identified as recruitment or stepdown stands that are retained in the allocation to create large blocks, corridors, or logical old growth landscape management units.

The assessment of allocated old growth stands within these three OGMUs resulted in the following adjustments in the old growth allocation. One stand, 433-01-028, that was included in the allocation but needed validation, did not meet minimum criteria and was removed (approximately 33 acres) from the old growth allocation. Treatment is not proposed in this stand. One stand previously identified as photo interpreted potential old growth but not allocated was validated as meeting the minimum criteria and was added to the allocation (approximately 19 acres). Seventeen stands have had a change in their old growth classification but were retained in the allocation. Three changed from code 10 to code 11, two changed from code 10 to code 9, four changed from code 9 to code 11, and eight changed from code 11 to code 9. As a result of this validation process OGMU 1 had an

increase of approximately 19 acres, and OGMU 9 had a reduction of approximately 33 acres in old growth allocation. The FSVEG and TSMRS data bases were updated to reflect these changes.

An assessment of open roads located in or adjacent to the allocated old growth for each alternative was completed in response to public comment. This assessment analyzed the potential for public use to adversely affect the character of current allocated old growth and is found in the project file (SOG-14 and 14a).

Affected Environment

The Hidden Cedar Project involves three Old Growth Management Units (OGMU) on the St. Maries portion of the St. Joe Ranger District. These are OGMU 1, 9 and 14 (St. Maries, 04). OGMU 1 is approximately 8,106 acres in size and currently has 514 acres, or 6.3%, as allocated old growth. OGMU 9 is approximately 10,363 acres in size and currently has 703 acres, or 6.8%, as allocated old growth. OGMU 14 is approximately 9,541 acres in size and currently has 985 acres, or 10.3%, as allocated old growth. A map showing the old growth management units, the allocated old growth in each OGMU, and the project area boundary is located in the project file (SOG-10).

Validation and monitoring of old growth is an ongoing process. As disclosed above, the validation process and review of these three OGMUs identified additional acres that meet the criteria as described in *Old-Growth Forest Types of the Northern Region* (Green et al, 2005) and other acres that were previously allocated but no longer meet the minimum criteria. Changes that were made in the FSVEG and TSMRS databases are documented in the project file (SOG-9). No treatment is proposed in stands that are known to meet the minimum criteria for old growth.

Environmental Consequences

Alternative A - (No Action)

Direct, Indirect and Cumulative Effects

There would be no direct/indirect or cumulative effects resulting from Alternative A, No Action, on either existing allocated old growth or other stands known to meet old growth criteria. Forest Plan standards for old growth retention would continue to be met.

There would be no direct or indirect effects from current and reasonably foreseeable activities including weed control, road and trail maintenance, and public recreation (i.e. berry picking, hiking, hunting, wood gathering and similar activities). No cumulative effects on allocated old growth are expected as a result of these other activities.

Alternatives B (Proposed Action), C, D, E and F

Direct, Indirect and Cumulative Effects

There is no road construction, timber harvest or other activities proposed within allocated old growth. There would be no direct/indirect or cumulative effects resulting from Alternatives B (Proposed Action), C, D, E and F on existing allocated old growth. Forest Plan standards for old growth retention would continue to be met.

There would be no direct or indirect effects from current and reasonably foreseeable activities including weed control, road and trail maintenance, and public recreation (i.e. berry picking, hiking, hunting, wood gathering and similar activities). No cumulative effects on allocated old growth are expected as a result of these other activities.

Consistency with Forest Plan and Laws

Old growth standard *10a* in the Forest Plan states: "A definition for old growth is being developed by the Regional Task Force and will be used by the Forest when completed." In compliance with Forest Plan old growth standard *10a*, the definitions of old growth developed by the Regional Old Growth Task Force, documented in *Old-Growth Forest Types of the Northern Region* (Green et al, 2005) have been incorporated into Forest Plan standard *10a* and were used in the validation and analysis process of old growth in this project.

Old Growth standard *10b* in the Forest Plan directs that we "Maintain at least 10 percent of the forested portion of the IPNF as old growth." The Idaho Panhandle National Forest is meeting Forest Plan standards for old growth with 12.1% of forested acres to be retained as old growth, as disclosed in the Old Growth chapter on page 71 of the 2004 IPNF Forest Plan Monitoring Report (PF: SOG-11).

Old growth standard *10c* in the Forest Plan states: "Select and maintain at least five percent of the forested portion of those old-growth units that have five percent or more existing old growth." The Hidden Cedar Project involves three Old Growth Management Units (OGMUs) on the St. Maries portion of the St. Joe Ranger District, OGMU 1, 9, and 14. OGMU 1 is approximately 8,106 acres in size with 514 acres, or 6.3%, allocated as old growth. OGMU 9 is approximately 10,363 acres in size with 703 acres, or 6.8%, allocated as old growth. OGMU 14 is approximately 9,541 acres in size with 985 acres, or 10.3%, allocated as old growth. The <u>current</u> old growth allocation within these three OGMUs meets this Forest Plan standard for all alternatives.

Old growth standard *10d* states: "Existing old-growth stands may be harvested when there is more than 5 percent in an old-growth unit, and the Forest total is more than 10 percent." Timber harvest **is not proposed** in any allocated old growth. None of the stands proposed for timber harvest meet minimum criteria for old growth. All alternatives in this project are in compliance with old growth standard *10d*.

Old growth standard *10e* states: "Old growth stands should reflect approximately the same habitat type series distribution as found on the IPNF." Compliance with this Forest Plan standard is disclosed on page 72 in the Old Growth chapter of the 2004 IPNF Forest Plan Monitoring Report (PF: SOG-11).

Old growth standard *10f* describes desirable patch size stating: "One or more old-growth stands per old-growth unit should be 300 acres or larger…..The remaining old-growth management stands should be at least 25 acres in size. Preferred size is 80 plus acres." Patch size for each of the three OGMUs involved with this project are discussed separately below.

In OGMU 1 the allocated old growth occurs in seven patches. These patches range in size from 20 to 179 acres, and average is approximately 74 acres. Within this OGMU six patches are greater than 25 acres, with three of those being greater than 80 acres. Of the patches greater than 80 acres, two are greater than 100 acres in size. No individual patches are 300 acres or larger in this OGMU, however,

one patch of 179 acres contributes to a 360-acre patch in neighboring OGMU 5 for a large continuous block of 539 acres. There is also one patch of 31 acres that contributes to an 80 acre patch in neighboring OGMU 5 for a large continuous block of 111 acres.

In OGMU 9 the allocated old growth occurs in 11 patches. These patches range in size from 10 to 197 acres, and average approximately 64 acres. Within this OGMU eight patches are greater than 25 acres, with four of those being greater than 80 acres. Of the patches greater than 80 acres, three are greater than 100 acres in size. No individual patches are 300 acres or larger in this OGMU, however, one patch of 35 acres contributes to a 320-acre patch in neighboring OGMU 5 for a large continuous block of 355 acres. One patch of 103 acres contributes to a 160-acre patch in neighboring OGMU 3 for a large continuous block of 263 acres.

In OGMU 14 the allocated old growth occurs in 11 patches. These patches range in size from 14 to 266 acres, and average approximately 90 acres. Within this OGMU nine patches are greater than 25 acres, with five of those being greater than 80 acres. Of the patches greater than 80 acres, four are greater than 100 acres in size. No individual patches are 300 acres or larger in this OGMU, however, one patch of 116 acres contributes to an 80-acre patch in neighboring OGMU 5 for a large continuous block of 196 acres. One patch of 266 acres contributes to a 160-acre patch in neighboring OGMU 15 and a 320-acre patch in neighboring OGMU 5 for a large continuous block of 746 acres. One patch of 68 acres contributes to a 360-acre patch in neighboring OGMU 8 for a large continuous block of 428 acres.

As discussed above, OGMUs 1, 9 and 14 are in compliance with old growth standard *10f*. A map identifying old growth patches and their respective areas is included in the project file (SOG-12).

Old growth standard *10g* states: "Roads should be planned to avoid old-growth management stands to maintain unit size criteria." No new system road construction or temporary road construction is proposed within allocated old growth stands. Additionally, the proposed road management prescription changes would reduce the existing open road access in or adjacent to allocated old growth stands by approximately 0.26 miles from the existing condition. This proposal is in compliance with old growth standard *10g*.

Old growth standard *10h* states: "Existing grazing allotments will be honored; …..New allotments in old-growth will not be issued." There are four grazing allotments within the Hidden Cedar Project Area. These allotments are addressed in the Environmental Assessment for the St. Maries Grazing Allotments (USDA 1999a), as well as the approved Allotment Management Plans. There are no new grazing allotment proposals, and there are none planned, within the Hidden Cedar Project. Grazing permits are restricted to the historical allotments within this analysis area. This proposal is in compliance with old growth standard *10h*.

Old growth standard *10i* states: "…goals for lands to be managed as old-growth within those lands suitable for timber production are identified in the management area prescriptions." Compliance with this Forest Plan standard is disclosed on pages 71 and 72 in the Old Growth chapter of the 2004 IPNF Forest Plan Monitoring Report (PF: SOG-11).

Specific goals, objectives and standards for old growth management as described in the Forest Plan on pages II-5 and II-29 are met with all alternatives in this project.

Plant Species at Risk

Changes Between the Draft SEIS and the Final SEIS

Surveys for two new species on the sensitive species list were completed in 2006 (SB-6). One population was located within a proposed unit, so the unit boundary will be adjusted to protect the population. Other known populations which are located in riparian zones would be protected with riparian buffers.

Changes Between the 2002 FEIS and this SEIS

The changes to the Hidden Cedar Project did not affect the analysis for rare plants. The differences between the two projects are slight. Changes in estimated timber sale acreages in potential rare plant habitat, across alternatives varies from three fewer to one additional total acres. The general proportion of logging systems and prescriptions is very similar and does not change analysis conclusions from original project (SB-1). Differences in road construction between the two projects can generally be measured in tenths of a mile except for Alternative F (a decrease of 2.0 miles from the original Alternative F). Project surveys were complete for the original project. However, a new sensitive species list was issued by the Regional Forester in 2004 (SB-2). As a result, there are two new species with the potential to be found in certain habitats within the project area. Surveys for these species were completed in 2006 (SB-6).

Introduction

Activities associated with timber harvest, road construction/reconstruction, controlled burning, watershed rehabilitation, and pre-commercial thinning have the potential to impact Endangered, Threatened, Proposed, and Sensitive (TES) plants. Effects on population viability from disturbance events (natural or human-caused) are hard to quantify with certainty for all TES plant species and species of concern. Specific knowledge of population biology and species ecology is not yet known for several species, particularly the sensitive moonworts and certain orchids. Much of the current knowledge regarding TES plant species is based on observational and even anecdotal information. Literature and monitoring reports for several species, including deerfern (Blake and Ebrahimi 1992), Constance's bittercress (Lichthardt 1998 and 2000), and Idaho barren strawberry (Crawford 1980), provide a greater understanding of the relationship of habitat disturbance to the integrity of species populations.

The risk of adverse effects on TES plants from activities varies with treatment type, timing and extent of treatment, habitat suitability, and the species. Plant surveys and design features are designed to protect populations and suitable habitat. Activities with effects that could lead to loss of population viability or trend toward federal listing would have the highest risks associated with them. Other activities may impact individual plants but are not likely to adversely affect population viability and as such are low to moderate risk activities. Small changes in the light regime, moisture levels, or moderate soil disturbance can impact individuals or populations of species dependent on specific successional habitats, soil fungi (mycorrhizae) associations, or canopy closure. Observations and monitoring information indicate that some activities may have little, or even positive effects on some species, such as deerfern (Blake and Ebrahimi 1992) and Constance's bittercress (Crawford 1980).

The purpose of this analysis is to determine if alternatives would adversely impact TES plants that may occur in the Hidden Cedar Project Area, to insure that the alternatives do not contribute to the loss of rare plant population viability, and to insure compliance with Forest Service and other federal policies. Indicators used to measure effects on sensitive plants and suitable habitat include: predicted canopy reduction due to harvest treatments, the extent of ground disturbance, proximity of proposed activities to known occurrences and suitable habitat, and the predicted reduction of fuel loads.

Regulatory Framework

Protection of plant species deemed threatened, endangered, or rare (Forest Service "sensitive") and protection for population viability are determined by federal legislation, regulations, policy, and direction. This regulatory framework includes the National Environmental Policy Act (1969); the Endangered Species Act (1973), as amended; the National Forest Management Act (1976); Forest Service Manual (2672.1 - 2672.43); Idaho Panhandle National Forests, Forest Plan (USDA 1987); and direction from the Washington Office and Regional Watershed, Wildlife, Fisheries, and Rare Plant program.

Analysis Area

The geographic scope of analysis for rare plant species in this project is the Hidden Cedar Project Area (approximately 15,000 acres of National Forest, and 33,000 total acres). Geographic scope of potential effects (direct, indirect, and cumulative) is determined by a combination of factors including: geographic location, the scope of the proposed action, resources and species which may be present, consequences and scope of effects, and the ability to measure effects. Scope of the action and potential for adverse effects determine the extent of analysis necessary. This analysis considers short and long-term management as it may affect known or suspected populations of TES plant species as well as their potential habitat.

Analysis Methods

Plant species can be assigned to one or more rare plant guilds, which are groups based on similar habitat requirements and useful for the purpose of analysis (Mousseaux 1995). For the St. Joe District, the rare plant guilds are: aquatic, deciduous riparian, peatlands, wet forest, moist forest, dry forest, and sub-alpine. Rock seeps and springs are another habitat that can support certain TES species, but they can occur across all guilds and are not identifiable at a coarse scale. A complete description of all guilds is located in the project file (SB-2).

Based on current information regarding preferred habitat and successional state for species within the different guilds, the District TSMRS (Timber Stand Management Record System) database indicates the amount of highly suitable rare plant habitat that may be present in the project area as indicated by the habitat type of each stand. In addition, site-specific information from timber stand examination records, aerial photographs, topographic position, existing habitat and survey information, personal knowledge and professional judgment were used in analysis. Evaluation of known sites for TES and species of concern (SOC) plants was accomplished using District sensitive plant records and Idaho Department of Fish and Game Conservation Data Center (ICDC) Element Occurrence records.

Affected Environment

The sub-basins of northern Idaho contain varied and diverse habitats and plant communities. Of the estimated 1,200 to 1,500 plant species known or thought to occur here, about ten percent are considered rare or uncommon.

Results from habitat queries indicate that the only high-potential habitat occurring within areas of proposed activities is within the moist forest and wet forest guilds (Plant-4). Of the 52 units considered for timber harvest only Units 25 and 39 do not contain high-potential habitat. All other units contain moist forest habitat except for Unit 46, which is comprised of wet forest habitat (SB-3). High-potential dry forest, sub-alpine, deciduous riparian, aquatic, and peatland habitats do not occur within proposed activity areas. A list of wet and moist forest species and their habitats is included in the project file as is a complete list of sensitive species and species of concern.

Of the nearly 33,000 acres within the project area, approximately 12,000 acres on NFS lands are known to be rare plant high-potential habitat. Since close to 60% of the project area is not under Forest Service jurisdiction, this number is likely to be much higher. Past and ongoing activities within the project area have led to habitat modification and fragmentation. Grazing has been occurring within the area for many decades. Road construction, timber sales, recreational use, vehicular traffic, grazing, and natural events have all contributed to an encroachment of weeds into the area, primarily along roads, in open meadows and in disturbed areas.

Threatened Plant Species

There are no known sites of federally listed plants on the Idaho Panhandle National Forests (IPNF). The U. S. Fish and Wildlife Service (USDI 2006) identifies two threatened plant species that may occur within Shoshone and Latah Counties: water howellia (*Howellia aquatilis* A. Gray) and Spalding's catchfly (*Silene spaldingii* Wats.). A threatened species is any that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Water howellia (*Howellia aquatilis*) and Spalding's catchfly (*Silene spaldingii*) are suspected on the District, meaning that these species is believed to have potential to occur, but to date have not been found.

Water howellia - a member of the family Campanulaceae, has the potential to occur on the St. Joe Ranger District. According to the Conservation Strategy for *Howellia aquatilis* (USDA 1994), there are 110 known occurrences of the species. Most occurrences are in Montana and Washington, with only one known occurrence in Idaho in Latah County. Water howellia occurred historically on the Forest but is believed to have been extirpated.

Water howellia is an annual aquatic species restricted to small, seasonal, pothole ponds or the quiet water of abandoned river oxbows. It occurs at elevations from 10 feet in Washington to 4,420 feet in Montana. The species reproduces only by seed. Germination occurs in October, presuming the plant's habitat has dried sufficiently to expose the seeds to oxygen. Because of this restrictive habitat requirement, population numbers in a given year are directly influenced by the extent of pond drawdown at the end of the previous growing season (USDA 1994).

Spalding's catchfly - a member of the family Caryophyllaceae, is suspected to occur in the IPNF. It is known from 52 sites in west-central Idaho, northwestern Montana, eastern Oregon, eastern

Washington and British Columbia. The total number of known individuals is around 16,500 (USDI 2001).

Spalding's catchfly is a long-lived perennial species that reproduces only by seed (Lichthardt 1997). Individual plants often exhibit long periods of dormancy (one to three years), and may even experience dormancy within a growing season (Lesica 1997). Its habitat is in dry grasslands and grassland inclusions in ponderosa pine and Douglas-fir forest. Suitable habitat for this species is typically dominated by fescues (*Festuca* species), blue bunch wheat grass (*Pseudoroegneria spicata*) and other bunchgrasses, but also has a high density of forbs. Some sites may have large shrub thickets of *Symphoricapos albus*, *Physocarpus malvaceus*, or *Rosa* spp. Soil types on which it has been found include loam, silty loam, granitic, loamy basaltic and loess (USDI 2000). Soils in its habitat are characterized as deep to moderately deep.

Sensitive Plant Species

Sensitive species, as determined by the Regional Forester (USDA 2004), are those for which population viability is a concern. This can be indicated by a current or predicted downward trend in population numbers or suitable habitat, which would reduce the species' existing distribution. Twenty-four of these species are known or thought to occur on the St. Joe Ranger District (SB-2). Two new species from this list, *Rhizomnium nudum* and *Grimmia brittoniae*, have the potential to be found in the project area (SB-2). One occurrence of Henderson's sedge (*Carex hendersonii*) is known within the project area (ICDC 2005) on private land. Outside of the project area, but within two miles of the project boundary, there are three populations of the sensitive species deerfern (*Blechnum spicant*) (ICDC 2005).

Species of Concern

Along with threatened, endangered, and sensitive plants, the Forest also tracks 23 Forest species of concern (SB-4). These species are considered to be secure at the global, Regional, and state levels, but may be at risk at the Forest level. While biological evaluations are not required to address species of concern, they are addressed in effects analysis (per the National Forest Management Act) when viability within the planning unit is an issue. There are two known sites of Lieberg's tauschia (*Tauschia tenuissima*) within the project area. Just outside the project boundary there is one population each of Lieberg's tauschia, phantom orchid (*Eburophyton austiniae*) and Case's fitweed (*Corydalis caseana* spp. *hastata*) (ICDC 2005).

Environmental Consequences

Plant Surveys

Regional direction (Leonard 1992) states that the need for and extent of field reconnaissance should be commensurate with the risk associated with the project and species involved and with the level of knowledge already in hand. Field surveys were conducted in all areas identified for project activities that contain high-potential suitable habitat. Surveyors walked through activity areas with the potential to contain TES plants during the growing season of those species likely to be found there. A general survey was conducted, with more time being spent in special habitats. When rare plant individuals were found, intensive searches were conducted within the area. Species presence is assumed for all highly suitable habitats and field surveys either validate or negate presence. Any occurrences that are deemed necessary to ensure species and population viability against a potential

trend towards federal listing are protected. The importance of a population is based on a variety of factors such as size of population, number of known sites, ranking, and sensitivity to disturbance. These practices are assumed to be an effective conservation strategy. Some isolated individuals or occurrences, not deemed critical to population viability, may be impacted by activities. Occurrences discovered after surveys and prior to project implementation would have mitigation measures designed by the District Botanist to ensure that species and population viability are maintained (see Design Feature 5 in Chapter 2).

In 2002, field surveys were conducted for all stands with high-potential habitat (approximately 1,341 acres using the earlier stand delineation) within the original Hidden Cedar Project (Plant-10). There were five populations of green bug on a stick moss (*Buxbaumia viridis)* and four populations of deerfern (*Blechnum spicant*) discovered during these surveys. Additional field surveys in 2005 in the vicinity of the Hidden Cedar Project revealed another population of deerfern and four populations of naked mnium moss (*Rhizomnium nudum*) (SB-5). Vegetation treatments are proposed on 1,393 acres, 1,355 (updated stand delineation) of which are located in stands with high-potential habitat. The maximum number of proposed road construction and temporary road construction miles is 11.1 and 2.9 respectively. In 2004 a new sensitive species list was issued by the Regional Forester (USDA 2004). Two new species from this list, *Rhizomnium nudum* and *Grimmia brittoniae*, have the potential to be found in the project area (SB-2). Approximately 160 acres were re-surveyed for these species in the spring of 2006. Documentation from field surveys for this project are located within the project file (SB-6). Known populations will be protected with riparian and unit buffers.

Effects Common to All Action Alternatives

Direct and Indirect Effects

High-potential dry forest, sub-alpine, deciduous riparian, aquatic, and peatland habitats do not occur within proposed activity areas. Therefore, there would be no direct or indirect effects on these habitats and their associated rare species.

The known population of Henderson's sedge within the project area is located on private land, and so its continued existence is not guaranteed.

Riparian planting would result in very little ground disturbance and is not expected to adversely affect the population viability of any rare species.

Pre-commercial thinning would generally occur in areas with low probability of providing habitat for TES plants. While it is possible that undetected individuals of *Botrychium* sp. could be impacted, no other TES species is expected to occur in such habitat. Effects to *Botrychium* species would likely be restricted to damage of seasonal, above-ground vegetation. There is no evidence that such removal adversely affects individual plants (Dr. Cindy Johnson-Groh, personal communication, July 2001).

An indirect effect of project activities may be the expansion of noxious weed populations. Such expansions would likely remain confined to areas of disturbance and high light levels. However, the possibility exists that if left unchecked they could spread into surrounding habitats and ultimately threaten rare plants, should they occur in the area. The Noxious Weed section of this document discusses weed expansion in more detail. Weed treatment and monitoring is likely to occur and would serve to decrease weed populations size. Noxious Weed treatments will be conducted in accordance with the St. Joe Noxious Weed Control FEIS (USDA 1999). See Design Features 4A,

4E, 4F, and 4G. Known TES plant occurrences would be buffered from weed treatments and are not expected to suffer adverse impacts. Noxious weed treatments are expected to improve or maintain the quality of habitat which may ultimately benefit TES plant species. Timber harvest and road building may also indirectly affect rare plant populations by opening up formerly inaccessible or unattractive foraging areas to incursion by livestock. Harvest may result in an increase in forage in newly created openings and roads can provide travel corridors to new areas.

Timber Harvesting

Timber harvest may directly eliminate individual plants or populations through physical disturbance and damage or eradicate soil mycorrhizae upon which many plant species depend. Canopy reduction can affect certain TES plants by changing light and moisture regimes. The effects threshold for canopy reduction has not been quantified for most TES plants, but is generally thought to be about 50 percent; above which effects would be minimal and below which effects would be evident. The higher the percent canopy removed, the greater the risk to TES plants in suitable habitat. The limited data and observations available indicate that many species in the moist and wet forest guilds are intolerant of major canopy removal (Lichthardt 1998, Greenlee 1997).

Indirectly, changes in fuel loading, duff levels, moisture regime, and light levels may impact TES plants and their habitat. Site preparation such as underburning or slash treatment associated with post harvest activities could also affect TES plants or habitat. While timber harvest has the potential to adversely affect rare plants it may not always do so. Effects vary according to species, harvest method and harvest prescription.

Of the prescriptions listed in Table 3-35, the potential effects on rare plant habitat from commercial thinnings, shelterwood preparatory cuts, irregular shelterwood cuts, and group shelterwood cuts would be comparable, varying primarily in the size of their openings. Shelterwood seed cuts and clearcuts would pose the largest threats to rare plant habitats of all the prescription types due to the extreme habitat modifications that would occur. Risks to TES species from shelterwood removal cuts would presumably be small because extensive stand manipulation would have already occurred during the seed cut.

Table 3-35 Timber Harvest Prescriptions Characteristics & Guilds Affected

Prescription^	Canopy Closure+	Site Prep#	Opening Size	Guild Affected*
Commercial thinning	45-55%	Yes	< 1 acre	moist forest
Shelterwood preparatory cut	45-55%	Yes	≤ 2 acres	moist forest
Irregular shelterwood cut	45-50%	Yes	≤ 5 acres	moist forest
Group shelterwood cut	45-50%	Yes	3 to 5 acres	moist forest
Shelterwood seed cut	20%	Yes	N/A	moist forest
Shelterwood removal cut	-	Yes	N/A	moist forest
Clearcuts w/ reserves	5%	Yes	N/A	moist and wet forest

+ Canopy closure resulting from the harvest activity. This column shows the range for all alternatives.
# Is there a possibility that site preparation such as underburning or slash treatment (after harvest) and planting may occur in openings?
* Rare plant habitat guild affected by prescription in all alternatives.
^ Not all prescriptions will take place in all alternatives.

Most timber harvest for the Hidden Cedar Project would take place in moist forest habitats, so most effects would be confined to moist forest guild species. Design features for all action alternatives would protect documented occurrences and mitigate for new ones discovered prior to implementation (Design Feature 5).

Yarding Method for Timber Harvesting (Helicopter, Cable-Skyline, Ground Based)

Helicopter yarding results in little ground disturbance and poses the least risks to TES plants and habitat of the three yarding systems. Cable-skyline yarding poses intermediate risks and ground-based yarding and skidding the highest due to direct physical impacts, soil compaction, and soil displacement.

New Road Construction, Road Reconstruction, and Reconditioning

New road construction would take place in all action alternatives. Road reconstruction and reconditioning would take place in all action alternatives. New road construction is a ground-disturbing activity that may have adverse effects on TES species in suitable habitat. Road reconstruction and reconditioning would occur in existing road prisms which are already disturbed and are of very low habitat suitability. Therefore, these activities pose low risk to TES species and habitat. Certain TES plant species have the ability colonize disturbed sites like road cuts from adjacent occupied habitat. However, these occurrences rarely constitute a viable population. Often they are individual plants that are part of, or isolated from, a larger "meta-population" in the vicinity.

Fuels Treatment

Fuels would predominantly be treated using mechanical and hand piling with some underburning and broadcast burning. Machine piling of slash in suitable habitat can be detrimental due to the direct physical disturbance, and the concentration of heat under the piles.

Hand piling of slash would be a fairly low risk to TES plant species, as long as slash piles were not placed directly on a TES plant occurrence. Low or even mixed severity fire in suitable TES plant habitat can be beneficial to certain TES plants, yet detrimental to others depending upon a variety of factors (project file (PF): Plant-8).

Watershed Rehabilitation, Including Road Decommissioning and Removal/Replacement of Road Channel Crossings

Over 60% of the TES plant species in the St. Joe Sub-basin can occur in riparian areas. Full road prism obliteration could affect some TES plants in suitable habitat, especially riparian areas. Direct impacts from equipment can occur above the top of the cut slope, and below the bottom of the existing fill as the slope is returned to a stable position. However, the actual amount of habitat affected along any road prism would be small and present little risk for any TES plant species or habitat. Removal and replacement of channel crossings also takes place in previously disturbed sites. Existing populations in both of these areas are rarely viable populations and often consist of individual plants that are part of, or isolated from, a larger "meta-population" in the local vicinity. The long-term effects of these treatments could be beneficial to TES plants due to improved channel stability and riparian community habitat.

Alternative A - No Action

Direct and Indirect Effects

There are no known direct effects from the No-Action Alternative. Indirectly, there may be more risk to TES plants and habitat due to an increasing fire hazard resulting from fuel accumulation. Fires have an array of effects on TES plant species ranging from beneficial to detrimental, depending on factors like fire intensity, the ability of the species to survive the event, and competition in early successional habitat. The ability to analyze these effects for all sensitive plant species is limited given our current knowledge.

A few TES plant species inhabit earlier seral habitats established by fire within the last 50 years, or in habitats that likely had frequent historical fires. It appears that these species are at least tolerant of more open forest conditions, and natural disturbance events such as fire. Species like Idaho barren strawberry, western star flower, and Constance's bittercress are known from more open, mesic forest habitats that may have experienced recent disturbance. Indications are that survival of Constance's bittercress after fire may be dependent on the availability of moist microsites.

Dry, open forest habitats historically have had a higher fire frequency of non-stand-replacing fires, than the moist and wet habitats. Species found within these habitats may therefore have higher survival rates following fire activity.

Clustered lady's slipper can be found in drier habitats that historically experience a more frequent fire regime. However, this species is threatened from high-intensity wildfire that removes the duff layer. Such fire activity has been documented to extirpate populations of clustered lady's slipper; however, individual plants survived areas that experienced low- to moderate-intensity fire (Greenlee 1997). It was noted that reproduction for this orchid following these events was reduced.

All the other moist forest, dry forest, and wet forest guild species have populations in mid and later successional habitats, preferring more closed canopy conditions. Some of these species such as moonworts and clustered lady's slipper orchid have factors like obligate soil mycorrhizae relationships that are likely to be affected by increased light (canopy reduction) and moderate to intense (duff-replacing) fires. Stand-replacing fires were an important part of ecosystem processes in northern Idaho prior to the beginning of suppression efforts in the 1930s. While not much is known about the historic condition of rare plant communities, it is evident that with the decrease in the quality and amount of highly suitable habitats, and increase in fragmentation due to human activities, that the ability of rare plants to re-colonize following disturbance has been reduced.

Species like maidenhair spleenwort and chickweed monkeyflower, which are found in seasonally moist moss mats and rock seeps are not likely to be affected by stand-replacing fires as their habitat is generally devoid of fuels that can carry a fire.

Cumulative Effects

Under Alternative A, susceptibility of the landscape to high-intensity, stand-replacing wildfire may increase due to increased fuel loading. Such fires would have a detrimental effect on most TES species in the moist and wet guilds as few species are adapted to these types of events. However, the time scale of such events is unpredictable. Therefore, for listed species, this alternative would have **no effect**, and for sensitive plant species/guilds this alternative would have **no impact**.

Past activities on federal and other lands, including fire, road construction, and timber harvest have likely affected rare plant populations and habitat. Future activities within the project area on other lands are likely to include road construction and associated activities. State and private landowners are not required to protect sensitive species.

Given the large amount of high-potential habitat on federal land within the project area, especially within the moist forest guild, it is highly likely that other ownerships within the project area will also have such habitats. Therefore, loss of rare species associated with these habitats is likely to occur in the future or to already have occurred.

Within the project area, activities occur that are associated with garnet digging. Unauthorized digging for garnets currently occurs in the project area. One site is located in high-potential rare plant habitat and has the potential to impact rare plants. All proposed and future ground-disturbing activities on National Forest lands, except wildfire suppression, are evaluated through surveys and biological assessments/evaluations as to their impact on TES plant species.

Alternatives B, C, D, F

Direct and Indirect Effects

***Alternative B*:** Alternative B would directly impact approximately 1,310 acres of moist forest guild habitat and 20 acres of wet forest guild habitat through harvesting (SB-3). Harvesting methods within high-potential habitat would include 142 acres of clearcut with reserves (11%), 39 acres of shelterwood seed cut (3%), 16 acres of shelterwood removal cut (1%), 72 acres of irregular shelterwood cut (5%), 57 acres of group shelterwood cut (4%), and 804 acres of commercial thinning (60%) (PF: SB-7). The single unit within the wet forest guild would be harvested as a clearcut. Over 90% of timber harvest would be done using harvest prescriptions of lesser impact. The majority of units would be harvested by cable-skyline (45%) followed by helicopter (29%) and lastly, ground-based (26%) methods (SB-7).

In addition there would be 11.1 miles of new road construction on NFS land (for access requests and timber harvest), 10.5 of it through high-potential moist forest habitat. A very small portion (<.1 mile) of these miles also includes some moderately high probability habitat for *Silene spaldingii*. Road construction in high-potential rare plant habitat poses a high risk to TES species due to the amount of ground disturbance involved. Approximately 23 miles of road reconstruction, long-term storage, and decommissioning would also occur, some of which would be on newly constructed roads after harvest activities end. These activities are expected to pose a low risk to rare plant species or habitat because they would be occurring in previously disturbed areas.

While surveys reveal the presence of most TES populations, the diminutive size and difficulty in detecting the moonworts could result in some populations being overlooked. In such an instance, individuals or populations of moonworts may be lost.

Surveys in 2002 revealed sensitive plants (either deerfern or green bug-on-a-stick moss) in Units, 7, 16, 24, 30 and 35. All of these sites have buffers either marked or planned (see Chapter 2). The monitoring of the green bug-on-a-stick moss near the proposed road construction in Unit 16 is still planned.

In the event that other TES plant populations are found prior to project implementation, the District Botanist would implement the necessary mitigation measures. As described in the design features in Chapter 2, population viability would be protected, although some isolated individuals may be impacted by activities.

***Alternative C*:** Alternative C would directly impact approximately 1,335 acres of moist forest guild habitat and 20 acres of wet forest guild habitat through harvesting (project file (PF): SB-3). Harvesting prescription acres are the same as in Alternative B except that 829 acres would be harvested by commercial thinning under this alternative. The single unit within the wet forest guild would be harvested as a clearcut. The majority of units would be harvested by helicopter, with approximately 15% by cable-skyline, and 3% with ground-based equipment (PF: SB-7). The large increase in helicopter yarding in this alternative compared to Alternative B represents a lower risk to TES species and their habitat.

There would be no new road construction on NFS land under this alternative aside from the proposed two miles of road on National Forest land and 5.5 miles on other land associated with access requests. Alternative C represents a lower risk to TES species in this regard compared to Alternative B. One half mile of the access request is located in moist forest high-potential habitat. Approximately 23 miles of road reconstruction, long-term storage, and decommissioning would also occur just as in Alternative B. The threats to TES species due to these activities is minimal since risks associated with these activities are low.

Surveys in 2002 revealed sensitive plants (either deerfern or green bug-on-a-stick moss) in Units, 7, 16, 24, 30 and 35. All of these sites would have buffers (see Chapter 2). The buffers marked in Unit 24 were large enough that the unit will likely be dropped. No road construction would occur in Unit 16, so monitoring of the green bug-on-a-stick moss would not be necessary.

Alternative D: Alternative D would impact approximately 564 acres of moist forest guild habitat and 20 acres of wet forest guild habitat through harvesting (SB-3). Harvest prescriptions within high-potential habitat include commercial thinning 301 acres (53%), shelterwood preparatory cut 121 acres (20%), group shelterwood cut 40 acres (7%), and clearcut with reserves 120 (20%). The single unit within the wet forest guild would be harvested as a clearcut. The majority of units would be harvested by helicopter, with approximately 26% using cable-skyline and 5% using ground-based equipment (PF: SB-7). In addition there would be approximately two miles of new road construction (for cost-share and access requests), .5 miles of which would go through high-potential moist forest habitat. There would also be 5.5 miles of road constructed for access on private land. Approximately 32 miles of road reconstruction, long-term storage, and decommissioning would also occur.

Surveys in 2002 revealed sensitive plants (either deerfern or green bug-on-a-stick moss) in Units, 7, 16, 24, 30 and 35. All of these sites would have buffers (see Chapter 2). The buffers marked in Unit 24 were large enough that the unit will likely be dropped. No road construction would occur in Unit 16, so the monitoring of the green bug-on-a-stick moss would not be necessary.

Alternative F: Alternative F would directly impact approximately 1,246 acres of moist forest guild habitat and 20 acres of wet forest guild habitat through harvesting (SB-3). Harvesting methods would include 116 acres of clearcut with reserves (9%), 39 acres of shelterwood seed cut (3%), 16 acres of shelterwood removal cut (1%), 22 acres of irregular shelterwood cut (2%), 57 acres of group shelterwood cut (4%), and 813 acres of commercial thinning (64%)(SB-7). The single unit within the wet forest guild would be harvested as a clearcut. Over 85% of timber harvest in high-potential

habitat would be done using harvest prescriptions of lesser impact. The majority of units would be harvested by cable-skyline (42%) followed by helicopter (34%) and lastly, ground-based (24%) methods (PF: SB-7).

In addition there would be 8.1 miles of new road construction on NFS land (for access requests and timber harvest), 7.6 of it through high-potential moist forest habitat. A very small portion (.04 miles) of the 8.1 miles also includes some moderately high-probability habitat for *Silene spaldingii*. Road construction poses a high risk to TES species. Approximately 73 acres of road reconstruction, long-term storage, and decommissioning would also occur, some of which would be on newly constructed roads after harvest activities end. These activities are expected to pose a low risk to rare plant species or habitat.

All areas proposed for ground-disturbing activities that have a possibility for adverse effects within high-potential habitat, were surveyed for TES species. While surveys reveal the presence of most TES populations, the diminutive size and difficulty in detecting the moonworts could result in some populations being overlooked.

Surveys in 2002 revealed sensitive plants (either deerfern or green bug-on-a-stick moss) in Units, 7, 16, 24, 30 and 35. All of these sites would have buffers (see Chapter 2). The buffers marked in Unit 24 were large enough that the unit will likely be dropped. The monitoring of the green bug-on-a-stick moss near the road construction in Unit 16 would still be done.

In the event that other TES plant populations are found prior to project implementation, the District Botanist will implement the necessary mitigation measures. As described in the design features in Chapter 2, population viability would be protected, although some isolated individuals may be impacted by activities.

Cumulative Effects

The cumulative effects area for TES plants and highly suitable habitat was determined to be the project area. Past activities on federal and other lands including fire, road construction, and timber harvest have likely affected populations and habitat. Design criteria would be applied to protect TES plant species and viability for any populations discovered prior to project implementation on National Forest System lands. The existing population of Henderson's sedge is located on private land and as such no guarantee can be made that it will be protected. State and private lands are not required to protect sensitive species. Current and future activities such as road building, timber harvest, burning, and recreation can be expected to result in habitat modification or plant population loss on these lands.

Activities associated with illegal, unregulated garnet digging would occur as outlined in Alternative A.

The cumulative effects on TES plants would be very similar in Alternatives B and C. Both alternatives add to cumulative effects by impacting high-potential plant habitat. While some aspects of Alternative C pose lower risks to TES species, the overall risks are not expected to be appreciably lower than Alternative B due to design features and proposed surveys.

The cumulative effects on TES plants in Alternative D would be less than those of Alternatives B, C, or F primarily due to the fact that fewer acres would undergo timber harvest. However, these effects

are still expected to be small on NFS land because adverse actions would be mitigated for. Effects on TES species due to actions on private land would be the same under all action alternatives.

Alternatives B and F would have **no effect** on Spalding's catchfly. Potential habitat does exist within the project area, however only a very small amount (< .1 acre) of this potential habitat would be impacted by any project activities. This area was surveyed and contains no habitat for Spalding's catchfly (PF: Plant-10).

Alternatives C, D and E would have **no effect** on Spalding's catchfly. The potential habitat described above is not located in any activity area for these alternatives.

Alternative E

Direct and Indirect Effects

No commercial timber harvest would occur under this alternative. In this respect, effects will be much as outlined in Alternative A, the No-Action Alternative.

The effects of road construction/reconstruction in this alternative are very similar to those in Alternative D. There would be no new road construction on NFS land under this alternative aside from the proposed two miles of road associated with access requests. All .5 miles of access requests are located in moist forest high-potential habitat and would be surveyed prior to construction. Road reconstruction, long-term storage and decommissioning would occur as in Alternative D.

Cumulative Effects

There are approximately 5.5 miles of potential road construction on non-National Forest lands within the project area. State and private landowners are not required to protect sensitive species.

Effects on TES plants would be low in the short-run but potentially high in the long-run as the possibility of intense wildfire increases (see Fire and Fuels Environmental Consequences for Alternatives A and E).

For Spalding's catchfly, this alternative would have **no effect**, as habitat is not present in any activity area.

Given that under this Alternative a small area of high-potential plant habitat would be impacted by project activities and it is easily surveyed before project implementation, there would be **no impact** on the moist and wet forest guilds in this alternative.

Determination of Effects for All Alternatives

St. Joe Sensitive Plants by Rare Plant Habitat Guild (revised)*

Species	Common Name	Habitat Guild	Effects
Asplenium trichomanes	maidenhair spleenwort	Moist/Wet Forest rock seeps	NI
Blechnum spicant	deerfern	Moist/Wet Forest	NI
Botrychium ascendens	upswept moonwort	Wet Forest	NI
Botrychium crenulatum	dainty moonwort	Wet Forest	NI
Botrychium lanceolatum	triangle moonwort	Wet Forest/Moist Forest	NI
Botrychium lineare	Slender moonwort	Moist Forest	NI
Botrychium minganense	Mingan moonwort	Wet Forest/Moist Forest	NI
Botrychium montanum	western goblin	Wet Forest	NI
Botrychium paradoxum	paradox moonwort	Wet Forest/Moist Forest	NI
Botrychium pedunculosum	stalked moonwort	Wet Forest	NI
Botrychium pinnatum	northwestern moonwort	Wet Forest/Moist Forest	NI
Botrychium simplex	least moonwort	Wet Forest/Moist Forest	NI
Buxbaumia aphylla	leafless bug-on-a-stick moss	Wet Forest/Moist Forest	NI
Buxbaumia viridis	Green bug-on-a-stick moss	Wet Forest/Moist Forest	NI
Cardamine constancei	Constance's bittercress	Deciduous Riparian/Moist/Wet Forest	NI
Cypripedium fasciculatum	clustered lady's slipper	Moist/Wet/Dry Forest	NI
Grindelia howellii	Howell's gumweed	Dry Forest (St. Joe, basalt breaklands)	NI
Gimmia brittoniae	Britton’s Grimmia	Moist Forest rock outcrops	NI
Hookeria lucens	clear moss	Wet Forest	NI
Mimulus alsinoides	chickweed monkeyflower	Wet/Moist/Dry Forest rock cliffs/seeps	NI
Rhizomnium nudum	Naked Mnium	Wet/Moist Forest	NI
Thelypteris nevadensis	Sierra woodfern	Wet Forest Seeps	NI
Triantha occidentalis spp brevistyla	sticky asphodel	Subalpine Peatlands	NI
Waldsteinia idahoensis	Idaho barren strawberry	Moist and Wet Forest	NI

**** based on Regional Forester's TES list, October 2004.***

NI = No Impact

Forest Plan Consistency

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

proposed alternatives, with implementation of design features, would meet the intent of the Forest Plan. The No-Action Alternative would also meet the intent of the Forest Plan.

All alternatives would also meet the intent of the Endangered Species Act and the National Forest Management Act.

Range

Changes Between the 2002 FEIS and this Draft SEIS

The changes to the Hidden Cedar Project did not affect the analysis for range. Overall, timber harvest acreages vary by eight or fewer acres across all prescriptions, allotments and alternatives. Road construction miles are essentially the same as the old project with a very small (.5 mile) decrease within the Catspur Allotment (project file (PF): S-B1). The scope of these changes is not large enough to make predictions of their effects on cattle movement or distribution and as such does not change analysis conclusions from original project.

The St. Joe District prepared an environmental assessment for the grazing program, and a decision was signed in 2005.

Regulatory Framework

Direction for the management of the range program on NFS lands is provided in several regulations, policies, and laws including the Idaho Panhandle National Forests Forest Plan (1987) which provides for the protection of current forage levels and the continuation of grazing and the Forest Service Manual (Chapter 2200, 1990 as amended). Section 2202.1 states the objective of the Range Management Program as being to integrate management of range vegetation with other resource programs. Other goals include: to provide for livestock forage, wildlife food and habitat, outdoor recreation, and other resource values dependent on range vegetation; to contribute to the economic and social well being of people by providing opportunities for economic diversity and by promoting stability for communities that depend on range resources for their livelihood; and, consistent with Forest land and resource management plans, to make forage available to qualified livestock operators from lands that are suitable for livestock grazing.

Analysis Area

The geographic scope of analysis for range issues for this project encompasses all of the Emerald Creek, Merry Creek, Keeler Creek, and Cat Spur Creek Allotments (approximately 83,396 acres - all ownerships total acres). The Keeler Creek (approximately 10,163 total acres) and Cat Spur Creek (approximately 5,213 acres) Allotments are entirely contained within the project area. Only small portions of the Emerald Creek and Merry Creek Allotments (2,517 and 1,038 total acres respectively) fall within the Hidden Cedar Project Area (see Grazing Allotments Map, M-20). Acres were derived from GIS.

Analysis Method

Information was collected from Allotment Management Plans, historic grazing records, permittee files, and the Environmental Assessment for the St. Maries Grazing Allotments (USDA 2005).

Affected Environment

Vegetation surveys completed in 1998 (USDA FS, 1999a, St. Maries Grazing Allotment EA) indicate that the condition of riparian vegetation in the Emerald Creek and Keeler Creek Allotments has an upward trend, and that the Cat Spur Creek Allotment is stable. These surveys also show that Forest Plan and INFS standards for allowable trampling, level of stream bank stability, and stream bank vegetation coverage are being met in the Emerald Creek, Keeler Creek, and Cat Spur Allotments. Data is not available for the Merry Creek Allotment.

Livestock primarily graze within riparian meadows and use adjacent upland areas for shade and cover. Livestock may alter riparian areas by trampling, rubbing, and browsing riparian vegetation. Removing vegetation, trampling and shearing may affect streambanks and fish habitat (Platts 1991). Monitoring for these effects will be done as described in the St. Maries Grazing Allotment Decision Notice (USDA 2005).

Emerald Creek Allotment

Cattle and sheep grazed in the area of the allotment in the 1920s and 1930s prior to land acquisition by the Forest Service. In 1943 and 1944 sheep were the primary grazers after the Forest Service acquired the land. In 1945 cattle and horse use officially began and has become the only permitted grazing on the allotment. Permitted numbers of stock fluctuated during the early years. Permitted numbers of cattle were 400 cow/calf pairs in 1953 which changed to 368 head in 1968, changed again to 320 head in 1969, and was then reduced in 1972 to 225 head. These numbers were maintained until the Emerald Creek Cooperative Resource Management Area Memorandum of Understanding was signed in 1994. The total number of cow/calf pairs allowed in the allotment was then set at 413, with a total of 41 cow/calf pairs permitted to graze on National Forest lands. Grazing is currently permitted from June 15th to October 15th each year. The majority of grazing occurs in the lower elevations of the East and West Forks of Emerald Creek and on Willow Creek, although some livestock follow existing roads to the Emerald Butte area and the upper portions of the East and West Fork drainages.

Merry Creek Allotment

Although grazing occurred prior to 1982, the Forest Service did not issue grazing permits in this area. In 1982 the Merry Creek Cooperative was formed in order to better coordinate and manage activities within the allotment. Initial forage utilization limits were set at 60%. Monitoring determined that use exceeding 60% utilization was occurring along lower Gold Creek and the BPA transmission line, and utilization limits were changed to 50% in 1992. Monitoring conducted in the 1990s has shown range condition to be fair to good. Currently, 315 cow/calf pairs graze in the allotment, with a total of 27 permitted to graze on NFS lands. Most of the forage on NFS lands is produced in riparian meadows along the West Fork of the St. Maries River, Gold Center Creek, and Merry Creek.

Cat Spur Creek Allotment

From 1940 to 1950 this allotment was part of the Keeler Creek Allotment and grazed exclusively by 625 sheep annually. In 1950 Cat Spur Creek was split out into its own allotment and allocated for cattle and horse use. From 1950 to 1957, 14 head of cattle were grazed on the allotment. In 1959 this number increased to 50 head of cattle with 14 being permitted to graze on NFS land. In 1969 more of the allotment came into Forest Service jurisdiction, and stocking levels were set at 50 cow/calf pairs with a total of 26 permitted to graze on NFS lands. These stocking rates remain in effect today. Historically primary range within the allotment has been in fair to good condition with an upward trend. Grazing currently occurs between June 6th and October 15th each year.

Keeler Creek

The current Keeler Creek Allotment boundary was created after the exclusion of the Cat Spur Creek Drainage and the subsequent creation of the Cat Spur Creek Allotment in 1950. In general, 625 head of sheep were grazed annually, but numbers were as high as 1,200 in 1958. Keeler Creek was designated as a sheep grazing allotment until 1964 when it changed to cattle and horse grazing. Up to 36 head of cattle were grazed on the allotment until 1973. From 1973 to 1993, 52 head of cattle (25 on National Forest land) were permitted to graze within the allotment.

In 1993 these numbers were reduced to 21cow/calf pairs in the allotment with a total of 10 cow/calf pairs permitted to graze on National Forest lands. The allotment is currently vacant.

Environmental Consequences

All Action Alternatives (B, C, D, E, and F)

Direct and Indirect Effects

Riparian planting would occur within the Keeler Creek Allotment. Any fencing placed around these plantings should not remove a large area from grazing.

Stands to be precommercial thinned generally have little forage available due to the very dense canopy. Forage may increase after thinning due to increases in light levels, and cattle may begin to utilize these areas. Grazing would eventually taper off due to decreasing light levels and corresponding decreases in forage abundance once the canopy begins to close again.

Cumulative Effects

Noxious weed treatments will be conducted in accordance with the St. Joe Noxious Weed Control FEIS (USDA 1999). Weed treatments are expected to improve or maintain habitat quality by allowing natives and pasture grasses to re-colonize areas previously occupied by weeds.

Table 3-36 Hidden Cedar Project Activities within Range Allotment Boundaries

		Approximate Acres or Miles					
Allotment	**Prescription**	**Alt A**	**Alt B**	**Alt C**	**Alt D**	**Alt E**	**Alt F**
Emerald Creek	Commercial thin	-	334	334	90	0	319
	Shelterwood preparatory cut	-	20	20	0	0	20
	Irregular shelterwood cut	-	72	72	0	0	22
	Group shelterwood cut	-	40	40	40	0	40
	Clearcut w/ reserves	-	44	44	35	0	20
	Total Acres	-	514	514	165	0	421
	New Road Construction*-USFS	-	2.6	0	0	0	1.1
	New Road Construction-other lands	-	0	0	0	0	
Merry Creek	Commercial thin	-	22	22	0	0	22
	Shelterwood preparatory cut	-	35	35	0	0	35
	Irregular shelterwood cut	-	0	0	0	0	0
	Group shelterwood cut	-	0	0	0	0	0
	Clearcut w/ reserves	-	0	0	0	0	0
	Total Acres	-	57	57	0	0	57
	New Road Construction*-USFS	-	.92	0	0	0	.92
	New Road Construction-other lands	-	0	0	0	0	0
Keeler Creek	Commercial thin	-	268	268	139	0	268
	Shelterwood preparatory cut	-	107	107	91	0	107
	Group shelterwood cut	-	16	16	0	0	16
	Clearcut w/ reserves	-	85	85	74	0	85
	Total Acres		476	476	304	0	476
	New Road Construction-USFS	-	6	2	2	2	3.6
	New Road Construction-other lands	-	5	5	5	5	5
Cat Spur	Commercial thin	-	102	102	0	0	102
	Clearcut w/ reserves	-	4	4	0	0	4
	Total Acres		106	106	0	0	106
	New Road Construction-USFS	-	.75	0	0	0	.75
	New Road Construction-other lands	-	2.3	2.3	2.3	2.3	2.3

Developed from proposed_veg.xls spreadsheet project file: SB-4
**There are no access requests in this allotment*

Alternatives B, C, D, and F

Direct and Indirect Effects

Alternatives B, C, D, and F include proposals to harvest timber which may affect grazing by creating more abundant forage within harvest units. Harvest prescriptions proposed within the allotments are commercial thinning, shelterwood preparatory cuts, group shelterwood cuts, irregular shelterwood cuts, and clearcuts with reserves. After logging, some livestock distribution changes may occur under these alternatives due to the creation of transitory range in openings. All acres harvested and underburned under the action alternatives would provide some transitory range.

Livestock distributions may also change due to new access provided by new roads. All action alternatives have some new road construction associated with them (Table 3-36). The movement of cattle on to newly created transitory range or to previously unused areas due to new travel corridors could have detrimental to beneficial effects. Such movement may serve to decrease grazing pressure on riparian areas and reduce overall effects of grazing over a larger area. It may also open potentially sensitive areas to grazing that were previously unused. For further discussion of these effects refer to the St. Maries Grazing Allotment EA (USDA 2005).

Site preparation and planting would occur in areas where timber harvest takes place first. If cattle choose to use newly created openings as transitory range, they would be likely to do so regardless of whether or not site preparation has occurred. However, site preparation may result in an increase in the amount of forage created in openings, making such openings more attractive to cattle.

Gopher control would not affect grazing either in scale or distribution. Gopher control activities would not result in any changes in access or available forage.

Alternative A

Direct, Indirect, and Cumulative Effects

There are no known direct or indirect effects from the No-Action Alternative. Current stocking levels and grazing practices would continue.

Past and present activities within the allotments include timber harvest, road building, seeding with non-native pasture grasses, mining, testing for garnet deposits, and recreational activities.

Unauthorized digging for garnets currently occurs along a tributary of Cat Spur Creek in T42N R1E Sec 19. The extent of disturbances related to digging with respects to grazing should be small to nonexistent.

Noxious weed treatments will be conducted in accordance with the St. Joe Noxious Weed Control FEIS (USDA 1999). Weed treatments are expected to improve or maintain habitat quality.

Alternative B

Direct, Indirect and Cumulative Effects

Cat Spur Creek Allotment

The Cat Spur Creek Allotment is entirely contained within the Hidden Cedar Project Area. Primary grazing areas occur along Cat Spur, Kitten, and lower Log Creeks. Existing road access to these primary riparian meadows would not change under any alternative. Approximately 102 acres of commercial thinning and four acres of clearcut harvest would occur within the allotment (Table 3-36). Harvest would not occur near the primary grazing areas and, so, chances are low that it would encourage cattle to drift from these areas into new ones. A short (approximately ¼ mile) road would be constructed at the western edge of the allotment in conjunction with a harvest unit. Although the likelihood of cattle utilizing this area is low, should it occur, this road could provide cattle with an easy travel corridor to the adjacent Keeler Creek Allotment.

New road construction associated with access requests would take place fairly close to primary grazing areas and could provide travel corridors for cattle. Any timber harvest associated with this road building could also provide new transitory range.

Past and present activities within the allotments include timber harvest, road building, seeding with non-native pasture grasses, mining, and recreational activities. Unauthorized digging for garnets currently occurs along a tributary of Cat Spur Creek in T42N R1E Sec 19. Prospecting permits, leases, and recreational digging may be proposed for this area in the future. These actions are not likely to affect grazing.

Keeler Creek Allotment

The Keeler Creek Allotment is entirely contained within the Hidden Cedar Project Area. Primary grazing areas exist along lower Hidden, Wood, and Keeler Creeks, and the West Fork of St. Maries River. At this time the allotment is vacant. Travel corridors already exist through these areas and new road construction on National Forest land would provide alternate access. Road construction associated with private access requests would provide more extensive access into some areas than previously existed. It is likely that timber harvest would occur along these routes in the future, which may provide transitory range and encourage cattle use. Commercial thinnings, shelterwood preparatory cuts, group shelterwood cuts, and irregular shelterwood cuts would all take place adjacent to primary grazing areas in this alternative. Each of these prescriptions would result in the production of transitory range and may encourage movement of cattle into these units and possibly other units adjoining them should grazing resume on the allotment.

Past and present activities within the allotments include timber harvest, road building, seeding with non-native pasture grasses, mining, and recreational activities.

Merry Creek Allotment

The Merry Creek Allotment is comprised of approximately 41,627 acres, of which, 1,038 acres are contained within the Hidden Cedar Project Area. The primary grazing areas within the allotment are not located within the Hidden Cedar Project boundary. However, suitable forage does exist in this section along the St. Maries River at the western edge of the allotment.

Whatever livestock use is occurring in this area is most likely confined to this meadow corridor. However, there is an existing harvest unit within ¼ mile of this corridor, which may provide transitory range. Under this alternative, three units would be harvested, one adjacent to and another within ¼ mile of this existing harvest. The close proximity of these units may encourage cattle to utilize them as transitory range. However, the quality of this transitory range may be minimal since the harvest prescriptions call for commercial thinning and shelterwood preparatory cuts.

Approximately one mile of new road construction would occur under this alternative. Most of this new construction would occur within harvest units and represent only a short extension of an existing road.

Past and present activities within the allotments include timber harvest, road building, seeding with non-native pasture grasses, mining, and recreational activities. Future activities such as road building, timber harvest, and burning on private and federal land have the potential to affect cattle use by creating new travel corridors, providing new transitory range, and potentially opening up sensitive areas to grazing.

Emerald Creek Allotment

The Emerald Creek Allotment is comprised of approximately 26,352 acres, of which, 2,517 acres are contained within the Hidden Cedar Project Area. Cedar Creek runs through this section of the allotment and provides meadow forage. Heavy use by cattle occurs on the private land in the lower portion of Cedar Creek. Less cattle use occurs on NFS lands in upper Cedar Creek. Currently roads in this area are gated, in long-term storage, or have barriers. This situation would not change under any alternative. Approximately 2.5 miles of new road would be constructed under this alternative in association with timber harvest in the Cedar Creek area (Table 3-36). All new road construction would be at least ¼ mile from the riparian meadows. Several timber harvest units (commercial thinning and group shelterwood) would be adjacent to the riparian meadow and may eventually be used as transitory range. A clearcut unit would exist within ¼ mile of the riparian meadows. Any road construction within these units may serve as travel corridors, enabling cattle to more easily use different areas within the allotment. This may increase cattle access and subsequent usage in upper Cedar Creek and make it difficult for the permittee to retrieve cattle in the fall and to control their movements during the grazing season.

Past and present activities within the allotments include timber harvest, road building, seeding with non-native pasture grasses, mining, and recreational activities. Future activities such as road building, timber harvest, and burning on private and federal land have the potential to affect cattle use by creating new travel corridors, providing new transitory range, and potentially opening up sensitive areas to grazing.

Alternative C

Direct, Indirect, and Cumulative Effects

Cat Spur Creek Allotment

Effects on rangeland would be nearly identical to those in Alternative B. The only difference between these two alternatives is that the short segment of road at the western edge of the allotment would not be constructed in Alternative C. Effects due to access requests, future Forest Service and private activities would be the same as in Alternative B.

Keeler Creek Allotment

There are slight differences between Alternatives B and C, but they are not expected to result in appreciable differences in how they affect rangeland use. Alternative C proposes no road construction aside from access requests, and two additional commercial thinning units would be harvested. These units are near the edge of the allotment, are far removed from the primary grazing areas, and have minimal road access to them. As such, they should not provide much additional transitory range. Effects due to access requests and future Forest Service and private activities would be the same as in Alternative B.

Merry Creek Allotment

Effects would be similar as those of Alternative B. The same units would be harvested. Effects from access requests, future Forest Service and private activities would be the same as in Alternative B.

Emerald Creek Allotment

Effects of this alternative would be similar to those of Alternative B. However, no new road construction will occur under Alternative C within the allotment (Table 3-36). Without new road construction, cattle may not travel as widely as in Alternative B. Effects due to access requests, future Forest Service and private activities would be the same as in Alternative B.

Alternative D

Direct, Indirect, and Cumulative Effects

Cat Spur Creek Allotment

There would be no timber harvest in the allotment under this alternative (see Table 3-36). However, timber harvest would occur along the border of the Keeler and Cat Spur Creek Allotments. Should harvest there result in an increase in usage by cattle, they could drift into the Cat Spur Creek Allotment. However, there would be little motivation to do so given the lack of attractive foraging in that area of the allotment. Effects due to access requests, future Forest Service and private activities would be the same as in Alternatives B and C.

Keeler Creek Allotment

In this alternative, commercial thinning and shelterwood preparatory cuts would occur adjacent to primary grazing areas and may provide transitory range. There would be fewer such units, and fewer units overall than in Alternatives B and C (Table 3-36). Road construction associated with access requests would be the same as in Alternatives B and C. Effects from future Forest Service and private activities would be the same as in Alternatives B and C.

Emerald Creek Allotment

Fewer units would be harvested under this alternative than in Alternative B or C (Table 3-36). There would be no road construction and only one commercial thinning unit would abut the riparian meadow along Cedar Creek.

It is expected that the quality of transitory range produced within this thinning unit would be poor and should not encourage cattle to drift off of the adjacent riparian meadows. Effects due to future Forest Service and private activities would be the same as in Alternatives B and C.

Merry Creek Allotment

There would be no harvest units or new road construction under this alternative and cattle use is expected to continue as it is does currently. Effects due to future Forest Service and other activities would be the same as in Alternatives B and C.

Alternative E

Direct, Indirect and Cumulative Effects

Cat Spur Creek Allotment

Effects of this alternative would be similar to those of Alternative A. However, road construction for private access requests would occur under this alternative (Table 3-36), and effects from this would be similar to those in Alternatives B, C, and D.

Keeler Creek Allotment

There would be no commercial timber harvest on NFS lands under this alternative. The effects of road building would be identical to those under Alternatives C and D.

Emerald Creek Allotment

There would be no timber harvest on NFS lands or road construction under this alternative, and cattle use is not expected to be different than in Alternative A.

Merry Creek Allotment

No commercial timber harvest on NFS lands or road construction would occur under this alternative. In this respect, effects would be much as outlined in the No-Action Alternative. Effects due to future Forest Service and other activities would be the same as in Alternatives B, C, and D.

Alternative F

Direct, Indirect and Cumulative Effects

Cat Spur Creek Allotment

Within the Cat Spur Allotment, effects from Alternative F would be the same as those from Alternative B. The same timber harvest, harvest prescriptions, and road construction will occur under both alternatives (Table 3-36).

Keeler Creek Allotment

Effects of Alternative F would be nearly or completely identical to those of Alternative B. Alternative F includes two additional thinning units near the southern boundary of the allotment, and would not include road construction in Unit 49. Cattle use on the allotment is not expected to be affected by either of these facts given that these activities would occur near the edge of the allotment, far removed from primary grazing areas. In addition, grazing primarily occurred only along the eastern portion of the West Fork of the St. Maries River.

Emerald Creek Allotment

Approximately one mile of new road would be constructed under this alternative in association with timber harvest in the Cedar Creek area (Table 3-36). All new road construction would be at least ¼ mile from the riparian meadows. Several timber harvest units would be within ¼ mile of the riparian meadow and may eventually be used as transitory range. Road construction and timber harvest may serve to increase access and available forage in upper Cedar Creek. Cattle use of this area may then increase over levels expected in Alternative A.

Merry Creek Allotment

Within the Merry Creek Allotment, effects from Alternative F would be the same as those from Alternative B. The same timber harvest, harvest prescriptions, and road constructions would occur under both alternatives (Table 3-36).

Consistency With Forest Plan and Laws

Management directive states that “transitory range in existing allotments may be used where compatible with the objectives of the specific management areas” and that forage production will not be reduced (Forest Plan II-7). The Forest Plan standard states “opportunities for grazing and other uses of public range resources will be managed to serve the welfare of local residents and communities “(Forest Plan II-31). All alternatives would meet the intent of the Forest Plan and follow Forest Service Manual direction.

Recreation

Changes Between the Draft SEIS and the Final SEIS

The analysis was updated to reflect the following changes in Alternative F: new road construction and decommissioning below Bechtel Butte and decommissioning/storage of the Wood Creek Road. Minor updates and corrections were made in alternative descriptions and tables.

Changes Between the 2002 FEIS and this SEIS

1. The fish pond proposed in Keeler Creek was eliminated from all action alternatives.
2. The garnet exploration that was proposed in the Wood Creek drainage was completed, and it was determined that this drainage would not be developed as a recreational digging site in the near future (for at least 10 years).
3. OHV (off-road vehicle) use has increased substantially. According to Idaho motorbike and ATV(all-terrain vehicle) registration statistics, OHV registrations have risen from 627 to 1,253 registrations (an increase of approximately 100%) in Benewah County, from 859 to 1,226 registrations (an increase of approx. 63%) in Shoshone County and from 1,304 to 1,642 registrations (an increase of approx. 26%) in Latah County in the four-year period from 2000 to 2004 (SREC-1). The project area is located in all three of these counties. The Idaho State Department of Parks and Recreation has completed initial analysis on a statewide OHV survey. Region 2, the Lewiston, Clearwater, and St. Joe area of the state has the highest per capita use of OHVs in the state (SREC-2). The number of OHVs that are not registered is not known.
4. Several roads have been put into long-term storage or were decommissioned (partially or fully recontoured) since the original Hidden Cedar ROD. The roads or portions of roads put into long-term storage include: 3340 (Maize Creek), 3350A (Corner Pocket Road), 3343 (Red Road), 3556 (Emerald Ridge) and 3557 (Cedar Butte). The roads or portions of roads decommissioned include: 3321BUA, 3340UB, 3343UB, 3343UC, 3343UD, 3380, 498UB, 498UC, 498UD and 498UH.

Regulatory Framework

Recreation Goals as identified in the Forest Plan pages II-I-2 include:

1. Provide for the projected use of developed recreation areas. Complete the development of new sites as budget becomes available.
2. Provide for a variety of dispersed recreation opportunities.
3. Provide opportunities for people to be involved in Forest management activities and supply information enabling visitors to better enjoy National Forest lands.

Recreation Objectives identified in the Forest Plan pages II-3 indicate that the Forest will continue to provide a share of outdoor recreation needs in relation to other public and private entities, provide for

the projected use of developed recreation areas with development of new sites as budget becomes available, to provide for a variety of dispersed recreation opportunities, to pursue opportunities to increase and improve the recreation trail system, and to continue and increase cooperative trail programs with organizations, clubs, and other public agencies.

The recreation experience is classified according to the Recreation Opportunity Spectrum (ROS) (Map M-19). Lands within and adjacent to the analysis area are a blend of Rural, Roaded Natural, and Roaded Modified where a modified environment predominates with some naturally appearing environment. The Forest Plan defines these (Forest Plan, VI-27):

Roaded Natural: A ROS class located along or near main forest roads and highways where the user will find subtle modification to the natural environment. Improvements are limited to roads, trails, few scattered structures and moderately developed campgrounds. The natural environment still dominates although timber harvest activities may be visible.

Roaded Modified: A ROS sub-class of the Roaded Natural class that is located along less used forest roads where the user will likely encounter large clearcuts and areas where management activities may be present. A few low standard recreation facilities may be provided.

Rural: A ROS class that is characterized by a culturally modified yet attractive environment. This is a roaded area where roads are generally open to recreation use. There will be a high level of interaction between users.

The ROS setting indicators are access, remoteness, size, visual characteristics, site management, visitor management, social encounters and visitor impacts (Project Planning ROS Users Guide Chapter 60, USFS, 1987).

The Hidden Cedar Project Area is in Management Areas (MA) 1, MA 4, and MA 5. Management area standards for recreation are identified as:

a) MA 1: Manage primarily for roaded modified and roaded natural ROS classes. Maintain a diversity of recreation opportunities. The Emerald Creek Garnet Area would be managed to provide a unique recreation rock hound experience in accord with its current management direction (Forest Plan, III-2).

b) MA 4: Manage primarily for roaded modified and roaded natural ROS classes. Motorized use is generally restricted to designated routes. Within critical habitat components motorized recreation use may be restricted to provide needed wildlife security. Maintain a diversity of recreation opportunities. The Emerald Creek Garnet area would be managed to provide a unique recreation rock hound experience and in accord with its current management direction. (Forest Plan, III-17-18)

c) MA 5: Manage toward roaded natural and semi-primitive ROS experience. Motorized use would be generally is restricted to designated routes. Within critical habitat components motorized vehicle use may be restricted to provide needed wildlife security. Provide dispersed recreation opportunities consistent with big game winter habitat needs. (Forest Plan, III-23)

Analysis Area

The analysis area for existing conditions and effects is the project area.

Analysis Methods

An overview of recreational use was developed through on-site visits, information obtained from local residents and from assumptions made from physical evidence (e.g. meat poles in a dispersed campsite = hunting use, etc.). The analysis period for the project is five years.

Affected Environment

Recreation Opportunity Spectrum

According to the St. Joe District's current ROS inventory (see ROS map, M-19), the project falls within the three ROS classifications displayed in Table 3-37.

Table 3-37 Recreation Opportunity Spectrum

ROS	Acres	% of Project Area
Roaded Natural	13,959	41
Roaded Modified	15,109	48
Rural Setting	3,886	11

Camping at Developed Campgrounds

Cedar Creek Campground is in the analysis area. The campground is located adjacent to State Highway 3 along the St. Maries River. The campground was renovated in 1999 – 2000, and has been operated as a fee site since 2001. The site receives moderate to high use in the spring, summer and fall, fills to capacity on holiday weekends.

Visitor Information Services and Bunkhouse Rental

The Clarkia Work Center provides visitor information services to 1,200 to 1,500 people per year during the season from Memorial Day to mid-October. The Clarkia Bunkhouse cabin rental accommodated 128 people over 138 nights in 2004.

Camping at Undeveloped Sites

There are numerous dispersed campsites distributed throughout the analysis area, including one site on Wood Creek Road, one on Hidden Creek Road, three sites along Cat Spur Road, two sites on the Keeler Creek Road, two sites on Bechtel Mt. Road, and two along the Log Creek Road. Use is fairly static along roads in the interior. The primary camping use is in the late summer and fall during huckleberry and hunting season. The privately owned Fossil Bowl has several undeveloped camping sites.

Day Use and Gathering Forest Products

Most of the recreation use within the analysis area is day-use as visitors pass through the area in route to other destinations. Day use in the area includes driving for pleasure and sightseeing; ATV and motorcycle travel; fishing; gathering forest products (huckleberries, mushroom, and Christmas trees); firewood collecting; and hunting for birds and big game including spring black bear and cougar and late summer/fall elk, deer and black bear.

Roads frequently used by visitors and area residents include Roads 504 (Clarkia/Emerald Road), 361 (Cat Spur), 765 (Keeler Creek), 3478 (Bechtel Butte), 1450 (Log Creek), 1451 (Staples Creek), 1491 (West Fork Merry Creek), 341 (Wood Creek), 498 (Hidden Creek), 3321 (Christmas Creek), 3685 (Bluebell), 765A (County Line), 1486 (Anthony Peak). Refer to the transportation section for further information about the road system.

Fishing

Area residents and others fish the St. Maries River and its tributaries. Use is light.

Fossil Digging

Digging for fossils occurs at the privately owned Fossil Bowl. The owner estimates that yearly an average of 2,400 people participate in fossil digging, including school groups and individuals.

Motorized Use for Vehicles under 50 Inches

Within the Hidden Cedar analysis area, there is very light motorcycle and snowmobile use. The level of ATV (all-terrain vehicles) use is moderate to high and is often incidental to fall hunting season. It occurs along the open roads with mixed vehicle traffic (where ATVs must be street-legal and operated by persons carrying a valid state driver's license). Some use may occur on roads with gates or barriers. Some roads with gates or barriers have no closure order in place and use by vehicles under 50 inches width is legal and may occur. The privately owned Fossil Bowl offers a developed motorcycle racetrack with a yearly average of 5,000 persons participating in motorcycle racing.

Recreation Special Uses

There are presently no designated or reserved outfitter camps within the project area boundaries. One outfitter holds a permit for guiding deer hunting in the western portion of the analysis area.

Recreational Garnet Digging

There is traffic through the Hidden Cedar Project Area to the nearby Emerald Creek Garnet Area, located on the East Fork of Emerald Creek (adjacent to the project area boundary). The Emerald Creek Garnet Area, located in 281 Gulch, is open seasonally from Memorial Day to Labor Day for recreational collecting of gem-quality garnets. There are currently no sites open for recreational garnet digging within the Hidden Cedar analysis area. There has been sporadic unauthorized digging within the project area. Refer to the Minerals section for additional information about the garnet resource.

Trails

There are currently no developed trail systems, any groomed snowmobile trails or any cross-country ski trails within the analysis area. There are some user-maintained trails. In general, the area receives very light winter use by snowmobilers and cross-country skiers on existing roads. Cross-country skiers have been noted on Hidden Creek and Wood Creek Roads.

Environmental Consequences

All Alternatives

Direct and Indirect Effects

Recreation use is expected to increase gradually over time. OHV (off-road vehicle) use has increased rapidly over the last five years and is expected to continue to increase rapidly over the next ten years. ROS classifications would remain the same as described in the affected environment.

See Maps M4, M6, M8, M10, M12, M15 for road management and proposed changes for each alternative.

One major factor that affects the recreation resource is the amount and kind of access available. Access opportunities are divided into the following categories:

Open Roads – those roads open to public use.

Gated Roads (Road Management Prescription A) – These roads restrict public access for full-size motorized vehicles. Vehicles less than 50 inches wide may or may not be restricted.

Roads with Barriers (Road Management Prescription B) – These roads restrict public access for full-sized motorized vehicles. Vehicle less than 50 inches wide may or may not be restricted.

Roads in Long-Term Storage (LTS – Road Management Prescription C) – These roads generally have culverts pulled, some type of barrier or road surface decompaction to discourage all motorized traffic, or some low level type of obliteration. It is assumed motorized traffic would be restricted on all roads put into long-term storage. The roads would also often be impassable for stock and pedestrian traffic as well.

Road Decommissioned (Road Management Prescriptions D and E) – These roads are partially or fully recontoured and it is assumed that they are closed to all motorized use. They are also generally impassable for stock and pedestrian traffic as well.

See tables below that summarize the number of miles with different types of access for each alternative.

Alternative A

Direct and Indirect Effects

The existing road system and travel management would remain the same. Opportunities for camping in developed and undeveloped sites, day-use activities, recreational garnet digging, fishing, fossil digging and motorized areas for vehicles less than 50 inches would remain the same.

Alternatives B, C, D, and F

Direct and Indirect Effects

All of these alternatives propose timber harvest activities. These alternatives may create temporary conflicts between logging and recreation traffic during proposed harvest activities. The logging activities generally occur between June and December. Increased traffic, including logging equipment, and support vehicles could be expected. Visitors might experience temporary delays. Signs would be placed on these roads to inform visitors of logging activities (Design Feature 8C). Undeveloped camping sites near logging units may be used by contractors with permits during logging operations for camping and/or for equipment parking. Any undeveloped recreation sites used for logging or related activities would be restored or rehabilitated as undeveloped sites following use (Design Feature 8A).

Alternative B

Direct and Indirect Effects

This alternative includes timber harvest activities and some new road construction. Public travel would be restricted on all of the new roads and some of the new roads would be put into long-term storage or be decommissioned after harvest and associated activities.

The road system and travel management would change from the existing condition. Opportunities for camping in developed and undeveloped sites, day-use activities, fishing and fossil digging would remain the same. Opportunities for unrestricted motorized travel and for using vehicles less than 50 inches wide would be reduced.

Post activity open roads would be reduced by approximately 1.8 miles. There would an additional 0.9 miles of gated roads. Barriered roads would be reduced by 7.2 miles because some of the currently barriered roads would go into long-term storage or be decommissioned. Approximately 20.7 miles of road would be placed into long-term storage. The roads put into LTS would be impassable for motorized vehicles and would likely be impassable for stock and pedestrian traffic. Decommissioning would be done on all or portions of 4.1 additional miles of roads. The decommissioned roads would be impassable for motorized vehicles, stock and pedestrian travel. All of the roads put into LTS or decommissioned would be either tail ends of roads, spur roads or short roads less than 1.0 mile long.

Table 3-38 Comparison of Miles of Road by Access Type by Alternative

Alternative	Road Management Prescription (miles)				
	Open	A Gated	B Barriered	C Stored	D & E Decommissioned
Alternative A (Existing Condition)	**89.5**	**104.3**	**52.2**	**53.2**	**11.5**
Alternatives B	**87.7**	**105.2**	**45.0**	**73.9**	**15.6**

Alternatives C

Direct and Indirect Effects

This alternative includes timber harvest activities and some new road construction that is associated with the access request only. Public travel would be restricted on all of the new roads and some of the new roads would be put into long-term storage or be decommissioned after harvest and associated activities.

The road system and travel management would change from the existing condition. Opportunities for camping in developed and undeveloped sites, day-use activities, fishing and fossil digging would remain the same. Opportunities for unrestricted motorized travel and for using vehicles less than 50 inches wide would be reduced.

Post activity open roads and gated roads would be the same as Alternative B. Barriered roads would be reduced by 5.8 miles because some of the currently barriered roads would go into long-term storage or be decommissioned. Approximately 13.2 miles of road would be placed into long-term storage. The roads put into long-term storage would be impassable for motorized vehicles and would likely be impassable for stock and pedestrian traffic. Decommissioning would be done on all or portions of 2.5 additional miles of roads. The decommissioned roads would be impassable for motorized vehicles, stock and pedestrian travel. All of the roads that would be decommissioned would be either tail ends of roads, spur roads or short roads less than 1.0 mile long.

Table 3-38a Comparison of Miles of Road by Access Type by Alternative

Alternative	Road Management Prescription (miles)				
	Open	A Gated	B Barriered	C Stored	D & E Decommissioned
Alternative A (Existing Condition)	**89.5**	**104.3**	**52.2**	**53.2**	**11.5**
Alternatives B	**87.7**	**105.2**	**46.4**	**66.4**	**14.0**

Alternative D

Direct and Indirect Effects

Alternative D includes timber harvest activities. Fewer miles of roads would be put into long-term storage and more miles would be decommissioned than in Alternatives B and C**.** Portions of Wood Creek Road 341 and Hidden Creek Road 498 would be decommissioned essentially eliminating motorized access on National Forest System lands north and west of State Highway 3 and south of Roads 504 and 3478.

The road system and travel management would change from the existing condition. Opportunities for camping in developed campgrounds, day-use activities, fishing and fossil digging would remain the same. Access to the dispersed site on Wood Creek Road would be eliminated. Opportunities for unrestricted motorized travel and for using vehicles less than 50 inches wide would be reduced more than it would be in Alternatives B and C.

Open roads would be reduced by approximately 4.1 miles. There would be 9.5 miles less of roads with gates and barriers because some of the gated and barriered roads would be put into LTS or decommissioned. Approximately 5.4 additional miles of roads would be put into LTS. The roads put into LTS would be impassable for motorized vehicles and would likely be impassable for stock and pedestrian traffic. Decommissioning would be done on all or portions of an additional 15.8 miles. The decommissioned roads would be impassable for motorized vehicles, stock and pedestrian travel. All of the roads put into LTS or Decommissioned would be either tail ends of roads, spur roads or short roads less than 1.5 miles long.

Table 3-39 Comparison of Miles of Road by Access Type by Alternative

Alternative	Road Management Prescription (miles)				
	Open	A Gated	B Barriered	C Stored	D & E Decommissioned
Alternative A (Existing Condition)	89.5	104.3	52.2	53.2	11.5
Alternative D	85.4	101.8	45.2	58.6	27.3

Alternative E

Direct and Indirect Effects

No commercial timber harvest activities are proposed in Alternative E, but the post-activity road system and travel management would be the same as in Alternative D. Recreation opportunities would also be the same as Alternative D.

Alternative F

Direct and Indirect Effects

Alternative F includes timber harvest activities and new road construction. Portions of Hidden Creek Road 498 and Wood Creek Road 341 would be decommissioned, essentially eliminating motorized access on National Forest System lands north and west of State Highway 3 and south of Roads 504 and 3478.

The road system and travel management would change from the existing condition. Opportunities for camping in developed campgrounds, day-use activities, fishing and fossil digging would remain the same. Access to the dispersed site on Wood Creek Road would be eliminated. Opportunities for unrestricted motorized travel and for using vehicles less than 50 inches wide would be reduced more than it would be in Alternatives B and C.

Open roads would be reduced by approximately 4.1 miles. There would be 8.7 miles less of roads with gates and barriers because some of the gated and barriered roads would be put into LTS or decommissioned. Approximately 9.6 additional miles of roads would be put into LTS. The roads put into LTS would be impassable for motorized vehicles and would likely be impassable for stock and pedestrian traffic. Decommissioning would be done on all or portions of an additional 17.4 miles. The decommissioned roads would be impassable for motorized vehicles, stock and pedestrian travel.

All of the roads put into LTS or Decommissioned would be either tail ends of roads, spur roads or short roads less than 1.4 miles long.

Table 3-40 Comparison of Miles of Road by Access Type by Alternative

Alternative	Road Management Prescription (miles)				
	Open	A Gated	B Barriered	C Stored	D & E Decommissioned
Alternative A (Existing Condition)	**89.5**	**104.3**	**52.2**	**53.2**	**11.5**
Alternative F	**85.4**	**102.9**	**44.9**	**62.8**	**28.9**

All Alternatives

Cumulative Effects

Present and Reasonable Foreseeable Actions

Recreational activities are expected to gradually increase over time. OHV (off-road vehicle) use has increased rapidly over the last five years and is expected to continue to increase rapidly over the next ten years.

According to Idaho motorbike and ATV (all-terrain vehicle) registration statistics, OHV registrations have risen from 627 to 1,253 registrations (an increase of approximately 100%) in Benewah County, from 859 to 1,226 registrations (an increase of approx. 63%) in Shoshone County and from 1304 to 1642 registrations (an increase of approx. 26%) in Latah County in the four year period from 2000 to 2004 (SREC-1). The project area is located in all three of these counties. The Idaho State Department of Parks and Recreation has just completed initial analysis on a state-wide OHV survey. Region 2, the Lewiston, Clearwater and St. Joe area of the state has the highest per capita use of OHVs in the state (SREC-2). The number of OHVs not registered is unknown.

Consistency with the Forest Plan and Laws

All of the alternatives would be within Forest Plan Standards for recreation because: a diversity of recreational opportunities would be provided**,** and the ROS classes remain the same in the Management Areas (MA-1, MA-4, and MA-5) found in the project area.

Scenery

Changes Between the 2002 FEIS and this SEIS

Through analysis of a project that bordered the general area of the Hidden Cedar Project an error has been discovered. After doing some investigation, it turns out that the original VQO map for the Hidden Cedar Analysis Area was digitized incorrectly. This error has resulted in major changes in acres in the five scenic integrity levels.

Table 3-41 Old Hidden Cedar Project Scenery Integrity Levels

VQO	Original Mapping		Supplemented EIS	
	Acreage in Project Area	Percent of project area	Acreage in Project Area	Percent of project area
Preservation	0	0	0	0
Retention	4,260	13	6,253	19
Partial Retention	3,636	11	22,029	67
Modification	24,808	75	3,490	11
Maximum Modification	249	1	1,180	3

The acre change was predominately from a Modification to Middleground Partial Retention. Due to the topography of the area and silvicultural treatments of commercial thins and shelterwood prep cuts the scenic integrity would still be met. There is no change in the units that were identified previously that are in the scenic integrity of Retention. Visual screening was identified for these units.

The mapping of scenic integrity changed enough to indicate a need to verify nine proposed units. VQOs for Units 20, 21, 22, 23, 24 and a portion of Unit 46 changed from 3B/M to Mg1B/PR with a prescription of clearcut. A portion of Unit 6 went from Mg1B/PR to Fg1B/R with a prescription of shelterwood final cut, and Unit 48 went from 3B/M to Fg1B/R with a prescription of clearcut. Ground verification showed that although the mapping polygon has “Foreground Retention” the proposed units are not visible in the foreground (Landscape Aesthetics, Chapter 4, page 5).

The Sensitivity Level 1 is for the view shed along Highway 3 through the project area. The highway travels along the valley bottom and then proceeds over the Palouse Divide. The topography of the area generally consists of gently rolling to flat ridges that then break into the view shed of Highway 3. All of the above mentioned units sit well back in the landscape up on the flatter ridges so they are adequately screened by the existing topography from the sensitive view shed of Highway 3.

Geographic and Temporal Scope of the Analysis

The geographic scope of the scenery analysis (existing condition, direct, indirect and cumulative effects) for the Hidden Cedar Project is confined to the project area boundary. The temporal scope of the analysis is confined to the decade following a decision.

Regulatory Framework

Scenery management direction for the analysis area is contained in the Idaho Panhandle National Forests Land and Resource Management Plan of 1987 (Forest Plan) and is described in the terms of Visual Quality Objectives (VQOs). VQOs were established during the Forest planning process and were mapped by computer. The mapping was based on the area seen from sensitive travel corridors and other features having a high visual sensitivity level. VQOs were assessed upon guidance contained in the Visual Management Handbook, Chapter I of the National Forest Landscape Management Series (USDA Forest Service, 1974). The system was revised and is now known as the Forest Service Scenery Management System. The revised guidelines are contained in Landscape Aesthetics, a Handbook for Scenery Management (USDA, Forest Service publication 701, 1995).

Visual Quality Objectives

Visual Quality Objectives (VQOs) were adopted during the Forest Planning process using the scenery data obtained from the previously described landscape attractiveness and visibility analyses. Adopted VQOs for the IPNF are contained in maps generated during the Forest planning process and are available at the St. Joe Ranger District office in St. Maries.

Visual Quality Objectives consist of five levels that describe scenery management objectives ranging from low scenic integrity to very high scenic integrity. The five levels are: Preservation, Retention, Partial Retention, Modification and Maximum Modification. The levels are directly correlated to VQOs contained in the IPNF Forest Plan.

Analysis Methods

To define the existing condition of the visual resource, the visual character of the landscape is assessed in terms of how it has been altered by human activities. Proposed management activities were reviewed to see how they may change the character. Visual significance was evaluated based upon viewing opportunities form important travel routes in the vicinity. Results were then evaluated as to whether or not they meet Forest Plan standards (VQOs).

Affected Environment

Landscape Character

The combination of landforms, water characteristics, vegetation, and cultural elements has resulted in a consistent landscape character over the geographic area (Landscape Aesthetics, Chapter 1). The landscape of the project area falls into one landscape character class of “Highly modified mature/immature mixed conifer forested landscapes on mountain slope or stream break landforms.”

Variety Classes

The variety classifications are: Class A- Distinctive, Class B- Common, and Class C-Indistinctive. The entire project area falls into Class B – Common, which is defined as areas where landform, vegetation patterns, water characteristics, and cultural features combine to provide ordinary or common scenic quality. These landscapes have generally positive, yet common attributes of variety,

unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern and balance. Normally they form the basic matrix within ecological units.

Landscape Visibility

Landscape visibility is defined by two elements:

1. Human values as they relate to the relative importance to the public of various themes
2. Relative sensitivity of scenes based on the position of the observer

The "human value component" is usually described by **concern** levels. The observer position component utilizes varying distance zones.

Concern Levels

The main travel routes which traverse the area and from which the area is viewed are:

Sensitivity Level 1 Travel Routes: State Hwy 3 along the St. Maries River and views from the Cedar Creek Campground.

Sensitivity Level 2 Travel Routes: Bechtel Creek to Bechtel Butte

Sensitivity Level 3 Travel Routes: the remainder of travel routes in the project area.

Site-Specific Forest Plan Visual Quality Objectives

Forest Plan VQO mapping was digitized and placed in a VQO GIS data layer for the project area. A map showing site-specific VQOs for the area can be found in the project file (SVQ-1) Table 3-42 summarizes the gross acreages within the project area of each of the five scenery integrity levels previously described.

Table 3-42 Forest Plan Visual Quality Objectives of the Hidden Cedar Project Area

VQO	Acreage in Project Area	Percent of Project Area
Preservation	0	0
Retention	6,253	19
Partial Retention	22,029	67
Modification	3,490	11
Maximum Modification	1,180	3

The VQO mapping also incorporates site-specific information on visibility from differing concern level (sensitivity levels) features, scenic attractiveness classes, and viewing zones.

Environmental Consequences

Land management activities can affect the scenic resource because of contrasts created between natural or natural-appearing forested landscapes and those unacceptably modified by management activities. These contrasts consist of changes in line, form, color, and texture of the vegetation and soil. The effects these alterations have are somewhat dependent upon individual values. The same activities can also alter the landscape character of an area.

Timber Harvest and Fuelbreak Treatments

The ability to control how timber harvest activities appear on the landscape depends on existing topography, logging systems; silvicultural systems employed, and slash disposal methods.

Clearcut with Reserves: (CC w/RES): This type of treatment generally (depending on the view shed and existing topography) does not meet Retention or Partial Retention VQOs when placed in foreground viewing zones. It can meet Partial Retention VQOs in the middleground or background viewing areas if unit boundaries are blended well with surrounding vegetation patterns and topographic features such as natural openings (use similar shapes and avoid straight line boundaries).

Shelterwood Final (SW2): This type of treatment can meet Partial Retention VQOs in the foreground viewing zone if boundaries are blended with surrounding vegetation patterns and topographic features such as natural openings (by using similar shapes and avoid straight line boundaries).

Commercial Thin (CT): This treatment can meet Retention in all viewing zones if unit boundaries are blended with surrounding vegetation patterns and topographic features such as natural openings (use similar shapes and avoid straight line boundaries).

Shelterwood Preparatory Cut (SW1): The scenic appearance would be similar to that of commercial thinning.

Group Shelterwood (GSW): Such a treatment can meet partial retention or retention VQOs in the middle ground if openings are shaped to mimic surrounding natural openings and opening boundaries are not geometrically (or having straight lines) shaped.

Road Construction/Decommissioning

The appearance of road construction and road decommissioning depends upon existing topography, presence or absence of screening vegetation, the contrast between soil and rock colors of undisturbed areas vs. road fills/cuts created by soil disturbance, and the ability to restore or re-vegetate road cuts and/or fill areas. Roads constructed through or along the tops of clear-cuts typically stand out when viewed in the foreground or middle ground viewing zones. Given time, revegetation of visible road cut and fills slopes as well as trees growing in the clearcuts or openings can ameliorate the soil/vegetation contrast situation. Given time, the disturbed soil of decommissioned roads will revegetate with shrubs and trees filling in the old road prism opening.

Prescribed Burning

The effects of burning activity slash are normally short-term (lasting normally one growing season) if the shapes of burned units are blended with existing topography, natural openings, and surrounding vegetation texture. Straight, geometrically- shaped fireline construction can produce longer lasting effects because of potential soil/vegetation color contrasts (disturbed subsurface vs. surrounding vegetated area). This can be ameliorated over the long term by revegetating disturbed soil. As harvest units are regenerated and shrubs grow back, most burned areas should be fully revegetated within a decade from treatment.

Alternative A

Direct, Indirect, and Cumulative Effects

The existing condition section of this report describes the existing scenic condition of the project area. If Alternative A was implemented there would be no change to the landscape character of the area or the view sheds of Sensitivity Level 1 or 2 features within the project area.

Alternatives B, C, D, and F

Direct, Indirect, and Cumulative Effects

Forest Plan Visual Quality Objectives (VQOs)

All proposed activities under these alternatives were designed and would be implemented to meet Forest Plan VQOs. All alternatives meet VQOs.

Timber Harvest Activities: All of the proposed timber harvest units that are within High Scenic Levels (Retention) are commercial thinning (CT) or shelterwood preparatory (SW1) silvicultural prescriptions or are screened by the existing topography and would meet VQOs.

Road Construction/ Decommissioning: No proposed road construction would be within High Scenic Levels. The proposed decommissioning of the Wood Creek Road would have a short-term effect for 3 to 5 years while vegetation is growing. This process could be hastened with additional plantings of established plants.

Fuels Reduction: All of the proposed timber harvest units that are within High Scenic Levels were designed to lop tops.

Alternative E

Road Construction/ Decommissioning: No proposed road construction would be within High Scenic Levels. The proposed decommissioning of the Wood Creek Road would have a short-term effect for 3 to 5 years while vegetation is growing. This process could be hastened with additional plantings of established plants.

Forest Plan Consistency

All the alternatives, with associated design criteria, meet the Forest Plan standards for visual quality.

Soils

Changes between the 2002 FEIS and this SEIS

Analysis for the soil resource incorporates field monitoring of soil condition. The field monitoring results are combined with the IPNF Soil Disturbance Spreadsheet Model for both the Forest Plan Standard of 80% and the Regional Guideline of 85% for acceptable soil productivity potential. Also some road recontouring and stream crossing removals and road decompaction that were proposed as part of the road storage and decommissioning in the original EIS have been accomplished. Landtype 132 was added to the list of high-sensitivity landtypes.

A cumulative total of soil impacted acres for all Forest Service past harvest/fuels activity was included in the 2002 Hidden Cedar EIS (p. 3-47). The estimated level of impacts by harvest activity and fuel treatments used in the 2002 FEIS were calculated with somewhat different disturbance coefficients (SW-11) than those currently used in the IPNF soil disturbance model. Field-verified soil disturbances levels by activity type were used in the current soil disturbance spreadsheet model (SSW-22, SSW-49).

Regulatory Framework

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

- Multiple Use-Sustained Yield Act of 1960
- National Forest Management Act of 1976 (NFMA)
- Code of Federal Regulations for Forest Planning (36 CFR 219.6)
- Forest Plan objectives and standards and Regional Soil Quality guidelines (2554.03-R1 Suppl. 2500-99-1)

The Multiple Use-Sustained Yield Act of 1960 directs the Forest Service to achieve and maintain outputs of various renewable resources in perpetuity without permanent impairment of the land's productivity.

Section 6 of the National Forest Management Act of 1976 (NFMA) charges the Secretary of Agriculture with ensuring research and continuous monitoring of each management system to safeguard the land's productivity.

The Code of Federal Regulations for Forest Planning that followed NFMA requires the Forest Service to measure effects of prescriptions, including “significant changes in land productivity” (Code of Federal Regulations 36, CFR Part 219.6, 2005). NFMA as amended at 16USC1604 (g)(3)(E) requires the Forest Service to “insure that timber will be harvested from National Forest System lands only where—(i) soil, slope, or other watershed conditions will not be irreversibly damaged” (project file (PF): SSW-66).

To comply with NFMA, the Chief of the Forest Service has charged each Forest Service Region with developing soil quality standards for detecting soil disturbance and indicating a loss in long-term productive potential. These standards and guidelines are built into forest plans.

Forest Plan direction (Forest Plan, p. II-17) is to manage the soil resource to maintain long-term productivity. The objective is that management activities on forest lands will not significantly impair the long-term productivity of the soil or produce unacceptable levels of sedimentation resulting from soil erosion. The Forest Plan includes three standards for soils.

> Forest Plan Soil Standard #1: Soil-disturbing management practices will strive to maintain at least 80 percent of the activity area in a condition of acceptable productivity potential for trees and other managed vegetation. Unacceptable productivity potential exists when soil has been detrimentally compacted, displaced, puddled, or severely burned as determined in the project analysis.
>
> Forest Plan Soil Standard #2: Projects should strive to maintain sufficient large woody debris to maintain site productivity. Large woody debris is essential for maintenance of sufficient micro-organism populations.
>
> Forest Plan Soil Standard #3: In the event of whole-tree logging, provision for maintenance of sufficient nutrient capital should be made in the project analysis.

The Regional soil quality guidelines (R-1 Supplement 2500-99-1) were revised in November 1999. Manual direction recommends maintaining 85% of an activity area's soil at an acceptable productivity potential with respect to detrimental impacts, including the effects of compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter, and soil mass movement. This recommendation is based on research indicating that a decline in productivity would have to be at least 15% to be detectable (Powers, 1990). In areas where more than 15 percent detrimental soil conditions exists from prior activities, the cumulative detrimental effects from project implementation and restoration should not exceed the conditions prior to the planned activity and should move toward a net improvement in soil quality. These guidelines do not apply to intensively developed sites such as permanent roads/landings, mines, developed recreation and administrative sites.

Methodology Used in the Soil Productivity Analysis

Analysis of the soil resource utilized field surveys, aerial photography, geographic information system (GIS) data, and information from the timber stand database (TSMRS), the roads database, and the IPNF Soil Disturbance Spreadsheet Model. Acres were calculated by ARCINFO GIS, and these were rounded which may result in slight discrepancies from numbers used and displayed elsewhere in this document.

Natural erosion and sediment production hazards were gathered from landtype descriptions in the Idaho Panhandle National Forests Land Systems Inventory (SSW-78). Landtype mapping is only a representation of on-the-ground conditions. Landtype ratings (high surface or subsurface erosion, high sediment delivery potential, high mass failure potential) are precautionary ratings and do not necessarily reflect response to management activities.

Each proposed harvest unit was field reviewed by the District hydrologist or trained members of the hydrology crew (SSW-48) to verify existing soil conditions by conducting the "Onsite Assessment Method" outlined in Niehoff (2002) (SSW-49). Forest Service employees received training in field sampling techniques from the IPNF Soil Scientist or from a District Hydrologist trained by the Soil Scientist (SSW-48). This training adequately prepares employees to accurately sample soil

conditions. See soil assessment sheets/data (PF: SSW-22). The protocol for field investigation of the soil condition involved two procedures: 1) random transects within proposed harvest units with sampling for compaction, large woody debris, and surface organic material; or 2) 'walk-through' verification of past activities with random sampling for compaction and surface organic material.

Potential disturbance for the soil resource was determined using Niehoff's (2002) guidelines for soil analysis, the Soil Disturbance Spreadsheet Model (SSW-40, SSW-49), and field verification (SSW-22). This analysis includes potential effects from proposed logging systems, temporary roads, landings, roads, and fuel treatments on soils. The spreadsheet model estimates detrimental disturbance on proposed harvest units for each harvest and fuel treatment method based on empirically derived coefficients obtained and averaged from numerous monitored sites throughout the Idaho Panhandle National Forests (Forest Plan Monitoring and Evaluation Reports 1988, 1991, 1993 and 1997).

Two different accounting methods were used for roads within activity areas. The Forest Plan Standard activity areas include all roads (new, temporary, existing system) within proposed units (SSW-30, SSW-37). The Regional Guideline activity areas include only temporary roads within proposed units because system roads are considered a committed or dedicated resource under the Regional guideline and are not included in calculations of disturbance (SSW-43).

Roads counted as disturbance in the analysis for determining whether the project meets the Forest Plan Standard of maintaining 80% of an area in accepatable productivity may lead to an inflated soil disturbance level because harvest units typically end at the road's edge and do not cross or include roads. Because GIS coverages are only represntations of reality. Roads may be partially shown within a stand or activitiy area (harvest unti) when in fact, the road edge is the boundary (SSW-76).

The IPNF Soil NEPA Analysis Process (Niehoff 2002) was used to determine whether proposed activities would detrimentally impact or have cumulative effects on soils. The model is limited to the logging system and slash disposal methods for which coefficients have been determined, and its coefficients assume that best management practices (BMPs) have been implemented since 1990. The model does not account for changes in soil types or the recovery of soils over time from existing previous harvest activities. It assumes skid trail spacing of 100 feet, operation of mechanical equipment on slash and burning in the spring or at times when there is 25% soil moisture. Also this model uses an average disturbance for an activity (such as tractor yarding, feller buncher, etc.,) from data collected from previously monitored sites throughout the IPNF (PF, SSW-49). The model utilizes the proposed harvest unit acreage to estimate disturbance levels, but actual implementation unit size may be less than originally proposed or it may be slightly larger to reflect site-specific timber types and land breaks (PF, SSW-72). The percent disturbance within a proposed unit is not expected to change because estimated disturbance is based on activity not unit acreage.

The use of this model may inflate estimated effects for areas proposed for ground-based logging systems where previous ground-based logging occurred. Information from field surveys was used for the existing condition then estimated effects from proposed activities were added to come up with total predicted detrimental disturbance. Design features require use of existing skid trails, so some of the proposed activities would occur on areas with previous disturbance. These existing skid trails would be identified in random field sampling as existing disturbance and they would also be counted in the model as proposed disturbance, thus inflating overall effects.

For each alternative, the detrimentally disturbed acres were calculated using coefficients based on past IPNF soil monitoring data. The coefficients were developed as an average soil disturbance level and were equated to harvest equipment, time of year (summer vs. winter), fuel treatment methods, and whether or not fuel treatment took place prior to 1990. Since the coefficients are based on an average, the areas that have had prior harvest activities could have soil disturbance levels lower or greater then the coefficient's average. This monitoring information is contained in Forest Plan Monitoring and Evaluation Reports and is summarized in the IPNF Soil NEPA Analysis Process (Niehoff 2002). Calculations incorporated the acres and types of proposed logging, burning, and roads/landings constructed for direct and indirect effects.

Direct effects on soils from proposed activities were estimated using the IPNF Soil Effects Spreadsheet model that accounts for compaction, erosion, severe burning, rutting, and displacement on the soil surface that is the most productive layer and also the easiest to disturb through activities. Potential impacts would result from the type of logging system and fuel treatments used and area disturbed due to construction of roads and landings.

Compaction, displacement, rutting, and severe burning can affect the soils physical, chemical, and biological properties, which indirectly can affect the growth and health of trees and other plants. Compaction reduces soil permeability and infiltration, which can cause soil erosion. Displacement reduces plant growth where topsoil and organic matter are removed. Severely burned soils can become hydrophobic (water repellent) and lead to increased erosion, runoff, and/or reduced productivity.

Tractor, skyline/cable and helicopter logging systems would be utilized with the proposed action (Table 3-49). Roads and landings that are to remain on the landscape for future use cause irretrievable effects on productivity as those lands become "dedicated" lands. Those roads that are temporarily needed for project work and are planned for decommissioning have detrimental effects initially, but rehabilitation efforts (ripping, recontouring, mulching, seeding) would initiate a long-term recovery sequence.

Acres of detrimental disturbance were calculated by multiplying acres of proposed activities by the disturbance coefficient derived from monitoring reports. Coefficients used for proposed logging systems are displayed in Table 3-43.

Table 3-43 Potential Detrimental Disturbance Coefficients

Tractor Logging	**Detrimental Disturbance Coefficients**
With grapple piling or fall burning	13%
Skyline or Helicopter Logging	
Helicopter & skyline logging	0% – 2%
With fall burning on south/southwest aspects	2%
With grapple piling	8%

Road calculations used 33- to 37-foot widths that take into account a 14-foot wide running surface and includes the cut and fill slope disturbance. To estimate improved soil productivity on roads to be

decommissioned or stored, 33-foot road widths were assumed. This equates to four acres per mile of decommissioning or storage. Log landing areas associated with proposed units are accounted for in the calculations.

Indirect effects may include the loss of site productivity due to the removal of vegetation and nutrients. Large woody debris is essential for maintenance of sufficient microorganism populations and long-term site productivity. Research indicates potassium (among other nutrients) is an important element for site productivity and may be deficient among certain Belt Supergroup formations. Foliar analysis was conducted to determine nutrient levels that are present in proposed harvest units that reside on Upper Wallace, Lower Wallace, and granitic parent material. Design features (see Chapter 2) are incorporated into the activities to meet the management of large woody debris and organic matter as detailed in the research guidelines contained in Graham et al. (1994). These recommendations emphasize tons per acre and are defined as any woody residue larger than three inches in diameter. Conservation of nutrients is proposed through allowing slash to, at a minimum, over winter (IFTNC, 1998) before treatment of excessive activity fuels.

In all harvest units tree tops, foliage, and branches would be left to overwinter, which allows potassium to leach out of these materials (Baker et al. 1989; Barber and Van Lear 1984; Edmonds 1987; Garrison and Moore 1998; Laskowski et al. 1995; and Palviainen et al. 2004). A reduction of available potassium leaching back into the soil profile could affect tree growth.

Cumulative effects include the combination of direct and indirect effects from past, present, and reasonably foreseeable activities. The cumulative effects analysis area for the soil resource consists of National Forest System lands in the project area. Activities on other lands that may affect soils are not included in this analysis because those activities do not affect the soils on National Forest System lands.

For analysis of detrimental disturbance using Regional soil quality guidelines, existing roads and landings designated as classified on the National Forest transportation system are considered dedicated lands. The loss of soil productivity on these sites occurred when the roads and landings were constructed and are an irretrievable effect.

Affected Environment

Geology, Soils, and Productivity

Soils in the Hidden Cedar area are generally formed in volcanic ash-influenced loess overlying weakly to highly weathered subsoil and substratum material derived from the underlying bedrock. Under the predominant timber stands a silt loam textured, ash capped soil has developed. The volcanic material accumulated from several of the Cascade volcano eruptions with most of the ash originating from Mt. Mazama (Crater Lake) in Oregon about 6,700 years ago. The uppermost part of the ash is usually enriched with organic matter that is incorporated into this part of the soil and has high water- and nutrient-holding capacities, both of which are important for soil productivity. The subsoils are not as fertile.

The geology of the area encompasses a mixture of residual parent material, primarily metasedimentary belt supergroup formations such as the Upper and Lower Wallace, St. Regis, and

Revett as well granitics, alluvial deposits, and other geologies that include basalt, granodiorite, and rhyolite (SW-1).

Table 3-44 General Geology Types

Soil Derived From:	Acres	% of Hidden Cedar Area
Alluvium	3,421	10.3%
Residual belt	9,409	28.5%
Residual granitics	6,675	20.3%
Residual schists	13,465	40.9%

Timber management practices can have long-lasting impacts on the soil resource if precautions are not taken. The following three design and management criteria relate to soil productivity in the project area.

1. Detrimentally disturbed soils within activity areas (related to IPNF Soils Standard #1):

Detrimental soil impacts are defined as the proportion of an activity area that may be subjected to displacement, compaction, erosion, or severe burning due to a particular management activity.

Soil disturbance is described by three different disturbance classes:

- Class 1 is a natural condition with no disturbance. Other classes are compared against this class.
- Class 2 represents slight soil disturbance. There is evidence of previous ground activities, but the observable soil characteristics do no meet detrimental soil damage criteria defined in Regional Soil Quality Standards.
- Class 3 represents detrimental soil disturbance. There is evidence of previous entries and the observable soil characteristics indicate that the site meets detrimental soil damage criteria defined in the Regional Soil Quality Standards.

The soils in an activity area are considered detrimentally disturbed when the following soil conditions exist as a result of forest practices:

Displacement: Soil displacement results in the loss of either one inch of or half of the humus-enriched surface layer (A-soil horizon), whichever is less. The loss of the litter layer alone could be detrimental on some marginal sites. Displacement removes the most productive part of the soil resource. Road construction, ground-based yarding, dozer piling, and cable yarding (corridors) are the major contributors to displacement.

Compaction: Soil are considered compacted when activities result in 15 percent or more increase in bulk density or a 50% reduction in water infiltration rates typical for volcanic ash influenced surface soils. Soil compaction reduces the supply of air, water and nutrients to plants. Road construction and ground-based yarding and piling are the major contributors to compaction.

Surface erosion: Surface erosion is indicated by rills, gullies, pedestals, and soil deposition and should be kept within tolerable limits by retaining enough ground cover, depending with onsite conditions.

Severity of burns: Fires may consume most woody debris and the entire duff and litter layer, exposing mineral soil. White or red ash indicates that much of the carbon was oxidized by fire (Burned-Area Emergency Rehabilitation Handbook FSH 2509.13). Burns that create very high temperatures at the soil surface when soil moisture content is low result in an almost complete loss of surface and upper soil horizon organics. Many of the nutrients and ectomycorrhizae associated with these organics can be lost to the atmosphere through volatilization and removed from the site in fly-ash (Garrison and Moore 1998) or lost to high ground temperature flux (Harvey et al. 1986 p. 7).

2. Maintenance of large woody debris and organic matter (Related to IPNF Soils Standard #2):

The second soil productivity criterion relates to the management of coarse woody debris and organic matter and follows research guidelines contained in Graham et al. (1994). Retaining coarse woody debris and organic matter is important to maintaining the soils most productive layer. Coarse woody debris is defined as material derived from tree limbs, boles, and roots greater than three inches in diameter and in various stages of decay and performs many physical, chemical, and biological functions in forest ecosystems and is a key habitat component for many wildlife species and for stream ecology (Graham et al., 1994). Because coarse woody debris is such a valuable part of a functioning ecosystem, a portion of the material must be maintained to ensure that organic matter is recycled for long-term productivity. Nevertheless, in natural systems organic matter fluctuates with forest growth, mortality, fire, and decay.

The average optimum level of fine organic matter is 21 to 30 percent (Graham et al. 1994), which equates to one to two inches of surface litter and humus. Optimum levels of fine organic matter relate to ectomycorrhizae fungus, which is a good indicator of healthy forest soil. In moist western hemlock and cedar habitat types, strong levels of ectomycorrhizae exist when organic levels exceed 30 percent. Soil survey data indicates that most forest sites have adequate organic matter levels to support strong ectomycorrhizae populations.

3. Low-potassium sites from geologic formations naturally deficient in potassium-bearing minerals (Related to IPNF Soils Standard #3):

Timber harvest results in the removal of nutrients that have been accumulated in trees over time. Of increased concern is the role of potassium in forest health, especially susceptibility to insects (Garrison-Johnston et al. 2003) and a possible link between potassium deficiency and the lack of tree resistance to root disease (Garrison-Johnston 2003). Research (Garrison-Johnston et al. 2003; Moore et al. 2004a; 2004b; Shen et al. 2001) suggests a complex balance between underlying geology and the natural deficiency of potassium in northern Idaho. In comparison, soil nitrogen can be replenished more rapidly than potassium can be. Soil nitrogen is replenished through nitrogen fixation or atmospheric deposition. Potassium mostly weathers from rocks.

Whole-tree yarding and removal of treetops can lead to the direct loss of potassium (Morris and Miller 1994). On some sites 45 percent of the available potassium is retained in trees with the remainder being held in subordinate vegetation, forest floor, and soil pools. Within the trees, about 85 percent of the potassium is held in the branches, twigs, and foliage (Garrison and Moore 1998). It is therefore vital to recycle as many nutrients as possible before removal which can be done by over-wintering small-sized debris to leach out potassium (Baker et al. 1989; Barber and Van Lear 1984; Edmonds 1987; Garrison and Moore 1998; Laskowski et al. 1995; and Palviainen et al. 2004).

Under most natural circumstances, potassium returns to the soil when the tree dies. Unlike many other soil nutrients, potassium is derived primarily from underlying geologic formations and is a product of slow weathering processes. Most of the Hidden Cedar Project Area's underlying bedrock formations are the Precambrian metasedimentary Belt series group, primarily the Upper and Lower Wallace Formations.

Furthermore, foliar analysis was conducted to determine nutrient levels that are present in proposed harvest units that reside on Upper Wallace and Lower Wallace Formations and granitic parent material. The result of this analysis indicates that the potassium level is ***above*** the critical level (IFTNC, 1998; PF: SW-39) for the Lower Wallace Formation. For the Upper Wallace and granitic formations, the potassium level is ***below*** the critical level (IFTNC, 1998, SW-39). Nitrogen and sulfur are above the critical level on the Upper Wallace, but below the critical level (IFTNC, 1998; PF: SW-39) on the Lower Wallace and granitic formations. The nutrient levels of phosphorous, calcium, magnesium, manganese, zinc, copper, iron, and boron are all above the critical level (IFTNC, 1998; PF: SW-39).

The Intermountain Forest Tree Nutrition Cooperative (IFTNC) continues to research potassium contents within tree species and different rock types in order to establish specific minimum thresholds for retention and determine effects of potassium on tree growth and resistance to root diseases (Mika 2005; Shaw 2005). Until these minimum thresholds are developed through research, the Idaho Panhandle National Forests are using management recommendations from the IFTNC as a guideline for maintaining sufficient potassium on a site. These measures are incorporated into the design features (Chapter 2) for this project.

Existing Conditions

Three criteria were used to assess existing conditions for soil resources:

1. Landtypes and hazard ratings of the Idaho Panhandle National Forest;
2. Productivity;
3. Site conditions from past activities in the activity units in which proposed treatment would occur.

Land Types and Hazard Ratings

The proposed harvest units cover 16 different landtypes. Fifty-one landtypes were identified and mapped in the project area. Descriptions of each landtype, detailed acreages for all alternatives, and maps displaying landtypes and hazards are in the project file (SSW-78). Landtype mapping is only a representation of on-the-ground conditions. Landtype ratings are precautionary ratings and do not necessarily reflect response to management activities. Ratings were compiled and are listed in subcategories for:

- mass failure
- surface erosion
- sediment delivery potential
- soil productivity

These are rated as low, moderate, or high for each landtype (Table 3-45).

Table 3-45 Landtype Subcategories Associated with Harvest Activities in the Project Area

	Mass Failure Potential			Surface Erosion Potential			Sediment Delivery Potential			Soil Productivity		
	L	M	H	L	M	H	L	M	H	H	M	MH
Alt. B	10%	90%	0%	99%	1%	0%	8%	91%	1%	70%	4%	26%
Alt. C	10%	90%	0%	99%	1%	0%	8%	91%	1%	68%	4%	28%
Alt. D	17%	83%	0%	100%	1%	0%	17%	81%	2%	39%	2%	59%
Alt. F	10%	90%	0%	98%	2%	0%	8%	91%	1%	67%	3%	29%

L - Low; M – Moderate; H – High; MH – Moderately High

Mass Failure Potential is the relative probability of downslope movement of masses of soil material. Besides natural failure, landslides or slumping can be triggered by a number of mechanisms, including harvest activities, severe burning, and related road building.

Within the proposed harvest activity areas in Alternatives B, C, and F ten percent of soils have a low mass failure potential, and 90 percent have a moderate mass failure potential (Table 3-44). Within the proposed harvest activity areas in Alternative D, 17 percent of soils have a low mass failure potential, and 83 percent have a moderate mass failure potential (Table 3-44).

Landtypes that exhibit moderate mass failure potential are located primarily on dissected rolling uplands, mountain sideslopes, and stream breaklands. Landtypes that exhibit high mass failure potential are located primarily on lower side slopes, toe slopes, and stream bottoms of weakly to moderately incised drainages within highly weathered rolling uplands (Map M-18).

Removal of forest canopy and cover from either clearcutting or wildland fire increases landslide occurrence (Gray and Megahan 1981; Megahan et al. 1978). This is primarily due to root decay, soil disturbance, increased snow accumulation and altered melting rates, and soil water increases from reduced interception and transpiration.

Little research has been conducted to determine if partial cutting affects landslide rates. Megahan et al. (1978) found that landslide occurrence increased only slightly when overstory canopy was reduced from 100 percent to 11 percent, but increased dramatically when canopy closure went below 11 percent. They also found that crown cover from shrubs affected landslide occurrence after 80 percent crown removal and indicated that landslide occurrence is more sensitive to shrub removal than tree crown removal.

Surface Erosion Potential is a rating of the relative susceptibility of exposed soils to sheet and rill erosion.

Within the proposed harvest activity areas in Alternatives B, C, D, and F 98 to 100 percent of soils have a low surface erosion potential, and one to two percent have a moderate surface erosion potential (Table 3-44). The potential for soil erosion is not so much associated with harvest treatments as with existing roads (Cacek 1998). The dominant erosion process on roads is surface erosion from bare soil areas including the cutslope, fillslope, and travelway.

Revegetation of cut slopes and fill slopes is often difficult because of lack of soil moisture and organic material, low productivity potential, and desiccation of seeds and seedlings, especially on

south-facing slopes. On moist slopes revegetation efforts are more successful and erosion of road cut slopes and fill slopes is generally lower.

Road erosion and sediment yield usually decline after construction (Jones 2000; Switalski et al. 2004) but can provide a chronic, long-term source of sediment to streams within the project area. 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 Water section.

Sediment Delivery Potential is a rating of the probability of eroded soil reaching a stream channel. By using slope gradient, slope shape, and distance to channel, a rating of low, moderate, or high potential is determined.

Within the proposed harvest activity areas in Alternatives B, C, and F, eight percent of soils have a low sediment delivery potential, 91 percent have a moderate sediment delivery potential, and one percent have a high sediment delivery potential (Table 3-44). Within the proposed harvest activity areas in Alternative D, 17 percent of soils have a low sediment delivery potential, 81 percent have a moderate sediment delivery potential, and 2 percent have a high sediment delivery potential (Table 3-44).

The landtypes that exhibit moderate sediment potential are situated at low- to mid elevation on mid- to lower side slopes and adjacent to incised drainages. The landtypes in the project area that rated as having a high sediment delivery potential to stream channels vary in their topographic setting from wide, low elevation stream bottoms to mid-elevation lower slopes/breaklands on deeply incised drainages and stream headlands. Small portions or slivers along the boundaries of Units 13, 47, 49, 50, and 51 are located on high sensitivity or high sediment delivery potential landtypes. Monitoring in 2005 found no Class 3 disturbance except in Unit 47, which had 1% of sampled sites in that category (Tables 3-46 and 3-47). Because drainage courses and riparian zones would be buffered and would not be entered or logged, the potential for increased sediment delivery from the moderately and highly rated landtype units is minimal.

Roads are considered a potential source for sediment delivery and the documentation of the detailed analysis is included in the Water section of this chapter.

Productivity Potential is a rating of the relative capacity or ability of a soil to produce and sustain biomass.

Within the proposed harvest activity areas in Alternatives B, C, and F 67 to 70 percent of soils have a high productivity potential, 3 to 4 percent have a moderate productivity potential, and 26 to 29 percent have a moderately high productivity potential (Table 3-45). Within the proposed harvest activity areas in Alternative D 39 percent of soils have a low productivity potential, two percent have a moderate productivity potential, and 59 percent have a moderately high productivity potential (Table 3-45).

Soils susceptible to reduced productivity potential are generally those located on shallow, rocky steep slopes on southerly aspects. Removal of canopy can affect soil moisture content in several ways. Precipitation may enter previously intercepted areas and provide existing or establishing vegetation with additional needed moisture and increase decomposition rates. Conversely, rain events may increase erosion on the now exposed soil, especially if the potential is high, and reduce the

availability of a growing medium. Furthermore, increased sunlight may also support plant growth or heat up soils to the extent that vegetation is inhibited.

When soils have adequate moisture conditions to retain their biological, chemical, and physical integrity, effects from the loss of forest floor can be minimized (Barnett 1989; Frandsen and Ryan 1985; Hungerford et al. 1991; McNabb and Cromack 1990). Direct effects of prescribed underburning and pile burning could potentially remove woody debris that would otherwise provide nutrients to the soil as the decay process occurs (Page-Dumroese et al. 2006). To minimize potential impacts, burning during high soil moisture would help maintain coarse woody debris requirements (Niehoff 1985; 2002; Design Feature 10. H.).

However, on an unpredictable site-specific basis, some drier sites may burn at a severity level that removes all of the protecting duff and litter layers, even under managed fire conditions. The duff and litter layer is important in protecting the soil horizons, both as reducing erosion potential and in maintaining soil moisture. Litter prevents the breakdown of soil aggregates and reduces the velocity of any overland flow, thereby reducing the erosion potential (Beschta 2004). Project design features and mitigation measures are expected to minimize this effect.

Soils and Productivity

The soils found in the Hidden Cedar Project Area owe their productivity to excellent nutrient-holding capacities and other favorable characteristics provided by an ash layer that can extend to over two feet deep in certain locations. However, these generally young and poorly developed soils can experience long-term deficiencies when insufficient biologically essential elements, like organic matter and coarse woody debris, are not available.

Organic matter content varies throughout the project area (Table 3-46, SSW-22) and appears to be optimum or low on the south-facing and higher on the north-facing slopes. Its variability and depth is natural and usually correlates to habitat type and aspect with excessive needle cast often decreasing the establishment of a more herbaceous cover. Exclusion of fire has also contributed to increased duff accumulations.

Coarse woody debris was found to be variable as well (Table 3-46, SSW-22). Some stands contain higher amounts of downed wood, generally on moist north-facing slopes while south-facing slopes have lower coarse woody debris levels that can reflect drier growing conditions. Decomposition may also be affected due to light and moisture variations under different canopy densities.

Site Conditions from Past Activities

Soil conditions within proposed harvest units were determined through random sampling. Two field methods were used to calculate soil disturbance as described in the Soils Analysis Methods section. Either random transects were placed within the proposed unit, or a random walk with sampling was conducted throughout the unit. Random sampling should best represent the existing soil condition. Forest Service employees received training in field sampling techniques from the IPNF Soil Scientist or from a District Hydrologist trained by the Soil Scientist (PF: SSW-48). This training adequately prepares employees to accurately sample soil conditions. The results of soil disturbance field determinations and proposed activity calculations based on field-verified disturbance levels indicate that both the Regional Guideline (Table 3-50) and the Forest Plan Standard (3-51) are currently met (SSW-22, SSW-40; SSW-41).

The proposed harvest units were field verified for evidence of past activity. Table 3-46 displays results from random transects, and Table 3-47 shows observations from 'walk-through' shovel sampling conducted for determination of soil disturbance class (SSW-22). Class 3 detrimental disturbance was found in 1% of Units 3, 8, 16, 47; 2% in Units 5; and 48 and 7% in Unit 40.

Based on past monitoring efforts (Niehoff 2002), tractor logging prior to 1990 has had the most detrimental soil impact and ranged between 24 and 42 percent. Since 1990, tractor logging methods and recommended protection measures have decreased most detrimental impacts to an average of 13 percent (Niehoff 2002), which is two percent less than the maximum allowable criteria established by the Regional guidelines. Helicopter and skyline/cable logging systems tend to have between 0 and 2 percent detrimental effects (Niehoff 2002) and (McIver and Starr 2000, pp. 11-16). These logging systems have less impact than tractor systems because the equipment stays on the road and the logs are partially suspended, restricting impacts to times when logs are being dragged over the ground (Krag 1991; Seyedbagheri 1996, pages. 7-9). Helicopter logging has minimal impacts as the logs are lifted into the air and transported to a landing site (Poff 1996; McIver and Starr 2000, pages 11-16). The landing site is usually one-half to one acre in size and receives the most impact from ground-based equipment that processes and transports the logs.

Approximately 7% of the soils on NFS lands in the project area may have been detrimentally impacted during timber harvest activities not related to system roads (SSW-65). Detrimental soil disturbance was estimated using coefficients for soil disturbance based on logging system and fuel treatment methods (SSW-49). If logging system was not known tractor logging, which causes the most soil disturbance, was assumed. Where information about existing soil disturbance from field surveys was available, that information was used. The field surveyed soil disturbance information showed less disturbance than what was predicted using IPNF averages from soils disturbance spreadsheet coefficients. Therefore, this may be an over-estimate of disturbance from harvest-related activities.

Units 26 and 29 were included in the 2005 field sampling but were not assigned a Disturbance Class rating. They were identified as having 'no evidence of previous activity' (PF: SSW-22) and are considered to have no impacts (SSW-41).

In addition to information obtained from field surveys, soils conditions in proposed Units 9, 19, 22, 23, 24, and 40 were documented by a District Silvicultural Forester. The Forester concluded, "…I saw nothing in the subject units that caused me concern for long-term site productivity or that I felt was an indication of major instability or soils/watershed problems" (PF: SSW-42).

Effects from Past Activities in the Cumulative Effects Analysis Area

Previous harvest, grazing, and minerals exploration activities on National Forest System land may have detrimentally impacted approximately 12% of the area. Approximately 1,034 acres of NFS land in the project area may have detrimental soil disturbance from previous harvest (not including roads). This estimate is based on project area harvest history and the soil disturbance spreadsheet model (SSW-65). This indicates there may be altered productivity from past harvest activities on an estimated 7% of NFS lands in the project area compared to 'natural' conditions. Estimates indicate that approximately 228 acres or 1.5% of National Forest System lands in the project area may have been impacted by grazing (SSW-65). There are approximately 113 miles of road on National Forest System land in the project area (see Transportation section). Assuming 4.5 acres/mile of road (37

feet wide), this is about 508 acres of roads or about 3% of NFS land; so approximately 3% of the National Forest System land in the project area is no longer in productive status because of roads. Previous minerals exploration activity negatively affected soils on one acre at the most.

Table 3-46 Field-Verified Soil Disturbance* Classes, Organic Depth, and Woody Debris

Unit	# of Transects	# of Points	Disturbance Class			Organic Depth			Woody Debris (tons/ acre)
			1	2	3	<3/4"	3/4 -1.75"	>1.75"	
1	5	105	95%	5%		57%	29%	14%	22.1
2	5	105	100%			71%	24%	5%	8.3
3	5	105	94%	5%	1%	50%	31%	19%	25.2
4	5	103	99%	1%		55%	24%	21%	21.8
5	5	104	87%	11%	2%	91%	8%	1%	10.3
6	5	102	100%			28%	55%	17%	27.0
8	5	100	90%	9%	1%	49%	41%	10%	4.6
9	1	9	66%	33.%		22%	55%	22%	21.7
16	5	100	89%	10%	1%	46%	38%	16%	8.8
18	5	102	98%	2%		24%	48%	28%	30.8
19	2	15	40%	60%		54%	46%	0%	14.87
22	3	30	67%	33 %0		23%	37%	40%	11.8
23	1	6	66%	33%		50%	33%	17%	22.0
24	3	30	50%	50%		20%	40%	40%	18.8
25	5	100	88%	12%		47%	39%	14%	12.6
27	5	100	96%	4%		13%	46%	41%	6.0
30	5	100	97%	3%		15%	73%	12%	10.4
31	5	100	95%	5%		43%	44%	13%	9.0
32	5	100	95%	5%		10%	72%	18%	16.1
33	5	100	100%			22%	59%	19%	26.2
34 & 38[1]	5	100	98%	2%		26%	54%	20%	14.7
35	5	100	96%	4%		19%	74%	7%	32.9
36	5	100	91%	9%		37%	52%	11%	9.7
40	3	30	53%	40%	7%	17%	20%	63%	3.8
47	5	100	93%	6%	1%	23%	70%	7%	10.5
48	5	100	92%	6%	2%	32%	49%	19%	38.4
49	5	100	95%	5%		38%	41%	21%	20.2
50	5	100	99%	1%		41%	83%	13%	17.8
51	5	100	100%			41%	43%	16%	13.9
52	5	100	92%	8%		39%	35%	26%	8.6

** Following guidelines from Niehoff (2002)*
[1]Units 34 and 38 are adjacent and were sampled together

Table 3-47 Field-Verified Disturbance Classes from Walk-Through Surveys

Harvest Unit	Past Activity Disturbance Class
7	1 & 2
10	1
11	1
12	1
13	1 & 2
14	1 & 2
15	1 & 2
17	1
20	1
21	1
26	No evidence of previous activity
28	1
29	No evidence of previous activity
37	1 & 2
39	1
41	1
42	1
43	1
44	1
45	1
46	1

Environmental Consequences to Soils

Effects to Soils with Alternative A (No-Action)

Under this alternative, no new management-induced detrimental soil impacts would occur in the Hidden Cedar Project Area. Stands would not be treated; and fire suppression would continue. This would increase buildup of fuels which may increase the risk of severe wildfire that could result in severe burning, erosion, and loss of soil nutrients. The introduction of weeds and unwanted flora following a fire could lead to higher competition between less desirable and native vegetation. In the absence of such a hot fire, nutrients would be retained on site. However, stand conversion back to more site-appropriate tree species would be delayed in comparison to the Proposed Action.

No direct effects to the soil resource would occur under the No-Action Alternative since there would be no road construction, logging, or fuel treatment activities. The existing road would not be altered, and no change in road mileage located in riparian areas would occur.

There would be no compaction or displacement beyond what currently exists. Throughout the silvicultural landscape, tree mortality from pathogens and weather events would continue as in the past, which has a direct influence on the area's recycling of organic matter and changes in fuel loading. In moist habitat sites, the increase in organic matter is a benefiting function to overall soil productivity. In dry habitat types, increases of organic matter may result in a negative response.

Effects of Fire on Soils under all Alternatives

Given the decades of fire suppression in the project area, the chance of a severe wildfire occurring could be high if an ignition starts in an untreated area during extreme dry weather conditions. The proposed vegetation treatments in the project area would not necessarily prevent severe wildfires from occurring, but would increase the ability to suppress such a fire should the ignition occur in the treated areas. Timber harvest and activity fuels treatments would reduce the chance that a wildfire could have as severe of an effect on the soils in treated areas as it could in untreated areas because there would be a reduction in the amount of fuels available for build-up on those treated sites.

The occurrence of a high-intensity wildfire would have a high 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, p. 146). Ashes that have burned white or a reddish color indicate that much of the organic carbon was oxidized and is no longer available to the soil. Other effects would include the loss of organics, loss of nutrients, and a reduction of water infiltration (Wells et al. 1979, p. 26). Burns that create very high 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, pp. 152-153; Amaranthus et. al. 1989, p. 48).

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 (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 depends 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 are difficult to predict and to quantify.

If hydrophobic soils result from severe, high-temperature fire moderate surface erosion would occur; but the potential for mass failures would be moderate to high because of the Hidden Cedar Project Area's overall landtype characteristics. The areas of primary risk after a severe burn are toe slopes and breaklands adjacent to streams as well as side slopes that consist of schistose material. Following a severe fire, rehabilitation efforts to mitigate the fire's effects on erosion and sediment delivery could negate most of the erosion concerns.

Effects to Soil under Alternative E

Direct and Indirect Effects

No harvest activities are proposed on National Forest System lands under Alternative E. The only change in soil quality expected from this alternative is through road treatments. Road decommissioning and storage would take place over approximately 24 miles which would lead to improved soil productivity on about 91 acres. Roads located in both Wood and Hidden Creek

riparian areas would be recontoured. In the long-term, there would be a decrease in soil movement and erosion once treatment is complete and vegetation is established on these areas.

Road construction related to providing access on non-Forest Service land would decrease soil productivity on approximately 26 acres.

Nutrient levels are not expected to change in the short-term. In the long-term, nutrient levels are expected to increase as nutrients tied up in vegetation are released after mortality through natural decomposition processes.

Effects to Soil under Alternatives B, C, D, and F

The effects of the action alternatives on the soil resource were assessed based on their potential to create detrimental impacts and to affect soil productivity. Standard and site-specific Best Management Practices (BMPs) (IPNF, 2002) and soil and conservation practices as described in the Soil and Water Conservation Practices (SWCP) Handbook FSH 2509.22 are included as design features (Chapter 2) and would be applied during timber harvest, road decommissioning and road construction, maintenance and reconstruction to minimize soil erosion and maintain acceptable soil productivity (Seyedbagheri 1996; Lynch and Corbett 1989, 1990; Idaho DEQ 2001; USDA 2001; PF: SSW-61). The Soil and Water Conservation Practices Handbook outlines BMPs that protect the soil and water resources at a higher level than do existing Idaho Forest Practices rules and regulations, thereby incorporating all Idaho State standards.

The techniques and their effectiveness are documented in several publications (Seyedbagheri 1996; Lynch and Corbett 1989 and 1990; Idaho DEQ 2001). The BMPs would have a high effectiveness in minimizing soil compaction and displacement, address seeding of disturbed areas, limit operations when soil moistures are high, and address conduct of logging.

Design Features to protect soil and site productivity (Design Feature 10) would be implemented as part of the action alternatives to ensure that activities are consistent with Forest and Regional guidelines in terms of soil compaction, displacement, and nutrient retention.

Effects of Harvest-Related Activities

Two different accounting methods were used for roads within activity areas. The Forest Plan standard activity areas include all roads (new, temporary, existing system) within proposed units. The Regional guideline activity areas include only temporary roads within proposed units. As previously discussed, system roads are considered a committed or dedicated resource under the Regional guideline and are not included in calculations of disturbance. Tables 3-50 and 3-51 display estimated impacts from proposed activities combined with temporary roads and past impacts for compliance with the Regional 15% detrimental disturbance guideline; and proposed activities combined with existing roads, proposed permanent or temporary roads, and past impacts for compliance with the Forest Plan Standard of 20% detrimental disturbance standard.

Building roads and landings, operating heavy equipment, skidding logs, and piling and burning slash may adversely impact soils. Most physical damage within harvest units occurs from log skidding and operation of heavy equipment. The amount of detrimental disturbance depends on landtype, soil moisture, slope steepness, complexity of topography, and the number of passes over the same ground by equipment or logs. Combinations of these may increase the magnitude or area of disturbance.

Under Alternatives B and F, approximately 30% of the proposed area to be harvested is designated for helicopter logging (Table 3-49). As a result, felling and yarding operations in helicopter units would have very little impact on soil productivity. In some units, track-mounted mechanized harvesters may assist logging operations. Impacts from this equipment are expected to be similar to an excavator for slash piling. Grapple piling results in approximately eight percent disturbance (Table 3-43). The rest of the units would use skyline/cable or ground-based systems that result in varying levels of disturbance. Ground-based logging would be used on less than 25% of proposed units (Table 3-49), but it can have the most detrimental effect to the soil resource. Design features and BMPs to protect soils and site productivity would be used to decrease the effect of ground-based yarding systems (Chapter 2).

Thirteen helicopter landings are proposed (PF: SSW-68). All of these are associated with roads, either existing or proposed. Eight of these landings are not within an activity area (proposed harvest unit) (PF: SSW-68). Five landings may be within or partially within activity areas. Units 16 and 49 may have a landing partially within the unit and Units 27, 30 and 38 have a landing associated with new road construction. Units 27, 30 and 38 have ground-based activities, and these landings are accounted for by the IPNF soil disturbance spreadsheet model. It is assumed for analysis purposes that landings will be within Units 16 and 49, and an additional one acre of disturbance was included as disturbance from proposed activities (SSW-39, SSW-40). Tables displaying soil disturbance levels include this one acre disturbance for Units 16 and 49 even though a landing may not actually be located within the units (Tables 3-50 and 3-51).

Whole-tree yarding and removal of tree tops can also reduce nutrients, woody material, and lead to the direct loss of potassium (Morris and Miller 1994). None of the proposed activity areas, however, would be whole-tree logged (Design Feature 10. I. ii.). The logging slash would remain within all harvest units and be left at least one winter before underburning or piling. This would allow nutrients, especially potassium, from the foliage and branches to leach into the soil's organic layer.

Table 3-49 Distribution of Yarding System and Fuel Treatment Acres by Alternatives*

Activity		Alternative B	Alternative C	Alternative D	Alternative F
Yarding System	Helicopter	316	370	290	344
	Cable/Skyline	699	673	252	644
	Tractor	353	350	64	316
Yarding System Totals		**1368**	**1393**	**606**	**1304**
Fuel Treatment	Broadcast Burn	210	260	174	177
	Grapple pile	533	312	157	468
	Lopping/Hand pile	625	821	275	650
	Jackpot Burning	-	-	-	9
Fuel Treatment Totals		**1368**	**1393**	**606**	**1304**
Estimated acres of soil disturbance from harvest and fuel treatment **		77	42	20	70

**acre differences are due to rounding **(SSW-40)*

Soil standards and guidelines would be met in all activity areas except for Unit 36. Unit 36 would result in 19% detrimental disturbance, and therefore would not maintain at least 85% acceptable soil productivity as recommended by Regional guidelines and would be close to the threshold for meeting the Forest Plan Standard. Analysis (Table 3-50) for Alternatives B and F shows that Unit 36 would exceed Regional soil quality guidelines under the current proposed activities that include both ground-based and helicopter yarding. The primary disturbance would be caused by a temporary road that would wind through the unit. Units 40 and 48 would be at thresholds for detrimental soil disturbance. Estimates show Units 40 and 48 would be right at the threshold for meeting Regional guidelines, and Unit 48 would also be right at the threshold for meeting the Forest Plan Standard.

Under all alternatives, using Forest Plan standard criteria, estimates for Unit 48 indicate the proposed activities, added to the existing condition, would result in approximately 20% detrimental disturbance (Table 3-51). Unit 48 has approximately 7% existing detrimental disturbance that needs to be incorporated into the harvest design to keep potential impacts at or below thresholds. Proposed monitoring within this unit (Chapter 2, Table 2-5) would verify soil impacts. If they are over the standard then decompaction of landings and skid trails would be required within the unit. Skid trail decompaction is expected to be moderately effective (SSW-75; Heninger et al, 2002; Dykstra and Curran, 2000 and 2002). On compacted areas, decompaction results in an estimated 30-50% recovery (SSW-75). In Unit 48 approximately 1.2 to 2.0 acred of skid trail would be decompacted (SSW-76), and if the treatment is 30-50% effective the estimated recovery would be one-third to one acre. Harvest activity along with decompacting skid trails would result in a detrimental disturbance between 14% and 18% (SSW-76).

Table 3-50 identifies estimated soil impacts within proposed harvest units based on the proposed harvest and fuel treatment, proposed temporary roads, and existing conditions not including permanent roads (PF: SSW-22, 36, 39, 40, 41). Table 3-51 identifies estimated soil impacts based on the proposed harvest and fuel treatment, proposed system and temporary roads, and existing conditions (SSW-22, 36, 39, 40, 41) in proposed harvest units. All other units should meet Forest Plan standards and Regional soil quality guidelines if design features are followed.

See Table 3-49 for estimated acres of soil disturbance from harvest and fuel treatment activities.

Table 3-50 Summary of Existing Conditions and Potential Impacts Using Regional Guideline Criteria (SSW-40)

			Alternative B			Alternative C			Alternative D			Alternative F		
Unit	Unit Acres	Existing Disturbance %	Potential Disturbance Acres	Potential & Existing Disturbance Ac.	Potential & Existing Disturbance %	Potential Disturbance Acres	Potential & Existing Disturbance Ac.	Potential & Existing Disturbance %	Potential Disturbance Acres	Potential & Existing Disturbance Ac.	Potential & Existing Disturbance %	Potential Disturbance Acres	Potential & Existing Disturbance Ac.	Potential & Existing Disturbance %
1	39	0	2.51	2.51	6	1.77	1.77	5	-	-	-	2.51	2.51	6
2	29	0	0.58	0.58	2	0.58	0.58	2	0.58	0.58	2	0.58	0.58	2
3	35	1	1.14	1.49	4	0.70	1.05	3	-	-	-	1.14	1.49	4
4	25	0	1.27	1.27	5	0.50	0.50	2	-	-	-	1.75	1.75	7
5	22	2	1.64	2.08	10.0	1.34	1.78	8	-	-	-	1.64	2.08	10
6	16	0	0.54	0.54	3	0.32	0.32	2	-	-	-	0.54	0.54	3
7	20	0	1.39	1.39	7	1.39	1.39	7	-	-	-	1.39	1.39	7
8	22	1	1.17	1.39	6	0.00	0.22	1	-	-	-	1.17	1.39	6
9	50	0	5.35	5.35	11	1.00	1.00	2	-	-	-	0.00	0.00	0
10	32	0	2.56	2.56	8	2.56	2.56	8	2.56	2.56	8	2.56	2.56	8
11	8	0	0.64	0.64	8	0.64	0.64	8	0.64	0.64	8	0.64	0.64	8
12	10	0	0.80	0.80	8	0.80	0.80	8	0.80	0.80	8	0.80	0.80	8
13	36	0	2.88	2.88	8	2.88	2.88	8	2.88	2.88	8	2.88	2.88	8
14	15	0	1.20	1.20	8	1.20	1.20	8	1.20	1.20	8	1.20	1.20	8
15	29	0	1.33	1.33	5	1.18	1.18	4	1.18	1.18	4	1.18	1.18	4
16	109	1	4.25	5.34	5	3.00	4.09	4	-	-	-	4.25	5.34	5
17	120	0	3.92	3.92	3	3.12	3.12	3	-	-	-	3.92	3.92	3
18	28	0	1.24	1.24	4	1.04	1.04	4	-	-	-	1.24	1.24	4
19	15	0	1.55	1.55	10	1.20	1.20	8	-	-	-	0.00	0.00	0
20	14	0	0.28	0.28	2	0.28	0.28	2	0.28	0.28	2	0.28	0.28	2
21	6	0	0.12	0.12	2	0.12	0.12	2	0.12	0.12	2	0.12	0.12	2
22	15	0	0.30	0.30	2	0.30	0.30	2	0.30	0.30	2	0.00	0.00	0
23	9	0	0.18	0.18	2	0.18	0.18	2	-	-	-	0.00	0.00	0
24	12	0	0.24	0.24	2	0.24	0.24	2	0.24	0.24	2	0.24	0.24	2
25	16	0	0.00	0.00	0	0.00	0.00	0	-	-	-	0.00	0.00	0
26	23	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
27	19	0	1.04	1.04	6	1.04	1.04	6	1.04	1.04	6	1.04	1.04	6
28	31	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
29	9	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
30	130	0	14.04	14.04	11	2.60	2.60	2	-	-	-	14.04	14.04	11

			Alternative B			Alternative C			Alternative D			Alternative F		
Unit	Unit Acres	Existing Disturbance %	Potential Disturbance Acres	Potential & Existing Disturbance		Potential Disturbance Acres	Potential & Existing Disturbance		Potential Disturbance Acres	Potential & Existing Disturbance		Potential Disturbance Acres	Potential & Existing Disturbance	
				Ac.	%		Ac.	%		Ac.	%		Ac.	%
31	15	0	1.87	1.87	13	0.30	0.30	2	-	-	-	1.87	1.87	13
32	11	0	1.10	1.10	10	0.22	0.22	2	-	-	-	1.10	1.10	10
33	9	0	0.79	0.79	9	0.18	0.18	2	0.18	0.18	2	0.79	0.79	9
34	18	0	1.21	1.21	7	0.36	0.36	2	-	-	-	1.21	1.21	7
35	17	0	0.00	0.00	0	0.00	0.00	0	-	-	-	0.00	0.00	0
36	8	0	1.54	1.54	19	0.64	0.64	8	-	-	-	1.54	1.54	19
37	21	0	1.68	1.68	8	1.68	1.68	8	-	-	-	1.68	1.68	8
38	41	0	4.30	4.30	11	0.00	0.00	0	-	-	-	4.30	4.30	11
39	22	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
40	7	7	0.56	1.05	15	0.56	1.05	15	0.56	1.05	15	0.56	1.05	15
41	46	0	1.60	1.60	4	1.60	1.60	4	1.60	1.60	4	1.60	1.60	4
42	5	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
43	12	0	0.24	0.24	2	0.24	0.24	2	0.24	0.24	2	0.24	0.24	2
44	18	0	0.32	0.32	2	0.32	0.32	2	0.32	0.32	2	0.32	0.32	2
45	13	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
46	20	0	0.40	0.40	0	0.40	0.40	2	0.40	0.40	2	0.40	0.40	2
47	38	1	1.67	2.05	5	0.76	1.14	3	0.76	1.14	3	1.67	2.05	5
48	17	2	2.21	2.55	15	2.21	2.55	15	2.21	2.55	15	2.21	2.55	15
49	68	0	6.91	6.91	10	1.00	1.00	2	1.00	1.00	2	6.91	6.91	10
50	10	0	-	-	-	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
51	15	0	-	-	-	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
52	18	0	1.31	1.31	7	1.31	1.31	7	1.31	1.31	7	1.31	1.31	7
Total Acres of Disturbance			79.9	83.2		41.8	45.1		20.4	23.7		72.8	76.1	

Table 3-51 Summary of Existing Conditions and Potential Impacts Using Forest Plan Standard Criteria (SSW-40)

			Alternative B			Alternative C			Alternative D			Alternative F		
Unit	Unit Acres	Existing Disturbance %	Potential Disturbance Acres	Potential & Existing Disturbance Ac.	Potential & Existing Disturbance %	Potential Disturbance Acres	Potential & Existing Disturbance Ac.	Potential & Existing Disturbance %	Potential Disturbance Acres	Potential & Existing Disturbance Ac.	Potential & Existing Disturbance %	Potential Disturbance Acres	Potential & Existing Disturbance Ac.	Potential & Existing Disturbance %
1	39	6	2.60	4.8	12	1.77	3.94	10	-	-	-	2.60	4.76	12
2	29	1	0.58	0.8	3	0.58	0.81	3	0.58	0.81	3	0.58	0.81	3
3	35	1	2.51	2.9	8	0.70	1.05	3	-	-	-	2.51	2.86	8
4	25	0	1.27	1.3	5	0.50	0.50	2	-	-	-	1.75	1.75	7
5	22	6	2.06	3.3	15	1.34	2.60	12	-	-	-	2.06	3.32	15
6	16	0	1.28	1.3	8	0.32	0.32	2	-	-	-	1.31	1.31	8
7	20	0	1.97	2.0	10	1.39	1.46	7	-	-	-	1.97	2.04	10
8	22	2	1.88	2.2	10	0.00	0.35	2	-	-	-	1.88	2.23	10
9	50	0	7.12	7.1	14	1.00	1.02	2	-	-	-	0.00	0.02	0
10	32	0	2.56	2.6	8	2.56	2.56	8	2.56	2.56	8	2.56	2.56	8
11	8	0	0.64	0.6	8	0.64	0.64	8	0.64	0.64	8	0.64	0.64	8
12	10	0	0.80	0.8	8	0.80	0.80	8	0.80	0.80	8	0.80	0.80	8
13	36	0	2.88	2.9	8	2.88	2.88	8	2.88	2.88	8	2.88	2.88	8
14	15	1	1.20	1.4	9	1.20	1.41	9	1.20	1.41	9	1.20	1.41	9
15	29	0	3.11	3.1	11	1.18	1.20	4	1.18	1.20	4	1.18	1.20	4
16	109	1	5.91	7.3	7	3.00	4.39	4	-	-	-	5.91	7.29	7
17	120	1	5.14	6.1	5	3.12	4.04	3	-	-	-	5.14	6.06	5
18	28	1	2.01	2.3	8	1.04	1.37	5	-	-	-	2.01	2.33	8
19	15	0	2.17	2.2	15	1.20	1.20	8	-	-	-	0.00	0.00	0
20	14	0	0.28	0.3	2	0.28	0.28	2	0.28	0.28	2	0.28	0.28	2
21	6	0	0.12	0.1	2	0.12	0.12	2	0.12	0.12	2	0.12	0.12	2
22	15	0	1.46	1.5	10	0.30	0.30	2	0.30	0.30	2	0.00	0.00	0
23	9	0	0.50	0.5	6	0.18	0.18	2	-	-	-	0.00	0.00	0
24	12	0	0.24	0.2	2	0.24	0.24	2	0.24	0.24	2	0.24	0.24	2
25	16	0	0.00	0.0	0	0.00	0.00	0	-	-	-	0.00	0.00	0
26	23	1	0.32	0.3	1	0.32	0.32	1	0.32	0.32	1	0.32	0.32	1
27	19	3	1.52	1.5	8	1.52	1.52	8	1.52	1.52	8	1.52	1.52	8
28	31	3	0.96	1.0	3	0.96	0.96	3	0.96	0.96	3	0.96	0.96	3
29	9	0	0.00	0.0	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
30	130	0	15.66	15.7	12	2.60	2.60	2	-	-	-	15.66	15.66	12

			Alternative B			Alternative C			Alternative D			Alternative F		
Unit	Unit Acres	Existing Disturbance %	Potential Disturbance Acres	Potential & Existing Disturbance		Potential Disturbance Acres	Potential & Existing Disturbance		Potential Disturbance Acres	Potential & Existing Disturbance		Potential Disturbance Acres	Potential & Existing Disturbance	
				Ac.	%		Ac.	%		Ac.	%		Ac.	%
31	15	0	2.49	2.5	17	0.30	0.30	2	-	-	-	2.49	2.49	17
32	11	0	1.10	1.1	10	0.22	0.22	2	-	-	-	1.10	1.10	10
33	9	0	0.87	0.9	8	0.18	0.18	2	0.18	0.18	2	0.87	0.87	10
34	18	0	2.50	2.5	14	0.36	0.36	2	-	-	-	2.50	2.50	14
35	17	3	0.00	0.4	3	0.00	0.43	3	-	-	-	0.00	0.43	3
36	8	0	1.54	1.5	19	0.64	0.64	8	-	-	-	1.54	1.54	19
37	21	0	1.68	1.7	8	1.68	1.68	8	-	-	-	1.68	1.68	8
38	41	1	5.15	5.5	14	0.00	0.39	1	-	-	-	5.15	5.54	14
39	22	9	0.00	2.0	9	0.00	2.02	9	0.00	2.02	9	0.00	2.02	9
40	7	7	0.56	1.1	15	0.56	1.05	15	0.56	1.05	15	0.56	1.05	15
41	46	0	1.60	1.6	4	1.60	1.60	4	1.60	1.60	4	1.60	1.60	34
42	5	0	0.00	0.0	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
43	12	0	0.24	0.2	2	0.24	0.24	2	0.24	0.24	2	0.24	0.24	2
44	18	0	0.32	0.3	2	0.32	0.32	2	0.32	0.32	2	0.32	0.32	2
45	13	0	0.00	0.0	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
46	20	4	0.40	1.2	6	0.40	1.21	6	0.40	1.21	6	0.40	1.21	6
47	38	1	1.79	2.2	6	0.76	1.15	3	0.76	1.15	3	1.79	2.18	6
48	17	7	2.21	3.4	20	2.21	3.44	20	2.21	3.44	20	2.21	3.44	20
49	68	1	12.50	12.8	19	1.00	1.34	2	1.00	1.34	2	6.91	7.25	11
50	10	0	-	-	-	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
51	15	0	-	-	-	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
52	18	2	1.63	1.6	9	1.63	1.63	9	1.63	1.63	9	1.63	1.63	9
Total Acres of Disturbance			76.7	118.7		41.8	57.2		22.5	35.9		87.1	100.5	

Harvesting on High Sensitivity Landtypes - A total of approximately 11 acres of high sensitivity landtypes is present in the proposed units (Table 3-52) with Landtype 518 being the predominant (10.3 acres) sensitive landtype. Landtype 518 is rated low for surface erosion hazard and moderate for landslide potential but has a high sediment delivery rating because of proximity to drainages. Unit 13 has just under an acre of mapped Landtype 132. Landtype 132 is rated moderate for surface erosion hazard, low for mass failure potential, and high for sediment delivery potential because of proximity to drainages.

No effects are expected from harvest operations on sensitive landtypes within activity units because design features call for adherence to BMPs, use of proposed harvesting systems, and application of RHCA buffers in drainages (SW-44; SSW-14, 50, 59); and the portions of units that have mapped sensitive landtypes (Table 3-52) would be helicopter or skyline harvested. Monitoring of past timber harvest activities that occurred on high sensitivity landtypes found no erosion within the harvest units and only some minor erosion on a road surface (PF: SW-44).

Proposed harvest units are **not** located on areas with high landslide potential. This is true for all alternatives. All potential high mass failure landtypes were buffered, as required by INFS (Map M-18).

Table 3-52 High Sensitivity Landtype* Acres by Unit

Unit	Acres	Landtype
13	0.9	132
47	3.5	518
49	4.3	518
50	1.4	518
51	1.0	518

** Sensitive landtypes are 132 and 518*

Precommercial Thinning - Pre-commercial thinning would be done by hand (chainsaws) and the felled trees would be left on site with no further treatment. Since there would be no soil compaction and no removal of biomass, there would be no effect on soil productivity or quality.

Fuel Treatments - Proposed fuel reductions after vegetative treatments include broadcast burning, underburning, grapple piling, pile burning, jackpot burning, and lopping and scattering slash (Table 3-49). Burns are prescribed for the spring when soil moisture conditions are at least 25 percent and snow often remains in the draws. The soil moisture level would prevent burning of the protective organic layer and moisture levels in the draws would prevent fires from entering those areas (USDA, 2001). Design features for grapple piling require operation of equipment over an adequate slash mat preferentially re-using existing skid trails if present. Tables 3-50 and 3-51 include proposed fuel treatment impacts. See Appendix A, Vegetation Treatment Summary, for a list of fuel treatments by unit for each alternative.

Roads

Effects of Road Construction - Alternative B proposes 11.1 miles of new construction, Alternative C proposes 2.0 miles, Alternative D proposes 2.0 miles, and Alternative F proposes 8.1 miles. The approximate loss of soil productivity related to proposed Forest Service new construction, based on 4.5 acres per mile, would occur on 50 acres in Alternative B, nine acres in Alternatives C and D, and 36 acres in Alternative F. This includes 2.0 miles of new road construction that would provide non-Forest Service landholders access to their land. Under all alternatives, the construction of roads would produce an irreversible effect to site productivity through compaction and displacement.

Road Construction on Highly Sensitive Landtypes - Approximately 175 - 200 feet of temporary road construction is proposed in Wood Creek on high mass failure potential Landtype 717 (Alternatives B and F). High mass failure potential is typically related to road construction. The site was investigated (SW-46), and it was determined to have little risk of failure due to its proximity to the ridge top and minimum amount of slope cutting required because the slopes are not steep. Although the landtype map showed this as a high mass failure potential area, on-the-ground conditions do not indicate high mass failure risk. Road design features for this area should prevent concentration of water that increases water in the soil enough to reduce shear strength and initiate earth movement. This road would be located approximately 110-200 feet above a stream course (SSW-52), would be buffered by existing vegetation, and would be recontoured once treatments are complete.

Table 3-53 Road Lengths on High-Sensitivity Landtypes for Hidden Cedar Area

Jurisdiction	Length on Sensitive Landtypes	Percent Road Miles by Land Jurisdiction
Other	26.4 miles	55.4%
USFS	21.3 miles	44.6%

Utilization of best management practices and engineering construction specifications would prevent significant effects from occurring on reconstructed or new road construction on these landtypes (Seyedbagheri, 1996; Lynch and Corbett, 1989, 1990; Idaho DEQ, 2001; SSW-61). Reconstruction would allow for safe timber haul and improve drainage which would reduce the risk of mass failure.

Table 3-54 Proposed Road Reconstruction on NFS Land on High-Sensitivity and High Mass Failure Landtypes

Watershed	Miles on Landtypes with High Sensitivity		Miles on Landtypes with High Mass Failure	
	Alt B/C	Alt D/E/F	Alt B/C	Alt D/E/F
Hidden Creek	0.2	0.1	0	0.1
W. Fk. St. Maries River	0.1	0.2	0.1	0.1
Lower St. Maries River	0.6	0.3	0.6	0.3
Wood Creek	0.2	0.0	0.2	0.0

Table 3-55 Road Construction on Non-FS Land on High Sensitivity and High Mass Failure Landtypes

Watershed	On High Sensitivity	On High Mass Failure
W. Fk. St. Maries River	0.1 mi.	0.0 mi.
Lower St. Maries River	0.2 mi.	0.2 mi.
Long Slim Creek	0.01 mi.	0.0 mi.
Cat Spur Creek	0.1 mi.	0.1 mi.

The majority (~77 percent) of the Hidden Cedar Project Area is located on soils with a high subsurface erosion potential (PF: SSW-73). Though harvest activities cause little concern, road construction disturbs soils to the subsurface level and has an elevated potential for increased erosion. BMPs, typical road design criteria (slash-filter-windrows, mulching and seeding, gravel aprons at crossing culverts, surface graveling, etc.) and generally upper slope locations of proposed new construction should prevent sediment generation and movement to stream channels.

Table 3-56 Miles of Proposed Road Construction Related to Timber Harvest on NFS lands on Various Subsurface Erosion Ratings

	Subsurface Erosion Rating		
	Low	**Medium**	**High**
Alternative B	0.2	1.2	7.7
Alternative C	-	-	-
Alternative D	-	-	-
Alternative E	-	-	-
Alternative F	0.2	0.7	5.8

Temporary Roads - All temporary roads would be fully recontoured to the natural slope upon completion of activities. Temporary roads that would remain on the landscape more than one dry season would be waterbarred according to specific interval direction and at specific angles to promote acceptable results (Timber Sale Contract, Erosion Control and Temporary Road provisions). They would then be mulched with a natural, weed-free material to prevent runoff and erosion during spring and/or winter runoff events. Obliteration would begin to reduce compaction of the soil, help to restore soil productivity, and decrease hydrologic effects from road surface runoff (Switalski et al, 2004; SSW-78).

Effects of Road Maintenance - No additional soil impacts would occur from proposed road maintenance activities such as blading, drainage improvements, and surfacing on existing dedicated roads.

Road Decommissioning and Storage - Soil productivity would improve from the existing condition by approximately 15.9 miles from road decommissioning or long-term storage in Alternatives B and C and by approximately 25 miles from road decommissioning or long-term storage in Alternatives D, E, and F. Under Regional guidelines, roads are considered a “committed” resource and are not

counted in the analysis for impacted soils, so the level of detrimentally impacted soils would not change even though soil productivity would increase on 64 acres (Alternatives B & C), 99 acres (Alternatives D & E) and 101 acres (Alternative F) due to decompaction and recontouring associated with road decommissioning and storage.

Proposed new road construction would remove some acreage from existing soil productivity. A reduction of productivity would occur on 50 acres in Alternative B, nine acres in Alternatives C & D, and 36 acres in Alternative F. The net change in increased soil productivity related to roads would be 14 acres in Alternative B, 55 acres in Alternative C, 90 acres in Alternatives D and E, and 65 acres in Alternative F.

Road Decommissioning and Storage in Riparian Areas – Soil productivity would increase on roads rehabilitated at stream crossings and within riparian areas. Erosion and soil movement would decrease through removal of riparian roads, planting, and seeding.

Fifty-seven crossings were removed during past activities (SSW-45), of which 22 were completed under the 2002 Hidden Cedar Project ROD (SSW-46). Alternatives B and C propose 20 additional crossing reductions. In Alternatives D and E, 33 crossings would be removed. Alternative F would remove 34 crossings (SSW-45). Alternatives D, E, and F would remove the riparian road in Hidden Creek and also remove the road in the riparian area of Wood Creek.

The following table identifies miles of 'encroaching roads' based on the definition of encroaching roads used in the DEQ TMDL model (roads within 50 feet of a stream channel SSW-47).

Table 3-57 Miles Proposed for Road Recontour or Storage w/in 50 Feet of Stream Channel

Drainage	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Keeler	0.2	0.2	0.2	0.2	0.2
Long Slim	0.0	0.0	0.0	0.0	0.0
Log	0.1	0.1	0.1	0.1	0.1
Kitten	0.0	0.0	0.0	0.0	0.0
Cat Spur	0.1	0.1	0.1	0.1	0.1
West Fork St. Maries River	0.5	0.5	0.5	0.5	0.5
Hidden	1.3	1.3	1.5	1.5	1.5
Wood	0.3	0.3	0.4	0.4	0.3
Mazie	0.6	0.6	0.6	0.6	0.6
Bechtel	0.2	0.2	0.2	0.2	0.2
Cedar	0.0	0.0	0.0	0.0	0.0
Staples	0.0	0.0	0.0	0.0	0.0
Blair	0.0	0.0	0.0	0.0	0.0
Lower St. Maries River	1.6	1.6	1.7	1.7	1.7
Total	4.9	4.9	5.3	5.3	5.2

Soil Productivity

Effects on Soil Productivity – Foliar analysis was undertaken to assess nutrient levels in trees on various geologic parent material (Table 3-58). The result of this analysis indicates that the potassium level is above the critical level (IFTNC, 1998) for the Lower Wallace Formation. For the Upper Wallace and Granitic Formations, the potassium level is below the critical level (IFTNC, 1998). Nitrogen and sulfur are above the critical level on the Upper Wallace but below the critical level (IFTNC, 1998) on the Lower Wallace and Granitic Formations.

Table 3-58 Geology by Unit

Geology	Unit Number
Granitic	33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51
Lower Wallace	1, 3, 4, 5, 7, 8, 9, 14, 15, 16, 17, 21, 22, 23, 24
Upper Wallace	2, 6, 10, 11, 12, 13, 18, 19, 20, 25, 26, 27, 28, 29, 30, 31, 32, 52

To maintain the long-term site productivity with adequate soil nutrients, it is necessary that fine residue (foliage and branches) is allowed to overwinter on-site within each proposed harvest unit. This allows potassium and other nutrients to leach out and back into the soil where it would be available for future uptake. Selective tree harvest would reduce competition for soil nutrients resulting in higher nutrient concentrations available for uptake by the remaining stand vegetation.

As a direct effect, harvesting on all sites would remove within each tree bole about 14 percent of the potassium that is contained within a tree. This may have an indirect effect on some plants that remain in the stand. Douglas-fir and grand fir consume and store more potassium than other tree species. The release and availability of this stored potassium would benefit western larch, ponderosa pine, and western white pine which require less potassium for growth and maintenance (Garrison and Moore 1998). These more potassium efficient tress would be planted as necessary in regeneration units. Measuring the effects of on-site productivity 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.

Approximately 7 to 14 tons per acre of coarse woody debris would be left on Douglas-fir/grand fir sites. The majority of harvest units presently display reduced coarse woody debris levels and could benefit from additional material. This would provide protection against soil erosion as well as a long-term source of nutrients and organic matter (Brown et al. 2003; Graham et al. 1994). However, removal of excess woody debris reduces the potential for high-temperature uncontrolled fires that could otherwise sterilize the soil at high temperatures, cause highly erosive hydrophobic soil conditions, and reduce overall soil productivity (Pritchett and Fisher 1987).

Indirect effects of soil wood loss also includes altered processes of forest regeneration and growth, favoring species requiring lower soil moisture and nutrient levels. Additional effects could include loss of habitat for species requiring soil wood as dens or substrate for invertebrates, bacteria and fungi, which affect food availability for small rodents and their predators.

The commercial thinning of Douglas-fir and grand fir in association with leaving western larch would allow the release of stored foliar potassium from the Douglas-fir as a beneficial nutrient for uptake by western larch (Garrison and Moore 1998) which is a more potassium-efficient species.

Cumulative Effects of Alternatives

The following components of soil disturbance were combined to estimate the cumulative impact to soils in the project area: timber harvest and fuels reduction, roads, recreation, grazing, fire, fire suppression, and minerals prospecting (SSW-39, 40, 65, 68). A detailed summary of past, present, and reasonably foreseeable activities is located at the beginning of Chapter 3. Previous activities on National Forest System land may have detrimentally impacted approximately 12% of the area (Effects from Past Activities in the Cumulative Effects Analysis Area). This estimate and the estimated values displayed in Table 3-59 as the cumulative soil disturbance should be considered conservative and are most likely over-estimated because of three things:

- The grazing estimated impact is based on the disturbance level monitored in Hume Creek (IPNF 2001 Forest Plan Monitoring Report, p. 52) and was applied to the entire allotment acreage on NFS lands. The Hume Creek monitoring was conducted in grassy/timbered bottoms of the drainages where most of the grazing pressure occurs. Observations indicate impacts to soils from grazing on NFS lands are not a substantial issue (SSW-44).
- The mining disturbance level is inflated from an estimated 0.2 acre to 1.0 acre to ensure that it is a conservative estimate.
- The existing road disturbance level is computed at 4.5 acres/mile or a road width (cut, fill and prism) of 37 feet, which is a high-end estimate.

Timber Harvest – Timber harvest has occurred throughout the cumulative effects analysis area (National Forest System lands in the project area) (SSW-65). The majority of previous logging began in the 1950s and continues today. Reasonably foreseeable agency actions include the Clarkia Interface Fuel Reduction project south and west of Clarkia.

Roads – Roads constructed in the past provide access to public and private land in the Hidden Cedar Project Area. System roads removed land from productivity when they were constructed and have little to no additional effect on the area if properly maintained. Future routine maintenance, road decommissioning, and culvert improvement activities can be expected in the project area, but the amount or location is not known at this time. Road decommissioning and soil restoration would contribute to a reduction in compaction, thus improving infiltration and reducing surface runoff (Switalski et al. 2004). Removing or replacing culverts is expected to have short term impacts on sediment yield below the crossing sites (see Water section).

Cost-share road construction is proposed in the West Fork of the St. Maries River Drainage on approximately 800 feet of high potential mass failure landtype. This section of road would run along the boundary between NFS lands and state lands. Because it would be a cost-share road the Forest Service would have jurisdiction and would be able to specify design features to reduce risks of mass failure.

Overall, erosion and sediment from NFS lands is expected to decrease because of the level of roads being decommissioned and put into long-term storage.

Recreation – The project area is open for general motorized use which allows for hunting, fuel wood gathering, collection of miscellaneous forest products, dispersed camping, and motorized touring. Recreational activities are expected to increase over time and may contribute to localized, small-scale disturbances.

Grazing – Monitoring of grazing sites on the St. Joe Ranger District found that there was an approximate five to six percent impact to the soil resource from compaction attributable to cattle grazing (PF: SSW-67). This monitoring was conducted on areas in the Hume Creek drainage (outside the Hidden Cedar Project Area) where cattle use was very evident from the existence of trails and cow manure (pers. observation J. Macy). Observations during the field seasons of 1999-2001, showed other areas with permitted grazing do not have the concentrated use evident in Hume Creek. With more dispersed grazing in the Hidden Cedar Project Area, soil impacts are less than those found in Hume Creek (SSW-44). The St. Joe Ranger District monitors "greenline" vegetation right along the riparian line annually (SB-12). In Catspur Creek, monitoring shows median end-of-season stubble height to be greater than six inches high (usually greater than 12 inches). This indicates good riparian health and good ground cover.

Fire – Wildfires have been common in the past and should not be eliminated as an ecological process. Proper management through fuel reduction and prescribed burning should sustain an environment where fire plays an interregnal role in stand maintenance and healthy forests with minimal soil damage. It is possible that salvage opportunities would be considered if a wildfire should occur within the project area. It is impossible at this time to predict if, when, where, or how that would be proposed; so it is not possible to determine potential effects. Additional analysis and a separate decision would be required.

Successful fire suppression actions would eliminate the chance of detrimental effects to soil productivity. Most hand fireline construction would have only minor disturbance to the soil resource. As needed, closed roads would be reopened for access and be incorporated as part of the fireline construction. As part of post-fire work, the areas of disturbance would be rehabilitated and the roads would be returned to their previous condition.

Noxious Weeds - Noxious weed monitoring and treatment would continue and would follow guidelines established in the St. Joe Noxious Weeds ROD (USDA 1999). Effects to soil resources were analyzed in the document and its adaptive strategy. No additional effects to soils beyond what was analyzed for and disclosed in the EIS are expected to occur.

Minerals Prospecting - Ongoing and proposed activities in Catspur Creek and near Bechtel Butte are estimated to result in less than one acre of detrimental soil disturbance.

Table 3-59 Cumulative Effects Summary

Activity	Estimated Detrimental Disturbance by Alternative in Acres					
	A	B	C	D	E	F
Past Harvest	1,034	1,034	1,034	1,034	1,034	1,034
Existing Roads	508	508	508	508	508	508
Past, Present & Future: Minerals Exploration	1	1	1	1	1	1
Past, Present & Future: Grazing	228	228	228	228	228	228
Future: Clarkia Interface Fuels Reduction	4	4	4	4	4	4
Proposed Harvest	0	77	42	23	0	87
Proposed Landings	0	8	8	8	0	8
Proposed Road Construction	0	50	9	9	9	36
Total Acres	1,775	1,910	1,834	1,815	1,784	1,906
Percent of NFS lands	11.4%	12.3%	11.8%	11.7%	11.5%	12.3%

Consistency with Forest Policy and Legal Mandates

All alternatives would comply with Forest Plan standards (Forest Plan pp. II-32 and II-33). Alternatives C, D, and E would comply with Regional Soil Quality Guidelines (PF: SSW-40; USDA 1999). Alternatives B and F would comply with Regional soil quality guidelines in regards to detrimentally disturbed soils for all units with the exception of proposed activities in Unit 36. If the temporary road were not constructed in Unit 36 the estimated disturbance level would be 2% for this unit (see Regional Manual Recommendations below). It is estimated that activities in Units 40 and 48 would result in detrimental disturbance on 15% of the activity area which is right at the Regional guideline of maintaining 85% of an activity area in acceptable conditions for soil productivity.

Forest Plan Standards

Forest Plan Soil Standard #1

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

See Table 3-51. All alternatives would comply with this standard, but Unit 48 is right at the threshold. Soil-disturbing management practices would not exceed 20 percent detrimental conditions and would maintain at least 80 percent of each activity area in a condition of acceptable productivity potential for trees and other managed vegetation (SSW-78, SSW-40). Unit 48 is estimated to be right at the 20% Standard (PF: SSW-40), but proposed monitoring within this unit (Chapter 2, Table 2-5) would verify soil impacts. If they are over the standard then decompaction of landings and skid trails would be required within the unit. Skid trail decompaction is expected to be moderately effective

(SSW-75; Heninger et al, 2002; Dykstra and Curran, 2000 and 2002). On areas with compaction, decompaction results in an estimated 30-50% recovery (SSW-75). In Unit 48 approximately 1.2 to 2.0 acres of skid trail would be decompacted (SSW-76), and if the treatment is 30-50% effective the estimated recovery would be one-third to one acre. Harvest activity along with decompacting skid trails would result in a detrimental disturbance between 14% and 18% (SSW-76).

Forest Plan Soil Standard #2

Projects should strive to maintain sufficient large woody debris to maintain site productivity. Large woody debris is essential for maintenance of sufficient micro-organism populations.

All alternatives would comply with this standard. The amount of large woody debris left on site would follow the research guidelines of Graham et al. (1994) to ensure the maintenance of site productivity (Design Feature 10. I. iii.).

Forest Plan Soil Standard #3

In the event of whole-tree logging, provision for maintenance of sufficient nutrient capital should be made in the project analysis.

No whole-tree logging is proposed in any of the alternatives. Tops of trees would be left in harvest units (Design Feature 10.I.1.). Fine organic matter layer thickness would be retained as appropriate for local conditions because mechanical equipment would operate on a slash mat.

Regional Manual Recommendations

Detrimental disturbance would not exceed the recommended 15 percent in any individual activity area under any alternative except for Unit 36 in Alternatives B and F. If the temporary road were not constructed in Unit 36 the estimated disturbance level would be 2% for this unit. It is estimated that Units 40 and 48 would be right at the threshold for the Regional guidelines.

Transportation

Changes Between the Draft SEIS and the Final SEIS

An error was found with the existing condition of the Hidden Cedar Road 498. The DSEIS showed 1.2 miles as gated when on the ground it is actually open. Minor road mile errors were corrected, and the tables updated. We added decommissioning 0.8 miles and storing 0.2 miles of the Wood Creek Road 341 to Alternative F.

Introduction

The Hidden Cedar transportation infrastructure has evolved through changes in technology, land ownership and human uses that have occurred over time. The network has served a multitude of activities, creating the system that is in place today. The design, operation and maintenance of the transportation system can have consequences that affect the physical, biological and social environments. This section focuses on the social or human aspects of the transportation system along with the composition and juxtaposition of the network. The physical and biological aspects are discussed in detail in each resource section.

Regulatory Framework

National Forest Management Act (NFMA): Directs that roads be designed to standards appropriate for intended uses and requires the re-vegetation of roads within 10 years of the termination of temporary and undeveloped roads created under contract, permit or lease.

Clean Water Act (CWA): Section 404 of the Clean Water Act authorizes the Secretary of the Army to issue permits for the discharge of dredged or fill material into wetlands (33 CFR 322). Roads for timber management are exempt from the permit process (33 CFR 323.4) if they are constructed and maintained with the use of BMPs listed in 40 CFR 323.a, as well as those approved in the rules and regulations of the Idaho Forest Practices Act. Effectiveness of proposed best management practices is high (project file (PF): SW-42).

State of Idaho Forest Practices Act (FPA): The purpose of Rule 040, Title 38, Chapter 13 of the Idaho Code is to provide standards and guidelines for road construction and maintenance that will maintain forest productivity, water quality, and fish and wildlife habitat.

Alaska National Interest Lands Conservation Act (ANILCA): Access to non-Federal in-holdings is governed by Section 1323(a) of this act. Implementing direction for this authority is found in regulations at 36 CFR 251 Subpart D-Access to Non-Federal Lands.

Forest Roads and Trails Act (FRTA) Section Two: Section Two of FRTA authorizes the road and trail systems for the National Forests, the granting of easements across Forest Service administered lands, the construction of maximum economy roads and the imposing of requirements on road users for maintaining and reconstructing roads.

36 CFR 219: Sets the requirements for integrating forest resources, including transportation access and travel management, into the planning process, integrating biological, physical, social, and

economic factors and environmental design criteria. Integration could involve the Endangered Species Act, the Clean Water Act and the National Historic Preservation Act.

36 CFR 212: Establishes the requirements for the administration of the forest transportation system and provisions for acquisition of rights-of-way. Describes a minimum road system and requires a science-based analysis to plan the road system.

36CFR 251, subpart D: Governs procedures by which landowners may apply for access across National Forest System lands, the terms and conditions that govern any special use authorization that is issued by the Forest Service to permit such access, and the criteria that authorized officers must consider in evaluation such applications. The rules provide that, subject to the terms and conditions set out in the rules, "landowners shall be authorized such access as the authorized officer deems to be adequate to secure them reasonable use and enjoyment of their land".

36 CFR 261.12 and 261.54: Establishes prohibitions on National Forest System road that are enforceable by the Forest Service.

Road Easements, Agreements or Memorandums of Understanding

In addition to the USDA Forest Service, the following entities have ownership and / or jurisdiction of roads within the Hidden Cedar Project Area:

State of Idaho, Department of Transportation

Clarkia Better Roads Highway District

Bonneville Power Administration

Potlatch Corporation

State of Idaho, Department of Lands

Clearwater Power Company

FSM 2700

Forest Service Manual 2700 provides direction for special uses management on National Forest System lands. Chapter 2730 – Road and Trail Rights-of-way Grants, covers policies, authorities, and direction for granting rights-of-way for roads and trails across National Forest System lands and interests in lands.

FSM 5400, Chapter 5460

Forest Service Manual 5400, Chapter 5460 provides direction concerning rights-of-way acquisition.

FSM 7700

Forest Service Manual 7700 provides direction for the planning, construction, reconstruction, operation and maintenance of the Forest Transportation System. It sets forth the authority, objectives, policy, responsibility and definitions related to the Forest Transportation System.

IPNF Forest Plan

Forest-wide management direction in the form of goals, objectives and standards are contained in Chapter II. Goals for transportation facilities is to construct, manage and maintain transportation facilities to meet management area goals in a cost effective way while meeting safety, user, and resource needs. Chapter III of the Forest Plan provides more specific management direction for

individual management areas. The Forest Plan provides some specific direction related to access and road management. Forest Plan standards for lands in the analysis area are to utilize the lowest standard road meeting transportation objectives compatible with resource protection and area management goals.

For wildlife, road restrictions and closures can be used as needed to meet habitat goals. In MA-16 (riparian), new construction should be limited to cases where no reasonable alternative exists and to pursue replacement of existing stream crossing barriers with structures allowing fish passage. All standards related to roads are listed in the Hidden Cedar Roads Analysis in the project file (PF: Book 9). The Inland Native Fish Strategy amends the Forest Plan and contains additional guidelines and standards related to the design, operation and maintenance of the transportation system, these are also listed in the Roads Analysis of the project file.

Analysis Area

For transportation purposes, the analysis area corresponds with the project area with some discussion of routes that pass through the area, serve adjacent lands or provide access to the project area. All proposed activities related to the transportation network are within the project area, except for timber hauling, road maintenance or restoration of an existing route to original standards to implement the alternatives, or road management for a road that extends beyond the project area.

Analysis Methods

A GIS road layer was developed using several data sources including: various maps, aerial photography, prior transportation planning efforts, Timber Sale Road Plans, GPS surveys, road maintenance logs and condition inventories, cost share and other road use agreements, the INFRA road database and land status and rights-of-way records. The State of Idaho Department of Lands and Potlatch Corporation provided additional information on planned and existing roads across their ownerships (PF: ST-2). Road segments were assigned attributes according to their jurisdictional status and road management prescription.

Most of the roads on National Forest System lands or under Forest Service jurisdiction within the project area have been driven or walked within the last few years. Information for roads that have not been visited recently was based on prior work experience in the area and observation of similar roads built in the same time period and area. Historic photos and maps, past timber sale files and stand data were used to produce an overlay of the development history of the road network. This historic information was used to verify road locations and to provide an indication of their condition if they had not been visited. The road jurisdiction and management prescriptions provide an indication of the use, design, operation and maintenance of the road. All mileages were derived from the GIS road layer.

The Roads Analysis Process (RAP, FSM 7712) was utilized to identify the minimum road system needed and roads not needed (36 CFR 212.5) for the project area. Needed equates to classified roads. Classified roads consist of public, private and NFS (includes cooperative and FS) roads. The analysis uses the following road prescriptions to categorize road management:

a) Open - roads used by the public,
b) Road Management Prescription A - gated,

c) Road Management Prescription B - barriered,
d) Road Management Prescription C - long-term storage (LTS),
e) Road Management Prescription D - decommission (partial recontour)
f) Road Management Prescription E - decommission (full recontour)

See Appendix C for Road Management Prescription definitions. This analysis documents the need for the addition of new roads and evaluates the opportunities for reconstruction and decommissioning of roads (PF: ST-1 Hidden Cedar Roads Analysis).

Existing Condition

The following table reflects the road status changes accomplished since 2002. These status changes were determined to be desirable during the Road Analysis for the original Hidden Cedar EIS Decision.

Table 3-60 Road Status Changes Since 2002

Jurisdiction	Open Miles	Gated Miles	LTS Miles	Recontour & Decommission Miles	Total Miles
FS on NFS Lands	**0.0**	**0.4**	**11.4**	**5.4**	**17.2**

NOTE: These mileages are reflected in the "Current Condition and Alternative A" listed below in this document.

Past Human Uses

Land ownership patterns have continued to shift through land exchanges and acquisitions from the early settlement days to the present. Several exchanges have occurred to consolidate various ownerships for the State of Idaho, Potlatch Corporation and the National Forest System. Potlatch Corporation also acquired Milwaukee Land Company holdings in the area, greatly increasing their ownership. Several Bureau of Land Management and National Forest parcels have been acquired by the State of Idaho. The land ownership patterns influenced the development of the road system, roads locations, and road construction standards. Roads were often built to avoid crossing ownerships.

Present Human Uses

The transportation network within the analysis area provides access that facilitates a variety of uses. State Highway 3 provides primary access to and from the area, along the main stem and the West Fork of the St. Maries River.

Land ownership surrounding Clarkia is a mix of private individuals, the State of Idaho Department of Lands, Potlatch Corporation (Potlatch) and National Forest. Privately-owned land is mostly within corridors extending south and east from Clarkia in the valley bottom up to Cat Spur Creek and Gold Center Creek. National Forest System land is primarily west of the West Fork, and in blocks surrounding Anthony Peak, in the upper portion of Cedar Creek and within the Log Creek Drainage. State of Idaho lands are scattered mostly through the Long Slim, Cat Spur and Middle Fork drainages. Potlatch lands are primarily in the Keeler Creek, Kitten Creek, lower Cedar Creek, Merry

Creek and Middle Fork areas. The mixed ownership pattern has resulted in a road network with mixed jurisdictions, rights-of-way and agreements.

Public access on "FS jurisdiction open roads is currently approximately 44.8 miles.

Table 3-61 Existing Condition (Alternative A) of the Road System in the Project Area

Road Jurisdiction	Open	Gated Rx A	Barriered Rx B	LTS Rx C	Decom-missioned Rx D & E	Total	% of Total Miles in Project Area
FS on NFS Land	40.5	14.5	11.9	35.0	11.2	113.1	36
FS on non-NFS Land	4.3	1.5	0	.6	0	6.4	2
Subtotal: FS Jurisdiction	**44.8**	**16.0**	**11.9**	**35.6**	**11.2**	**119.5**	**38**
Other* on NFS Land	8.3	.7	0	0	0	9.0	3
Other* on non-NFS Land	36.5	87.6	40.3	17.6	.3	182.3	59
Subtotal: Other Jurisdiction	**44.8**	**88.3**	**40.3**	**17.6**	**.3**	**191.3**	**62**
Total Miles of Road in Project Area by Rx	**89.5**	**104.3**	**52.2**	**53.2**	**11.5**	**310.8**	**100**

** "Other" roads include state and private.*
NOTE: Differences in total miles for this and each of the following tables is due to rounding.

Road development within the project area has been extensive. The base transportation network of arterials, collectors and major local roads is well established. Even though the project area is well roaded, timber harvest using conventional ground-based and cable logging systems would require additional local road development.

Information for the classified road system was updated for this supplemented EIS using information from Potlatch Corporation, Idaho Department of Lands, and 2004 NAIP digital satellite imagery. The classified (long-term motor vehicle access) road system is comprised of: 1) public roads under the jurisdiction of the State of Idaho Department of Transportation and the Clarkia Better Roads Highway District; 2) roads used for utility and transmission line access by the Bonneville Power Administration (BPA) and Clearwater Power Company (NFSR Co-op); 3) private roads on individual and corporate lands; 4) State of Idaho, Department of Lands ownership; 5) Co-op National Forest System Roads (NFSR Co-op joint ownership with State and Corporate entities known as Cost Share) residing on both NFS lands and Other lands); and 6) NFSR roads. The latter refers to those roads that reside on National Forest System land only. Please refer to Appendix C for definitions of roads used in this section.

Major Routes within and Adjacent to the Project Area

Jurisdictional changes from BPA, private and Forest Service existing roads to joint use agreements, as well as sharing in requests for access across National Forest System lands are identified as *cost-share* opportunities. Cooperative use agreements (cost share) develop and use a single road system when such a system serves or can be made to serve the needs of both the Forest Service and other

landowners (FSM 5467.02 and 36 CFR 212). Cost-share roads are National Forest System Roads. Cost-share principles apply to construction, reconstruction, maintenance and use of shared facilities. The Forest Service has existing cost-share agreements within the project area with Potlatch and the State of Idaho.

State Highway 3 is a double-lane, paved highway. The alignment on some segments reduces travel speed to 35-45 miles per hour. Fog and icy conditions are prevalent from fall through spring. Commercial truck traffic is primarily associated with log and wood chip transport. The highway provides regional access to the Clarkia area from Moscow-Pullman, Lewiston-Clarkston, Grangeville, St. Maries and Interstate 90 (Wallace, Coeur d'Alene and Spokane). The route serves as an alternative to US 95 between Interstate 90 and US 12. A gradual increase in use can be expected.

The St. Maries River Railroad is used primarily to transport logs from the Potlatch log yard in Clarkia to their plywood mill and sawmill in St. Maries with cedar logs transported to Bovill. The rail line also provides rail links from the Potlatch facilities, Regulus Stud Mill in St. Maries, the Medley Cedar Mill and Scott Paper chip plant in Santa and Emerald Creek Garnet Company south of Fernwood to major rail carriers and the Port of Lewiston. A recent decline in use is likely to continue for the near future. Market conditions, Potlatch operations, truck haul competition and timber availability in the Clarkia/Floodwood area will all play a role in the future status of the railroad.

The primary forest arterial for the Upper St. Maries River Basin is the Fishhook / Gold Center Road 301. This route receives heavy truck traffic primarily from State and Potlatch lands in the Floodwood area by way of the Middle Fork St. Maries River Road 382 and the Stony Creek Road 1475. Road 301 continues past Road 382 to White Rock Springs providing access to Windy Creek, Stony Butte and Glover Creek. The segment from Clarkia to White Rock Springs is cost shared with Potlatch Corporation.

From White Rock Springs the standard of Road 301 decreases to a primitive road along the St. Joe / Clearwater Divide past Marks Butte, Freezeout Mountain and Crater Peak. Road 301 eventually crosses the Little North Fork of the Clearwater and becomes a major haul route up over Breezy Saddle and down Fishhook Creek to Forest Highway 50 at Avery. In addition to being an important haul route, the primitive portion of Road 301 provides a variety of recreational opportunities. There are several dispersed campsites with toilet facilities and trailheads along the route. Hunting, berry picking and sightseeing are the primary uses. The route is also a designated snowmobile trail that also receives cross-country ski traffic. Heavy truck traffic levels are expected to remain constant and recreational use is expected to increase.

Another important arterial is the Clarkia Marble Creek Road 321 that intersects with Road 301 near Clarkia, continues over Hobo Pass and down Marble Creek to FH 50. Portions on both ends of the route are cost-shared. The tributary area of Road 321 to Clarkia includes Merry Creek, Bussel Creek, Hobo Creek and Cornwall Creek and includes Potlatch and State lands. Road 321 provides the primary access to Marble Creek and the associated historical recreation and interpretive sites. The combination of FH 50, SH 3 and Road 321 provide an easily accessible scenic loop normally suitable for passenger cars. Generally, Road 321 receives heavy truck traffic on an intermittent basis and use is expected to continue to be heavy at times. Recreational use is expected to increase.

Road 504 connects SH 3 with the Palouse Emerald Creek Road 447 providing alternate secondary access to the Emerald Creek Campground and the Emerald Creek Garnet Area. Road 504 also collects timber traffic from the Becthel Creek drainages (Rd 3340), Clarkia Peak (Road 504A),

Bechtel Mountain (Road 3478) and Cedar Butte (Road 3557). This route serves only National Forest lands.

Road 447 lies to the north and west of the project area that connects SH 3, between Fernwood and Clarkia to SH 6 near Harvard. Established uses and levels are not expected to change.

The combination of Cat Spur Creek Road 361 and Log Creek Road 1450 is a cost-share collector route providing access to National Forest, Potlatch and State lands. The tributary area includes the Anthony Peak area (Roads 1486 & 3685), Kitten Creek and Log Creek (Roads 361, 1450 & 3354) and the Long Slim Drainage (Road 1450). The Dworshak Taft transmission line also crosses through the tributary area, giving the Bonneville Power Administration an interest in some of the tributary roads. Permits for grazing and mineral extraction have been issued, and one is currently under consideration for granting by the Forest Service for the Cat Spur area. Other uses are primarily related to hunting with some dispersed camping and general forest day-use activities. Some primitive roads connect the 1450 Road System with the Keeler Creek Road 765 and the East Fork Potlatch River road system out of Bovill. The condition of the connecting routes limits their use and most traffic is terminal. The current trend for the next decade is increased use for commercial timber haul that may discourage other public uses.

Prior to the construction of State Highway 3 at its current location, access to Bovill followed a wagon route that is now part of Roads 765 and 765A. Road 765 begins at SH 3, crosses the West Fork of the St. Maries River where it also crosses the railroad grade and then continues up Keeler Creek. Where Road 765 starts up Keeler Creek, Road 765A continues up the West Fork parallel to the river and railroad grade and eventually ties back into SH 3 near the St. Maries River / Potlatch River Divide.

Road 765 from SH 3 to Road 765A and Road 765A are county roads maintained by the Clarkia Better Roads Highway District. From Road 765A, Road 765 was relocated out of the riparian area of Keeler Creek, and the old route location was obliterated. The new location is partially cost-shared with Potlatch Corporation, with the State of Idaho Department of Lands expressing an interest in utilizing the route. The current use and trend of these roads is similar to Road 361.

East Elk Road 1451 is a cost-shared route connecting SH 3, near the Cedar Creek Campground to Road 1491 in the West Fork of Merry Creek. This road, locally referred to as the Staples Creek Road, has a tributary area that extends into the Norton, Toles and Lines Creek Drainages. The route also has a buried powerline that continues to a BPA microwave site on Incline Ridge. The road serves intermingled owned lands in the project area between Blair Creek and East Elk Peak.

Christmas Creek Road 3321 is a combination public, private and cost share route serving Christmas Creek and the south side of the Blair Creek Drainage. Private roads also connect Road 3321 to Roads 1451 and 1491.

Other collector roads available for unrestricted use are the Wood Creek Road 341 from SH3 to Road 3499 and the Hidden Creek Road 498 from Road 765, across SH 3 to just short of the Hidden Emerald Divide. Both roads continue beyond these points, but use is restricted or barriered. Road 3499 connects Road 341 with Road 498; but the culverts across Hidden Creek and Wood Creek have been removed, physically blocking passage. Road 498 provides access to most of the Little East Fork of Emerald Creek, which has an area restriction on motorized use. See Appendix B Map 4 – Road Management for Alternative A (existing road system).

Environmental Consequences

Present and Reasonably Foreseeable Activities

Within the next ten to twenty years, current uses can be expected to continue. Indications are that timber harvest on corporate and State lands will continue at or near their current levels. Roads will continue to be developed on State and private lands to facilitate primarily tractor and cable logging systems. Potlatch Corporation and the State of Idaho Department of Lands have indicated that they plan on constructing approximately 6.5 miles of road on their lands that would not involve crossing any National Forest System lands. Potlatch Corporation has also been in the process of decommissioning unneeded roads on their lands, meeting the requirements for an abandoned road (Idaho Forest Practices Act, Rule 040, section 04(e)).

Under the Dutch Cat Environmental Assessment and Decision Notice new roads were constructed, and changes were made to the operation and maintenance of the existing road network under Forest Service jurisdiction in the Anthony Peak and Cat Spur areas. The existing condition (Alternative A) reflects those changes.

Road maintenance activities will continue on public, private and National Forest roads. BPA and Clearwater Power need continued access across NFS lands to maintain power line facilities.

Alternative A

Direct, Indirect and Cumulative Effects

Alternative A would maintain current public access to National Forest System lands. Implementation of present and reasonably foreseeable actions would increase the amount of cost-shared road (other land owners would buy into some of the existing road system), thereby reducing the monetary maintenance responsibility of the Forest Service on National Forest System roads (NFSRs). The present and reasonably foreseeable road construction would occur on private ownership. Alternative A would not provide adjacent landowners additional access across National Forest System lands needed to develop or manage their land. Maintenance of National Forest System roads would occur primarily on cost-share and major forest routes that provide open public access. Secondary gated and closed roads (road management prescriptions A and B) would be maintained as funding allows at a minimal level to prevent environmental damage. The Forest Service and BPA would continue to cooperatively maintain BPA roads that occur on National Forest System lands.

Public access on FS Jurisdiction open roads would remain at approximately 44.8 miles.

Table 3-62 provides a *summary* of Alternative A road miles by road management and jurisdiction for the project area.

Table 3-62 Alternative A Summary of Roads by Road Management & Jurisdiction

Road Jurisdiction	Open	Gated Rx A	Barriered Rx B	LTS Rx C	Decom-missioned Rx D & E	Total	% of Total Miles in Project Area
FS on NFS Land	40.5	14.5	11.9	35.0	11.2	113.1	36
FS on non-NFS Land	4.3	1.5	0	.6	0	6.4	2
Subtotal: FS Jurisdiction	**44.8**	**16.0**	**11.9**	**35.6**	**11.2**	**119.5**	**38**
Other* on NFS Land	8.3	.7	0	0	0	9.0	3
Other* on non-NFS Land	36.5	87.6	40.3	17.6	.3	182.3	59
Subtotal: Other Jurisdiction	**44.8**	**88.3**	**40.3**	**17.6**	**.3**	**191.3**	**62**
Total Miles of Road in Project Area by Rx	**89.6**	**104.3**	**52.2**	**53.2**	**11.5**	**310.8**	**100**

** "Other" roads include state and private.*
NOTE: Differences in total miles for this and each of the following tables is due to rounding.

Effects Common to Alternatives B, C, D, E and F

Direct, Indirect and Cumulative Effects

All the action alternatives provide adjacent landowners access across National Forest System lands that would enable them to develop and manage their lands. All of the 7.6 miles of proposed road construction associated with access requests would occur within existing cost-share areas. Of the 7.6 miles, about 2.0 miles would cross National Forest System lands, of which, 1.6 miles would also serve National Forest System lands and would be cost-shared. The Forest Service would be granting 1.6 miles of cost share easements and 0.4 miles (reconstruction) of non-cost-shared easements.

The Forest Service would also be acquiring approximately 0.7 of a mile of cost-share easements on existing roads in addition to the above activity.

Private land owners and the Idaho Department of Lands have indicated they will construct a total of approximately 5.6 miles of road on their respective lands in addition to the construction associated with the granting of access across National Forest System Lands.

Alternative B

Direct, Indirect and Cumulative Effects

Alternative B would also construct approximately 7.5 miles of new National Forest System road (NFSR) in order to access those lands to be managed and then would be put into long-term storage following that management activity. Another approximately 1.6 miles of temporary road would be constructed and rehabilitated following use. Upon site specific project identification, road

construction to minimum standards and/or reconstruction and restoration to original road standards would occur on approximately 6.1 miles in addition to the approximately 1.8 miles associated with cost-share activities. Overall, public access on FS jurisdiction open roads would be reduced from approximately 44.8 miles within the project area to approximately 42.9 miles available for unrestricted use.

Table 3-63 Alternative B Summary of Roads by Road Management & Jurisdiction

Existing Roads Management Prescription After Implementation							
Road Jurisdiction	**Open**	**Gated Rx A**	**Barriered Rx B**	**LTS Rx C**	**Decom-missioned Rx D & E**	**Total**	**% of Total Miles in Project Area**
FS on NFS Land	38.7	10.5	3.3	46.8	13.7	113.0	33
FS on Non-NFS land	4.2	1.4	0	.7	0	6.3	5
Subtotal: FS Jurisdiction	**42.9**	**11.9**	**3.3**	**47.5**	**13.7**	**119.3**	**38**
Other* on NFS Land	8.3	.7	0	0	0	9.0	3
Other on Non-NFS Land	36.5	87.5	40.3	17.9	.3	182.5	59
Subtotal: Other Jurisdiction	**44.8**	**88.2**	**40.3**	**17.9**	**.3**	**191.5**	**62**
Total Miles of Existing Road in Project Area	**87.7**	**100.1**	**43.6**	**65.4**	**14.0**	**310.8**	**100**
Proposed New Construction and Management Prescription After Implementation on National Forest System Lands							
	Open	**Gated Rx A**	**Barriered Rx B**	**LTS Rx C**	**Decommissioned Rx D & E**		**Total**
NFS System Roads (for proposed timber sale)	0.0	0.0	0.0	7.5	0.0		**7.5**
Cost Share	0.0	1.1	.3	0.2	0.0		**1.6**
Access across NFS Lands not Cost Share	0.0	0.3	0.0	0.1	0.0		**0.4**
Total New Construction	**0.0**	**1.4**	**0.3**	**7.8**	**0.0**		**9.5**

** "Other" includes state and private roads.*
NOTE: Small discrepancies in total miles for this and each of the following tables are due to rounding.

Increased timber traffic from Alternative B, would have the greatest impact to open, single-lane roads available for public use. The possibility of mixed user conflicts would be highest on Road 504, where public use tends to be higher and timber traffic may not be expected. Increased timber traffic on Roads 341, 361, 498, 1451 and 3321 is not as likely to cause user conflicts because the roads historically were used primarily for timber purposes.

For public safety, some roads may have temporary restrictions placed upon them limiting public use or the timing of haul activities. Public traffic that uses Road 504 could be routed over Road 447 during periods of peak logging activity.

Alternative C

Direct, Indirect and Cumulative Effects

Alternative C does not propose any new road construction other than access requests which totals approximately 2.0 miles. Upon site specific investigation, reconstruction and reconditioning of existing roads to original road standards is anticipated to occur on approximately 6.1 miles of road. Public access on FS jurisdiction open roads would decrease from 44.8 miles to 42.9 miles. Table 3-64 displays a summary of the road system by road management and jurisdiction according to ownership.

Table 3-64 Alternatives C Summary of the Roads by Road Management & Jurisdiction

Road Jurisdiction	Open	Gated Rx A	Barriered Rx B	LTS Rx C	Decom-missioned Rx D & E	Total	% of Total Miles in Project Area
FS on NFS Land	38.7	10.5	3.3	46.8	13.7	113.0	36
FS on Non-NFS land	4.2	1.4	0	.7	0	6.3	2
Subtotal: FS Jurisdiction	**42.9**	**11.9**	**3.3**	**47.5**	**13.7**	**119.3**	**38**
Other* on NFS Land	8.3	.7	0	0	0	9.0	3
Other on Non-NFS Land	36.5	87.5	40.3	17.9	.3	182.5	59
Subtotal: Other Jurisdiction	**44.8**	**88.2**	**40.3**	**17.9**	**.3**	**191.5**	**62**
Total Miles of Existing Road in Project Area	**87.7**	**100.1**	**43.6**	**65.4**	**14.0**	**310.8**	**100**
Proposed New Construction and Management Prescription After Implementation on National Forest System Lands							
	Open	**Gated Rx A**	**Barriered Rx B**	**LTS Rx C**	**Decommissioned Rx D & E**		**Total**
NFS System Roads (for proposed timber sale)	0.0	0.0	0.0	0.0	0.0		**0.0**
Cost Share	0.0	1.1	.3	0.2	0.0		**1.6**
Access across NFS Lands not Cost Share	0.0	0.3	0.0	0.1	0.0		**0.4**
Total New Construction	**0.0**	**1.4**	**0.3**	**0.3**	**0.0**		**2.0**

** "Other" includes state and private roads.*
NOTE: Small discrepancies in total miles for this and each of the following tables are due to rounding.

Increased timber traffic from Alternative C would have the greatest impact to open, single-lane roads available for public use.

The possibility of mixed user conflicts is highest on Road 504, where public use tends to be higher and timber traffic may not be expected. Increased timber traffic on Roads 341, 361, 498, 1451 and 3321 is not as likely to cause user conflicts because the roads historically have been used primarily for timber purposes. For public safety, some roads may have temporary use restrictions placed on them limiting public use or the timing of haul operations.

Alternative D

Direct, Indirect and Cumulative Effects

Alternative D would convert 2.8 miles of unclassified road to NFSR. It would also construct 1.6 miles of new NFSR associated with cost share activities. Upon site specific investigation, reconstruction and restoration to original road standards would occur on a minimum of approximately 4.9. Overall, public access on FS jurisdiction open roads would be reduced from approximately 44.8 miles within the project area to approximately 40.7 miles available for unrestricted use. Table 3-65 displays a summary of the road system for Alternative D by road management and jurisdiction according to ownership

Table 3-65 Alternative D Summary of Roads by Road Management and Jurisdiction

Road Jurisdiction	Open	Gated Rx A	Barriered Rx B	LTS Rx C	Decom-mission	Total	% of all Roads in Project Area
FS on NFS Land	36.4	7.2	3.5	39.0	27.0	113.1	36
FS on Non-NFS land	4.3	1.2	0	.7	0	6.2	2
Subtotal: FS Jurisdiction	**40.7**	**8.4**	**3.5**	**39.7**	**27.0**	**119.3**	**38**
Other* on NFS Land	8.2	.7	0	0	0	8.9	3
Other on Non-NFS Land	36.5	87.6	40.3	17.9	.3	182.6	59
Subtotal: Other Jurisdiction	**44.7**	**88.3**	**40.3**	**17.9**	**.3**	**191.5**	**62**
Total Miles of Existing Road in Project Area	**85.4**	**96.7**	**43.8**	**57.6**	**27.3**	**310.8**	**100**
Proposed New Construction and Management Prescription After Implementation on National Forest System Lands							
New Construction	**Open**	**Gated Rx A**	**Barriered Rx B**	**LTS Rx C**	**Decommission Rx D & E**	**Total**	
NFS System Roads (for proposed timber sale)	0.0	0.0	0.0	0.0	0.0	**0.0**	
Cost Share	0.0	1.1	0.3	0.2	0.0	**1.6**	
Access across NFS Lands not Cost Share	0.0	0.3	0.0	0.1	0.0	**0.4**	
Total New Construction	**0.0**	**1.4**	**0.3**	**0.3**	**0.0**	**2.0**	

** "Other" includes state and private roads.*
NOTE: Small discrepancies in total miles for this and each of the tables in this section are due to rounding.

Increased timber traffic from Alternative D would not have much impact to open single lane roads available for public use. The possibility of mixed user conflicts is highest on Road 504, where public use tends to be higher and timber traffic may not be expected. The anticipated timber volume that would use Road 504 is greatly reduced from the proposed action. Increased timber traffic on Roads 341 and 498 is not likely to cause user conflicts because the roads historically have been used primarily for timber purposes. For public safety, some roads may have temporary use restrictions placed upon them limiting public use or the timing of haul activities. Public traffic that uses Road 504 could be routed over Road 447 during periods of peak logging activity or timber traffic could be routed down Road 3557 and the double lane segment of Road 447.

The greatest impact to public use of roads would occur with the elimination of portions of Roads 341 and 498. In the project area, administrative and public traffic would essentially be eliminated on National Forest System lands north and west of SH 3 and south of Roads 504 and 3478.

Alternative E

Direct, Indirect and Cumulative Effects

Alternative E would not construct or reconstruct any new road in addition to the activities common to all action alternatives.

Overall, public access on FS jurisdiction open roads would be reduced from approximately 44.8 miles in the project area to approximately 40.7 miles available for unrestricted use. Table 3-66 displays a summary of the road system for Alternative E by road management and jurisdiction according to ownership.

The greatest impact to public use of roads in the project area would occur with the elimination of portions of the Wood Creek Road 341 and Hidden Cedar Creek Road 498. Administrative traffic and private access for the area currently tributary to Road 498 would be eliminated, leaving approximately 20.4 miles of existing classified road inaccessible. In the project area, administrative and public traffic would essentially be eliminated on National Forest lands north and west of SH 3, west and south of Roads 504 and 3478, south of the East Fork of Emerald Creek and East of the Little East Fork of Emerald Creek.

Table 3-66 Alternative E Summary of Roads by Road Management and Jurisdiction

Road Jurisdiction	Open	Gated Rx A	Barriered Rx B	LTS Rx C	Decom-missioned Rx D & E	Total	% of Total Roads in Project Area
FS on NFS Land	36.4	7.2	3.5	39.0	27.0	113.1	36
FS on Non-NFS land	4.3	1.2	0	1.0	0	6.3	2
Subtotal: FS Jurisdiction	**40.7**	**8.4**	**3.5**	**40.0**	**27.0**	**119.4**	**38**
Other* on NFS Land	8.3	.7	0	0	0	9.0	3
Other on Non-NFS Land	36.5	87.6	40.4	17.6	.3	182.4	59
Subtotal: Other Jurisdiction	**44.7**	**88.3**	**40.4**	**17.6**	**.3**	**191.4**	**62**
Total Miles of Existing Road in Project Area	**85.5**	**96.7**	**43.8**	**57.6**	**27.3**	**310.8**	**100**
Proposed New Construction and Management Prescription After Implementation on National Forest System Lands							
New Construction	**Open**	**Gated**	**Barriered**	**LTS**	**Decommissioned**	**Total**	
NFS System Roads (for proposed timber sale)	0.0	0.0	0.0	0.0	0.0	**0.0**	
Cost Share	0.0	1.1	0.3	0.2	0.0	**1.6**	
Access across NFS Lands not Cost Share	0.0	0.3	0.0	0.1	0.0	**0.4**	
Total New Construction	**0.0**	**1.4**	**0.3**	**0.3**	**0.0**	**2.0**	

** "Other" includes state and private roads.*
NOTE: Small discrepancies in total miles for this and each of the tables in this section are due to rounding.

Alternative F

Direct, Indirect and Cumulative Effects

Alternative F would construct 7.2 miles of new National Forest System road (NFSR). 4.5 miles would be put into long-term storage following use. Another 1.6 miles of temporary road would be constructed and rehabilitated following use.

Alternative F would also, upon project and site specific reconnaissance, provide for road reconstruction and restoration to original road standards those roads or portions of roads that are below current road standards.

Overall, public access on FS jurisdiction open roads would be reduced from approximately 44.8 miles to approximately 41.7 miles available for unrestricted use.

Table 3-67 Alternative F Summary of Roads by Road Management & Jurisdiction

Road Jurisdiction	Open	Gated Rx A	Barriered Rx B	LTS Rx C	Decom-missioned Rx D & E	Total	% of Total Miles in Project Area
FS on NFS Land	36.4	7.7	3.1	38.8	26.9	112.9	36
FS on Non-NFS land	4.2	1.2	0	.9	.2	6.5	2
Subtotal: FS Jurisdiction	**40.6**	**8.9**	**3.1**	**39.7**	**27.1**	**119.4**	**38**
Other* on NFS Land	8.3	.7	0	0	0	9.0	3
Other on Non-NFS Land	36.5	87.6	40.4	17.6	.3	182.4	59
Subtotal: Other Jurisdiction	**44.8**	**88.3**	**40.4**	**17.6**	**.3**	**191.4**	**62**
Total Miles of Existing Road in Project Area	**85.4**	**97.2**	**43.5**	**57.3**	**27.4**	**310.8**	**100**
Proposed New Construction and Management Prescription After Implementation on National Forest System Lands							
New Construction	**Open**	**Gated Rx A**	**Barriered Rx B**	**LTS Rx C**	**Decom-missioned Rx D & E**	**Total**	
NFS System Roads (for proposed timber sale)	0.0	0.0	0.0	4.6	0.0	**4.6**	
Cost Share	0.0	1.1	0.3	0.2	0.0	**1.6**	
Access across NFS Lands not Cost Share	0.0	0.3	0.0	0.1	0.0	**0.4**	
Total New Construction	**0.0**	**1.4**	**0.4**	**4.9**	**0.0**	**6.6**	

** "Other" includes state and private roads*
NOTE: Small discrepancies in total miles for this and each of the following tables is due to rounding.

Increased timber traffic from Alternative F, would have the greatest impact to open single-lane roads available for public use. The possibility of mixed user conflicts is highest on Road 504, where public use tends to be higher and timber traffic may not be expected. Increased timber traffic on Roads 341, 361, 498, 1451 and 3321 is not as likely to cause user conflicts because the roads historically have been used primarily for timber purposes.

For public safety, some roads may have temporary use restrictions placed upon them limiting public use or the timing of haul activities. Public traffic that uses Road 504 could be routed over Road 447 during periods of peak logging activity.

Consistency with Forest Plan and Other Regulation

Alternative A

Alternative A does not meet Forest Plan Objectives for Transportation Facilities because it does not provide for needed access of other landowners within the analysis area.

All Action Alternatives

All action alternatives meet Forest Plan objectives by cooperatively providing for access for other land owners within the project area. The conditions for construction and reconstruction of such roads are described in Section 33CFR323.4. All construction and reconstruction will be designed and constructed in accordance with the Forest Plan objectives and other laws and directives such as the Clean Water Act, Forest Roads and Trails Act (FRTA), Alaska National Interest Lands Conservation Act (ANILCA), Idaho State BMPs, Forest Service Manual and Forest Service Handbook direction.

All construction and reconstruction of roads plans, standards and specifications provide for minimum needed road width, drainage and safe operation while incorporating measures for mitigating for resource disturbances.

Provisions for and execution of maintenance on existing roads and newly constructed roads within Forest Service jurisdiction and on NFS lands are designed to minimize resource disturbance, as required by the Forest Plan.

Water

Changes Between the Draft SEIS and the Final SEIS

Discharge records (annual peak flows) from the USGS gauging station for the St. Maries River at Santa were analyzed for peak flow trends.

Changes Between the 2002 FEIS and this SEIS

The major change from the previous analysis is that there is now an approved total maximum daily load (TMDL) for the West Fork of the St. Maries River and the Lower St. Maries River (below Clarkia) for temperature and sediment. The 2002 303(d) (approved in 2005) list of impaired waterbodies does not include habitat alteration and nutrients as pollutants for the St. Maries River, and the St. Maries River below Santa is no longer listed (SSW-3). Sediment estimates were determined using coefficients and equations from the Idaho Department of Environmental Quality (DEQ) TMDL model (SSW-1, 24, 53, 54, 58). Approximately one-third of the road decommissioning and storage approved in the original Hidden Cedar Record of Decision (ROD) was completed. These road treatments repaired road failure hazard sites and removed and rehabilitated 22 stream crossings. In 2004 approximately 15 acres of riparian planting along Hidden Creek was completed and large woody debris was placed in the West Fork of the St. Maries River, as approved in the 2002 Hidden Cedar ROD.

Introduction

The Hidden Cedar Project Area consists of the West Fork St. Maries River and a portion of the main stem of the St. Maries River. It includes tributaries to these reaches of the river (Map M-17). The West Fork drainage includes about 36.5 square miles, is 10 miles long, and flows east and then north from headwater elevations up to 5,200 feet. The confluence of the Middle and West Forks of the St. Maries River occur at an elevation of about 2,700 feet near the town of Clarkia. There is an additional 15.4 square miles downstream of this confluence within the Hidden Cedar Area and is identified in this report as the Lower St. Maries River. The Middle Fork of the St. Maries River lies outside the analysis area. The Hidden Cedar Project Area receives about 40 inches of precipitation annually. Approximately 80% of the area is within the 3,000-4,500 foot contour interval “rain-on-snow” zone (USDA FS, 1997).

Valleys are broad in the lower reaches of the main tributaries and the St. Maries River and the meadows are used for grazing and hay production. Upper reaches have narrow valleys and moderately-steep to steep side slopes. Ridge tops are generally broad and rounded. Slopes are highly dissected and for the most part heavily vegetated with conifers, shrubs, forbs and grasses.

Regulatory Framework

Forest Plan

The Idaho Panhandle National Forests' Forest Plan (USDA FS, 1987) defines the following management goals for the water resources on NFS lands:

1. Maintain water quality protective of fisheries habitat, water-based recreation, public water supplies, and to meet or exceed State Water Quality Standards: To help accomplish this objective, BMPs must be applied to management activities. Monitoring efforts must focus on the implementation of BMPs and their effectiveness in protecting water quality. Water quality that is below Forest standards must be improved through restoration projects and through scheduling of timber harvest and road building activities.
2. Protect stream channel integrity: Manage riparian areas to meet objectives for dependent resources (fish and wildlife habitat, water quality, stream channel integrity, and vegetation) while producing other resource outputs.

Forest-wide standards direct the following on NFS lands with respect to the water resource:

1. Management activities on Forest lands would not significantly impair the long-term productivity of the water resource and would ensure that state water quality standards are met or exceeded.
2. Maintain concentrations of total sediment or chemical constituents within State standards.
3. Implement project-level standards and guidelines for water quality contained in the Best Management Practices (Forest Service Handbook 2509.22, available upon request), including those defined by State regulation or agreement between the State and Forest Service such as:

    a. Idaho Forest Practices Rules (IDAPA 20.02.01)

    b. Stream Channel Alterations Rules (IDAPA 37.03.07)

    c. Best Management Practices (Applicable BMPs & Soil and Water Conservation Practices, SSW-2)
4. Cooperate with the states to determine necessary instream flows for various uses. Instream flows should be maintained by acquiring water rights or reservations.
5. Manage public water system plans for multiple use by balancing present and future resources with public water supply needs. Project plans for activities in public water systems would be reviewed by the water users and the State. Streams not defined as public water systems, but used by individuals for such purposes would be managed to the standards stated below or to the fisheries standards whichever is applicable.
6. Activities within non-fishery drainages, including first and second order streams, will be planned and executed to maintain existing biota. Maintenance of existing biota will be defined as maintaining the physical integrity of these streams. Best Management Practices (Forest Service Handbook 2509.22, SSW-2), Forest Plan Appendix O, and riparian guidelines will be used to accomplish this objective.
7. It is the intent of the Forest Plan that models be used as a tool to approximate the effects of National Forest activities on water quality values. The models will be used in conjunction with field data, monitoring results, continuing research, and professional judgment, to further refine estimated effects and to make recommendations.

Standards for managing riparian areas were established as Forest Plan amendments based on the Inland Native Fish Strategy (1995), commonly referred to as INFS. Riparian Habitat Conservation Areas are determined for watersheds and essentially promote water quality benefits through stream

shading, vegetative buffers for sediment control, and channel stabilizing features of woody debris and stream bank vegetation.

Clean Water Act

A declared objective of the Clean Water Act (CWA) of 1977 (33 U.S.C. 1323) is to "...restore and maintain the chemical, physical, and biological integrity..." of streams (US Congress, 1988). The CWA directs the Forest Service to meet state substantive and procedural requirements respecting control and abatement of pollution. Through a Memorandum of Understanding Implementing the Non-point Source Quality Program in the State of Idaho of 1993 (IDWR, 1993) the Forest Service is responsible for implementing nonpoint source pollution control and the Idaho Water Quality Standards (IDAPA 58.01.02) on National Forest System lands. Forest Service water quality policy within the MOU is to: promote the improvement, protection, restoration and maintenance of water quality to support beneficial uses, promote and apply approved Best Management Practices (BMPs) to control non-point source pollution, comply with state and national water quality goals, and design monitoring programs for specific activities and practices that might affect in-stream beneficial uses.

Idaho State Water Quality Laws & Regulations

The State of Idaho established the Idaho Water Quality Law (§39-3601 et. seq.) and Water Quality Standards (IDAPA, 58.01.02) designed to protect beneficial uses. The State's Antidegradation Policy (IDAPA 58.01.02.051) directs that existing uses and the level of water quality necessary to protect those uses must be maintained and protected. In order to meet the intent of the CWA, the Forest Service is responsible for implementing non-point source pollution control and the Idaho Water Quality Standards on National Forest System lands (IDWR, 1993).

Designated beneficial uses for the St. Maries River below the confluence of the West and Middle Forks to Carpenter Creek are Cold Water Aquatic Life, Primary Contact Recreation, Domestic Water Supply and Special Resource Water designations and below Carpenter Creek Cold Water Aquatic Life and Primary Contact Recreation (IDAPA 58.01.02.110.11; IDHW, 1988). Tributaries (including West Fork St. Maries River) are Undesignated Surface Waters (IDAPA 58.01.02.101.01); existing beneficial uses are aquatic life (cold water biota), and primary or secondary contact recreation (IDAPA 58.01.02.101.01.a).

Water Quality Limited Segments

The West Fork St. Maries River and the main stem St. Maries River below Clarkia are listed on Idaho's 2002 303(d) list of Water Quality Limited Water Bodies (SSW-3). The pollutants of concern are temperature and sediment for the West Fork and the St. Maries River from the confluence of the Middle and West Forks to Carpenter Creek.

Total Maximum Daily Loads (TMDLs)

TMDLs were developed for the West Fork St. Maries River (West Fork) and the Lower St. Maries River for temperature and sediment in 2003 (SSW-4). The West Fork sediment TMDL calls for reducing sediment by 180 tons/year from National Forest System (NFS) lands and 168 tons/year from non-National Forest lands. For the St. Maries River stream reach from Clarkia to the mouth of Emerald Creek the TMDL calls for reducing sediment by 481 tons/year from NFS lands and 1,032

tons/year from non-National Forest lands. The temperature TMDL calls for increasing shade canopy over the stream channels by 60-85% in the Lower St. Maries and 43-90% in the West Fork. These TMDLs apply to the Hidden Cedar Project Area.

Executive Order 11988

Executive Order 11988 (SSW-5) directs agencies to provide leadership and take action to reduce the risk of flood loss; to minimize the impact of floods on human safety, health and welfare; and to restore and preserve the natural and beneficial values served by floodplains in carrying out their responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

Executive Order 11990

The Wetlands Protection Order (SSW-6) directs agencies to provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agencies' responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

Analysis Methods

The water resource is assessed using the proper functioning of basin hydrology (vegetation and soils conditions), sediment, water yield, stream channels, and water quality and beneficial uses (pollutant sediment levels, stream temperature). Models are used for estimating effects and to guide and support professional judgment. Water yield and peak flow are interchangeable in the analysis that follows. Water yield is estimated through three methodologies: WATSED, Kappesser (1991) and Packer (1971). Embry (1981) developed equations for estimating peak flows in northern Idaho, and these were used to estimate increased peak flow discharge in the Kappesser and Packer methodology. Additionally, peak flow analysis was done for the St. Maries River discharge values from the USGS gauging station at Santa, Idaho (SSW-11). Stream channel conditions and responses are based on classifications developed by Rosgen (1996) and Montgomery and Buffington (1998); and through comparison and analysis of historical and recent aerial photographs. Sediment from the proposed activities was estimated based on coefficients and equations developed by the Idaho Department of Environmental Quality (DEQ) for the St. Maries River Subbasin Assessment and TMDL (2003) (SSW-1, 18). The amount of potential sediment in road fills was estimated (SSW-34, 56, 57), but the risk of crossing failure was not evaluated.

Assumptions and Limitations of Analysis Methods

Sediment

Sediment reduction and addition values were calculated based on coefficients and equations from the Idaho Department of Environmental Quality (DEQ) Sub-basin Assessment and Total Maximum Daily Load (TMDL) spreadsheet model (TMDL model) (SSW-18). One form of sediment counted by the TMDL model is generated by roaded areas within 200-feet on either side of stream crossings. In addition the DEQ TMDL model attributed sediment to 'encroaching' roads – those roads within 50 feet of a stream channel – which the DEQ modeled as causing within-channel erosion. Timber stands that are non-stocked (per Idaho Forest Practices Act) were also considered sediment sources. Sediment modeling includes reductions from road recontouring and long-term storage, but not road graveling. It also includes sediment additions from road construction and short-term additions from stream crossing restoration, non-stocked stands, and temporary roads. Short-term was assumed to be ten years because these activities are expected to be completed in eight years or less, and their effects may linger for two years. Values used for sediment calculations were derived using ARCVIEW queries, intersection of ARCVIEW coverages (example: road and 50-foot-buffered stream intersect) and visual identification of stream crossings in ARCVIEW map display of roads and stream coverage (SSW-1, 24, 53, 54, 58).

The Idaho DEQ TMDL (2003, p.143-152) identified that sediment modeling provides "…relative, rather than exact, sediment yields." And that "[s]everal conservative assumptions were made in the model construction, which cause it to develop conservatively high estimations of sedimentation of the streams modeled." Using the TMDL model for estimating sediment reductions from restoration activities has these same limitations as identified by DEQ. The DEQ Sediment Model over-estimates sediment production by at least 20% (SSW-4, p. 149)

No fill failure values were included in the DEQ TMDL model for the portion of the St. Maries River within the project area. Every stream crossing has the potential for failure given the right circumstances – the culvert may become plugged or the design flow exceeded. The amount of potential sediment in road fills was estimated (SSW-56, 57), but it was not used to estimate changes in sediment production. The risk of crossing failure was not evaluated. Fill sizes were estimated (1500-7500 cubic feet of fill) and potential sedimentation from various fill failure amounts (25%-100%) was averaged (SSW-34) for both crossings proposed to be removed and those that would remain. The DEQ spreadsheet model (SSW-4, SW-14) includes a mass failure component, but very few sub-watersheds were identified as contributing sediment from mass failures (SSW-4).

A comparison of the GIS road coverage used by Idaho DEQ in their TMDL model and the current (updated) Forest Service road coverage shows that the DEQ model included sediment from roads that were recontoured or had stream crossings removed (SSW-26). There were also existing stream crossings and encroaching roads in the Forest Service GIS road coverage that were not part of the road coverage used by DEQ. The sediment estimate presented in this SEIS includes sediment reductions from roads that were previously recontoured or stored and sediment increases from roads that were not accounted for.

Sediment reductions achieved under the 2002 Hidden Cedar Record of Decision were included in the sediment budget values for all alternatives because these sediment-reducing activities are part of the Hidden Cedar Project and were accomplished after the 2002 Hidden Cedar ROD was signed and

before the supplemental analysis began. The values are 17 tons/year reduction for the West Fork St. Maries River and 2.5 tons/year reduction for the Lower St. Maries River.

Sediment generated during stream crossing removal and restoration is identified as a short-term sediment addition (SSW-56, 57). It is recognized that sediment would be generated when a stream crossing is removed, but this would be a short-term, small sediment addition compared to the continual sediment additions from road encroachment and road surface delivery if the road and crossing were left in place. It is estimated that there would be some sediment generated for one to two years from these restorations; but the chronic sources of sediment would essentially be eliminated, and sediment would not be generated into perpetuity from these sites.

All proposed road construction on National Forest System land (except access construction) are proposed to be recontoured or placed into long-term storage. The sediment generated by these new roads, as accounted for in the TMDL model, would no longer exist once stream crossings are removed and 200 feet on either side of the crossing are recontoured. In this analysis the sediment is left as a long-term addition because there is no set timeline for when the activity will occur. When crossings are removed the newly constructed roads would actually not continue to contribute sediment, so this analysis over-estimates the long-term sediment additions.

No increases in sediment to the stream system is expected from road reconstruction and road maintenance because the TMDL model always counts a road the same way: it estimates road sediment from 200 feet on either side of a stream crossing and from encroaching roads – those within 50 feet of a stream. The TMDL model sediment estimates do not change because of maintenance or reconstruction.

Water Yield

For this analysis water yield is synonymous with peak flows. USGS gauged data from the St. Maries River annual-series of peak flows was plotted, for the period of record (1966-2005) and values extrapolated from St. Joe discharge data (1911-1912, 1921-1965), based on discharge per unit area. This extrapolation was done because: 1) the largest flood for the St. Joe River occurred in 1933; 2) of the top 20 peak flows on the St. Joe River, 9 were prior to 1966 and 11 since 1966; 3) three out of the top five discharges occurred prior to gauge establishment on the St. Maries River; and 4) these large peak flow events are likely to have occurred on the St. Maries River. The longer timeframe for discharge measurements should more accurately reflect trends in peak flow values compared to a shorter timeframe. It is expected that gauged data would reflect peak flow increases from management activities conducted in the basin above the stream gauge location.

Rain-on-snow and snowmelt related to harvest activities are estimated using Kappesser and Packer methodologies, respectively. Neither of these methods is field verified for the Hidden Cedar Project Area. The estimated values derived from these two procedures are compared to WATSED estimated water yield, but there is no timing element for either the Packer or Kappesser methods. Whereas WATSED recognizes a recovery period there is no identified recovery in the other models.

WATSED

WATSED is designed to objectively compare relative differences among forest management alternatives in terms of changes in trend, risks, and regimen of water and sediment yield. Estimates are calibrated using measured data that include a combination of primary watershed processes. The

model is driven by local climatic conditions and it uses Equivalent Clearcut Area (ECA) notation to represent the apparent degree of landscape disturbance through time. Recovery curves for various road designs and configurations (clearing width, cutslope area, width, and length), logging systems and harvest methods (tractor, cable, aerial), wildfire, and site preparation (mechanical, prescribed fire, or hand) are used to characterize the watershed disturbances that result in cumulative effects. WATSED is not intended to simulate watershed response for individual or episodic storm, mass erosion events or extreme drought or flood years. It is not intended to accurately predict sediment and water yields that might occur as a result of stochastic events or non-forest related actions. It does not address or analyze the effects of grazing or mining (other than vegetation removal and road construction) or other non-silviculture related practices (SSW-27).

Historic and Current Aerial Photographic Comparison

The comparison of stream channels used 1933 aerial photographs and compared these to 2002 aerial photographs. Where substantial changes were noted (3 locations) additional photographs (1958, 1965, 1969 and 1975) were used to determine the approximate date these occurred (SSW-9). Channel depth cannot be determined from aerial photographs.

Cumulative Effects

There is uncertainty in future activities on non-Federal land and effects from those activities. Limited information was disclosed by non-Federal land owners/managers and was included in the cumulative effects analysis. Without full disclosure of spatial and temporal data associated with planned future private and state activities, quantification of future cumulative effects is not possible.

Scientific Uncertainty and Controversy

There is some uncertainty and controversy in estimating effects to stream channels and separating the degree of anthropogenic effects from non-human effects. Human activities can influence the morphology of streams, but the effects may not be different from natural conditions or disturbances – magnitudes of certain variables in the geomorphic system may increase [from human activities] resulting in accelerated or decelerated responses in fundamental geomorphic processes. The appropriate [geomorphic] principles are not abrogated (Leopold et al., 1964 p. 434). Natural changes and their consequences are similar to changes induced by man's activities (Schumm et al., 1984, p. 161, Schumm, 1977, pp. 133-137). Stream channels evolve: an alluvial river is continually changing its shape, dimension and pattern and "it is the rule rather than the exception that banks will erode, sediment will be deposited and floodplains, islands, chutes and side channels will undergo modification with time" (Schumm, 1977, p. 131). Comparisons of historical 1933 and recent aerial photographs were used to determine that channel conditions over time have not changed substantially, but channel depth cannot be determined from these photos. The photo analysis did not show large areas of deposition as would be expected if substantial entrenchment were occurring. There is a small degree of uncertainty in the determination that channel conditions have not substantially changed over time without comparing channel depth over time, and that data is not available.

"One characteristic that is common to both streams and research is that what initially appears complex is even more so upon further investigation (National Council of the Paper Industry for Air and Stream Improvement (NCASI), 1999)." "Cumulative watershed effects are particularly difficult

to predict and identify because the individual water and sediment inputs are delivered to the stream system at different points in time and space and these interact with the water and sediment already in the stream (NCASI, 1999)." "The often nebulous relation between management activities and stream response has even resulted in CWEs [cumulative watershed effects] being called the UFOs of hydrology (Rice and Thomas, 1986)."

TMDL Sediment Reduction

The values for sediment reduction assigned in the TMDL are based on land ownership (SSW-4). The majority of estimated sediment is from roads (SSW-4), and a more accurate reflection of needed sediment reductions should be based on road mileage by ownership, which would likely lessen the amount of sediment reduction assigned to the US Forest Service. This issue needs to be addressed in the future TMDL Implementation Plan. It is uncertain what this proposed change would do for the TMDL assigned reduction values. There is no sediment monitoring data for the St. Maries River to indicate current vs. natural loading and transport rates.

Water Yield

There is some degree of uncertainty and controversy in attempting to quantify changes in water yield-peak discharge related to forest harvest activities.

In northwestern Montana and Northeastern Idaho, rain-on-spring-snowmelt was the most common cause of annual maximum daily flows, although relatively infrequent mid-winter rain-on-snow events caused the largest flows on record (MacDonald and Hoffman, 1995, p. 90). In their study of causes of peak flows in NW Montana and NE Idaho, MacDonald and Hoffman (1995, p. 94) state: "For the six study basins there was no apparent correlation between the magnitude of peak flows and the amount of forest harvest", and they also state (p. 94) that "Forest harvest would be expected to cause differential increases in the magnitude of observed peak flows, but climatic differences are the dominant control on the size of peak flows within the study area."

Kattelmann and Ice (2004, p.194) cite various authors and disparate conclusions, from analysis of the same data, related to timber harvest and peakflows within the transient snow zone. They further state (p. 192): "The role of logging in the rain-on-snow or transient snow zone is controversial" and invite readers (p. 194) "…who wish to delve deeper into the debate about forest management and changes in peak flow" to "review the articles and the numerous "comments" that were published in the exchanges between the authors".

Stednick and Troendle (2004, pp. 169-186) document water yield and peakflow increases from timber harvesting practices in the central Rocky Mountains. They state (p. 176) in a discussion of peak flows on Fool Creek: "Timber harvesting can increase the size of the peak flow, but that change is less evident for recurrence intervals greater than two years." (A two-year recurrence interval peak flow has a 98% chance of occurring in any year.)

Three methods were used to estimate changes in water yield related to the proposed activities. WATSED compares management activities effect on the peak flow month discharge, the Packer method estimates increased snowmelt from vegetation reduction, and the Kappesser method estimates a risk factor for rain-on-snow increases to peak flows. The estimated values are displayed in Tables 3-70 and 3-72. Documentation is found in project file documents, SW-18, 19, 20, 25, 26, 31, 40 & 47 for these methods and results. The estimated values from these three methods were combined for an average percent water yield increase for the St. Maries River and tributaries with

proposed activities. There may be some controversy in averaging these methods, but since they are all estimates and their range of values are not highly disparate, combining and averaging them may give the most reasonable estimate from modeling.

Additionally, analysis was conducted on peak flow data from USGS gauging stations on the St. Maries River and the St. Joe River. Statistical analysis showed "no trend" in peak flow data for the St. Maries River (SSW-28). Also, peak flow data was extrapolated from the St. Joe River data based on the area/discharge relationship, to apply to the St. Maries River for years prior to establishment of the gauging station. Trend lines for the St. Joe and the St. Maries River (with extrapolated data) actually display decreasing peak flows (SSW-29, 32). There is some degree of uncertainty in trying to predict water yield changes from management activities given the contradictory nature of modeled estimates and gauge station peak flow data analysis. Harvest levels on NFS, state, and Potlatch lands have been increasing over time in the Hidden Cedar Project Area (SSW-13). This is expected to be the case on additional non-FS land that drains to the gauging station in Santa, Idaho. Increasing levels of timber harvest have not led to a statistical trend in peakflow increases at this downstream gauging station (SSW-28).

Impact Levels

Controversy will always exist as to what level of management (impacts) is acceptable, what constitutes a "viable" aquatic population, and the prediction of management impacts on the viability of aquatic species.

Design Feature Effectiveness

Design features are expected to be effective or they would not be included for use in project implementation. Actual effectiveness of individual design features may vary over temporal and spatial scales. The applications may vary as enforced by contracting officers; contractors may proceed with activities that have environmental consequences before apprehension, suspension and corrections from a contracting officer; and some "on-the-ground' adjustment may be required to redesign or make the design feature more effective.

Lake Coeur d'Alene - Base Level for St. Maries River

It is not known if streams draining into Lake Coeur d'Alene have adjusted to lake base level changes caused by the dam at Post Falls or to what degree this changed base level has affected sediment transport within the main channels or headwater reaches of the basin.

Analysis Area

The Hidden Cedar Area is composed of the West Fork of the St. Maries River, its named tributaries, the Lower St. Maries River below Clarkia to the confluence with Emerald Creek and some unnamed "face" drainages of the main St. Maries River. Direct, indirect and cumulative effects of the proposed activities are evaluated on the St. Maries River watershed and its tributaries within the Hidden Cedar Project Area as defined on the Watershed Analysis Area Map (M-17). The Middle Fork of the St. Maries is not within the analysis area and is only discussed to augment the cumulative effects analysis. The Middle Fork has minimal federal land. Private and state ownership and timber companies have the largest roles in managing this area. Table 3-68 identifies named drainages in the Hidden Cedar Project Area, their seventh-level Hydrologic Unit Code (HUC-7) and their size in acres from ARCINFO Geographic Information Systems (GIS). Throughout the Water Section, acres were

calculated by ARCINFO GIS, and these are rounded off which may cause slight discrepancies between resource analysis numbers.

Table 3-68 Watersheds in the Hidden Cedar Project Area

Watershed	HUC-7	Size (acres)
Blair Creek	17010304504600	1,849
Staples Creek	17010304504300	360
Cedar Creek	17010304506600	2,126
Bechtel Creek	17010304505011	1,328
Maize Creek	17010304505010	1,407
Wood Creek	17010304505009	777
Hidden Creek	17010304505008	1,677
West Fork St. Maries River	17010304505000	5,245
Keeler Creek	17010304505006	2,665
Long Slim Creek	17010304505005	2,474
Cat Spur Creek (including Kitten Creek)	17010304505003	7,675
Lower St. Maries River	17010304504100	5,373

AFFECTED ENVIRONMENT

There are many functions in the hydrologic system; the following are discussed in this report: vegetative and soil conditions, sediment, water yield, stream channels, water quality and beneficial uses.

Proper Functioning of Basin Hydrology

Vegetative and Soil Conditions

One purpose of vegetative treatments is to move composition and structure toward more natural conditions. Natural vegetative conditions would equate to natural hydrologic conditions. However, hydrologic effects from roads or channel modifications do not represent natural conditions and may preclude some benefits of vegetative treatments. Roads which currently affect hydrologic function would continue to do so; yet unused roads would become overgrown and roots would break up the soil, at least partially restoring hydrologic function over the long term

Past vegetative treatments, fire, and past and future fire suppression have all affected basin hydrology through change of the hydrologic cycle. Change in canopy cover or density affects transpiration, interception, snow accumulation, evaporation from the ground surface (wind velocity and radiation balance changes), sublimation, and organic material accumulation. Changes in water yield and peak flows may also result from change in the vegetative structure. Basin hydrology responds to these changes by adjusting components of the hydrologic cycle.

It is estimated that previous harvest, grazing, roads, and minerals exploration on National Forest System land may have detrimentally impacted approximately 12% or 1,861 acres of the area (see Soils section).

Considering geologic timeframes, a watershed has experienced all vegetative conditions ranging from complete fire holocaust that created hydrophobic soil conditions and extreme runoff events to overstocked dense stands of timber that utilized most soil moisture and intercepted much precipitation (especially snow) and reduced water yields to minimal levels.

Human activities can influence the morphology of streams, but the effects are not different from natural conditions or disturbances – magnitudes of certain variables in the geomorphic system may increase [from human activities] resulting in accelerated or decelerated responses in fundamental geomorphic processes. The appropriate [geomorphic] principles are not abrogated (Leopold et al., 1964 p. 434). Natural changes and their consequences are similar to changes induced by man's activities (Schumm et al., 1984). Stream channels evolve: an alluvial river is continually changing its shape, dimension and pattern and "it is the rule rather than the exception that banks will erode, sediment will be deposited and floodplains, islands, chutes and side channels will undergo modification with time" (Schumm, 1977, p. 131).

Sediment

Dams for development of hydroelectric power at the mouth of Lake Coeur d'Alene were constructed in the late 1890s to early 1900s. It is estimated that the dams raised the lake level a minimum of eight-feet or as much as 14-feet since constructed or during upgrades after initial construction (SSW-55).

The change in base level affects the movement of sediment because of a flattening of gradient caused by the raised elevation of the mouth of the river. Aggradation (or deposition) will occur for some distance upstream (Leopold and others, 1964, p. 258-261; Schumm, 1977, p. 164-165).

It is not known if streams draining into Lake Coeur d'Alene have adjusted to this changed base level over the past century; or to what degree this changed base level has affected sediment transport within the main channels or headwater reaches of the basin. Theoretically, aggradation is expected from the damming of a stream (Leopold and others, 1964, p. 258-261; Schumm, 1977, p. 164-165), and this occurred over a distance of as much as 5000-feet above one dam (Leopold and others, 1964, p. 265); but this may or may not be not be consequentially affecting upstream channels or tributaries; sometimes deposition only affects limited reaches upstream (Leopold and others, 1964, p. 261).

Sediment increases from natural or anthropogenic influences to the St. Maries River system may be evident in the river to the slack water portion backed-up by Lake Coeur d'Alene. Once the stream reaches the slack water section, sediment drops out due to decreased stream velocity. In general, water yield increases (if they are substantial increases to peak flows) may cause changes in channel geometry to about this same location

The sediment TMDL, which indicated a larger than 'natural' sediment level, should be considered the cumulative effect of the changed base level for streams in the project area.

Water Yield

Peak flows are estimated using Embry's (1981) procedure (Table 3-69). However, Embry's (1981) procedure does not account for management activities. Increases in water yield are estimated using the WATSED model and procedures developed by Kappesser (1991) and Flood using Packer's (1971) research in North Idaho (project file (PF): SW-26). WATSED estimated current conditions based on activities, including private activities within the drainages modeled.

Table 3-69 lists estimated peak flow for the two- and fifty-year recurrence intervals in cubic feet per second (cfs) for selected drainages in the Hidden Cedar area. These are the drainages with proposed activities.

The WATSED model estimates water yield increases over "natural" conditions for the existing condition. Road and harvest activities on all lands within the identified drainages, including private and state were used to estimate watershed response using WATSED. Table 3-70 identifies WATSED values by drainage.

In the Cat Spur watershed the WATSED model can be compared to actual measured discharge from the years 1987-1997. The model had a range of values that over-predicted water yield by as much as 2.16 times in 1994 to under-prediction 0.75 times the measured value. Over this period, the average increase in peak month discharge that was measured is equal to the modeled value. (USDA FS, 2000).

Analysis of yearly peak flow values from US Geological Survey (USGS) gauging station on the St. Maries River at Santa, Idaho, indicates that there is no significant trend in peak flow values (SSW-28) for the period of record, 1966-2005.

Table 3-69 Embry Estimated Flood Frequency

Watershed	Annual Precipitation	2 Year Peak flow	50 Year Peak flow
Wood Creek	42 inches	22 cfs	57 cfs
Hidden Creek	42 inches	45 cfs	112 cfs
W. Fk. St. Maries R.	44 inches	129 cfs	324 cfs
Maize Creek	41 inches	37 cfs	94 cfs
Lower St. Maries R.	40 inches	121 cfs	304 cfs
Long Slim Creek	42 inches	63 cfs	159 cfs
Log Creek	42 inches	56 cfs	141 cfs
Kitten Creek	42 inches	41 cfs	102 cfs
Keeler Creek	43 inches	69 cfs	174 cfs
Cat Spur Creek	42 inches	97 cfs	244 cfs
Cedar Creek	40 inches	53 cfs	138 cfs
Blair Creek	40 inches	47 cfs	117 cfs
Bechtel Creek	40 inches	35 cfs	87 cfs

Table 3-70 WATSED - Water Yield on Existing Condition

Watershed	Percent increase over "natural"
Wood Creek	12%
Hidden Creek	8%
W. Fork St. Maries River	5%
Maize Creek	9%
Lower St. Maries River	10%
Long Slim Creek	3%
Log Creek	5%
Kitten Creek	5%
Keeler Creek	9%
Cat Spur Creek	3%
Cedar Creek	5%
Blair Creek	15%
Bechtel Creek	6%

Stream Channels

Stream channel conditions and effects are assessed for the individual tributaries and cumulative stream channel effects are assessed downstream through the West Fork St. Maries River and the Lower St. Maries River.

Stream channel integrity is assumed to mean a channel system in which water and sediment yields are balanced such that the channels maintain a form reflective of what might be naturally expected (Leopold et al., 1964). Fundamental to this discussion are channel types, response potential, and cause-effect evaluation. Sediment and water yield predictions are evaluated against channel response potential and cause-effect linkages to indicate a potential for compromising stream channel integrity. The channel types referred to here are from Montgomery and Buffington (1997) and Rosgen (1994).

Using the Rosgen (1994) classification system, the channel of the West Fork St. Maries River is a low sinuosity moderate gradient "B" channel in upper reaches and in the lower elevations are incised low gradient "F" and meandering low gradient "C" channels (SW-2). The Lower St. Maries below Clarkia to the confluence with Emerald Creek is a meandering low gradient "C" channel and incised low gradient "F" channel. In the Montgomery and Buffington (1997) classification, upper reaches classify as colluvial, cascade, step-pool to forced pool riffle; and in lower reaches as pool riffle. Tributaries of the St. Maries River (and West Fork) like Hidden, Maize and Wood Creeks have Rosgen sinuous low gradient "E" channels in the lower reaches, transitional "C" channels and "B" channels in the upper reaches and in the Montgomery-Buffington system, pool riffle and forced pool riffle in lower reaches and cascade, step pool and forced pool riffle in upper reaches. Both Bechtel and Maize Creek have short reaches of Rosgen "D" channels – multiple channels associated with past beaver pond deposition. Cedar Creek field notes (SW-5) indicate wetland meadows and discontinuous channels with some areas of pool-riffle and a dry Rosgen "E" channel near the mouth.

Personal observation (SWS-8) of the valley bottom at the boundary between federal and private land found no existing stream channel.

Alluvium ranges from fine sands and silts to gravels and cobbles. This material has been transported and resorted at high discharges, although flows at or near the average annual peak (QF2P at bankfull or less) do not appear to cause significant mobilization and redistribution.

Existing conditions are evaluated in terms of water and sediment yield characteristics and their relationship to current and potential natural channel form. Cascade and step-pool reaches are considered transport segments that are morphologically resilient because they can rapidly convey increased sediment and discharge; pool-riffle reaches are response segments whose channels may incur morphological adjustment in response to increases in discharge or sediment (Montgomery and Buffington, 1997) The lower reaches of the West Fork and main stem of the St. Maries River are adjusting to riparian and watershed vegetative changes from past activities, such as fire, harvest, railroad construction, homesteading, etc. These activities can limit the amounts of large organic material and deep-rooted shrub component that normally stabilize stream channels. The tributaries of the West Fork appear to be transporting their sediment and discharge without excess alterations to stream channels. Some gradual lateral channel migration is occurring in the lower reaches of the West Fork and St. Maries River, but this is expected in Rosgen "F" & "C" channel types. The rate of adjustments in these stream types is dependent on vegetation type/quantity and soil/alluvium types. The gradual lateral migration of the St. Maries River is within natural river evolution and there does not appear to be consequential levels of deposition or degradation (entrenchment) (SSW-9).

Seventeen road hazard sites were identified in the project area (SW-3, SSW-70). Most of these are surface erosion (9), small slumps or fill settling (5), or inadequate crossings (3) (SW-3, SSW-70). No effect on basin hydrology is anticipated from the existence or repair of these sites because they are not affecting components of the hydrologic cycle.

An analysis of aerial photographs of the St. Maries River from 1933 and 2002 shows very little change in channel conditions over this time span (SSW-9, 51). Most meander cutoffs occurred prior to 1933 except in one area, which is likely a response from flooding in 1964; and straightening of the channel at two locations near Clarkia on private land (SSW-9, 51). It is likely that these changes were caused by road and railroad construction, log drives (SSW-31), deliberate actions to increase arable land or may have occurred naturally or in some combination of these activities. Historic channel remnants are also visible in some of these 1933 photos on the floodplain in the vicinity of Clarkia (SSW-9, Photos #1708 & #1805**)** and north of the mouth of Emerald Creek (SSW-9, Photo #1492). It also appears that the construction and location of the railroad grade in the St. Maries River bottom isolated meanders and straightened the stream channel in some locations prior to 1933.

For further information on stream channel conditions see the Fisheries section.

Water Quality and Beneficial Uses

The Water Quality Limited Stream Segments (WQLS) on the State of Idaho's 303(d) list are apparently not fully supporting beneficial uses because of pollutants – sediment and temperature. It is imperative that no further impairment of these stream reaches occur because of management activities on federal land through pollutant increases or introduction of new pollutants, and that federal activities are designed to restore water quality that would move toward support of these

beneficial uses. The temperature and sediment TMDLs identify reductions in these pollutants that should lead to beneficial use support. The incorporation of large woody debris accomplished in 2004 on the West Fork was intended to improve habitat conditions and should improve support of assigned beneficial uses. Cumulatively there has been an estimated sediment reduction of over 100 tons/year in the St. Maries Basin within the project area, based on road recontouring and stream crossing removals not identified in the DEQ TMDL assessment or that occurred since the assessment (SSW-1).

Given the inherent diversity, complexity, and measurement uncertainty of sediment production and transport processes, universal sedimentary cumulative effects' modeling is not realistic (NCASI, 1999). There is no sediment monitoring data for the St. Maries River to indicate current vs. natural loading and transport rates. Sediment levels are estimated using the DEQ TMDL model (SSW-1, 24, 53, 54, 58).

Environmental Consequences

Hydrologic response to vegetative change is highly variable and dependent on numerous site factors - elevation, aspect, slope, soils, landforms, flow regimes, stream channels, precipitation, etc. It is important that hydrologic changes from vegetation changes are examined in the context of those factors and then be translated into potential changes to stream flow, flooding, water quality, erosion, and aquatic habitat. Numerous models attempt to replicate these complex processes, some from a theoretical basis and others derived from empirical data. It is the intent of the Forest Plan to use models as a tool to approximate effects, but also be used in conjunction with data, research, and professional judgment to refine estimates and make recommendations (USDA FS, 1987). This analysis takes a pragmatic, stepwise approach to describe potential changes to water and sediment yield and likely effects on beneficial uses, hydrology, channel conditions, pollutant sediment delivery, and soil productivity.

Alternative A (No Action) - Direct and Indirect Effects

No new activities would occur in this alternative. Existing management would continue.

Proper Functioning of Basin Hydrology (Vegetative and Soil Conditions)

Past vegetative treatments, fire, and past and future fire suppression have all affected basin hydrology through change of the hydrologic cycle. Change in canopy cover or density affects transpiration, interception, snow accumulation, evaporation from the ground surface (wind velocity and radiation balance), sublimation, and organic material accumulation. Changes in water yield and peak flows may result from change in vegetative structure (MacDonald and Hoffman, 1995). An analysis of discharge records from gauging stations on the St. Maries and St. Joe River indicates that peak flows are not appreciably increasing in either drainage (SSW-28, 29, 32).

Because roads within a basin generally increase runoff and decrease subsurface flows, these components of the hydrologic cycle would remain at their current levels.

Soil productivity would remain constant over the short-term with an improving long-term trend as old roads grow in, disturbed soils (old roads) rebuild horizons and organic debris rebuilds. Improved soil conditions would increase infiltration rates.

Sediment

Twelve miles of road identified in the 2002 Hidden Cedar have been recontoured or placed into long-term storage, which reduced estimated sediment production (SSW-10). Fifty-seven crossings were removed during past activities (SSW-45), of which 22 were completed under the 2002 Hidden Cedar Project ROD (SSW-46). Roads which currently affect hydrologic function would continue to do so; yet unused roads would become overgrown and roots would begin decompacting the soil, at least partially restoring hydrologic function over the long term.

Water Yield

Changes in water yield and peak flows may result from change in vegetative structure (MacDonald and Hoffman, 1995). It is likely that a decrease in water yield would occur over time as the vegetation within these watersheds becomes denser and utilizes more soil moisture and the canopy intercepts more precipitation. A review of discharge records from gauging stations on the St. Maries and St. Joe River indicates that peak flows are not appreciably changing in either drainage (SSW-28, 29, 32).

Stream Channels

No changes to stream channels are expected from Alternative A. Tributary streams (Rosgen B and E channels) are transport reaches that are resilient to most discharge or sediment-supply perturbations because of high transport capacities and generally supply-limited conditions (Montgomery and Buffington, 1997).

The lower reaches of the main stem of The West Fork and the St. Maries River (Rosgen C and F channels) are more responsive to altered discharge and sediment supply (Montgomery and Buffington, 1997; Rosgen, 1996), and they also may be adjusting to loss of riparian vegetation. These lower reaches are experiencing gradual lateral migration (SSW-9), some areas of aggradation where obstructions or lower gradients aid in sediment storage, and some areas of degradation where gradients or entrenchment is high. Some of the main effects to channel morphology have been the forced channel changes, the loss of riparian vegetation and the loss of stabilization provided by large woody debris on the lower reaches of the West Fork and St. Maries River. This trend would continue until riparian vegetation becomes reestablished. The gradual lateral migration of the St. Maries River is within natural river evolution and there does not appear to be consequential levels of deposition or degradation (entrenchment) (SSW-9).

A review of aerial photographs taken in 1996 (post flooding) indicate no consequential morphological adjustments to the St Maries River channel occurred from the flood of 1996 that was the highest peak flow in the period of record (SW-15). A comparison of channels in 1933 and 2002 aerial photographs (SSW-9, 51) show no evidence of accelerated lateral migration even after the highest discharge for the 36-year period of record occurred in 1996. Recent riparian plantings and large woody material placement are expected to improve channel conditions. The comparison of aerial photographs photos (SSW-9, 51) shows that most channel modifications and changes occurred prior to 1933 and very little channel adjustment has occurred in the 69 years between photos. In addition, peak flow discharge measured on the St. Maries River at Santa shows high variability, and the stream channel accommodated these flows without substantial adjustment (SSW-9, SSW-11).

Water Quality and Beneficial Uses

The State of Idaho recognizes impaired water quality on the West Fork and main stem St. Maries River from sediment and temperature. Total Maximum Daily Load determinations were completed and approved by EPA in 2003. Channel conditions would remain much the same. Bedload, fine sediment loads and discharge would remain at current levels with discharge decreasing over time as vegetative density increases.

No further road decommissioning would occur to restore hydrologic hill slope functioning and reduce sediment generation. Road failure hazards would be reduced with road maintenance. Hazards would not be reduced to the degree or in a timeframe consistent with desired conditions, and pollutant sediment delivery would remain a concern. Sediment from diffuse sources (hill slopes) would continue to be low as observed (SW-44). No new road crossings or restoration of existing crossings would occur. Beneficial Use impairment would remain at the current level because no further restoration activities would occur.

Stream temperatures would decrease over time as riparian vegetation grows and provides shade to streams. No roads would be constructed, as opposed to the action alternatives, so riparian vegetation would not be removed.

Cumulative Effects for Alternative A

Proper Functioning of Basin Hydrology (Vegetation and Soil conditions)

Although the model estimates increased water yield (Table 3-70, SW-31, SW-36), measured discharge data does not show a trend of increased water yield (SSW-28). No effect to basin hydrology from water yield increase is expected. Other components of the hydrologic cycle would remain at the current level with the exception of interception and transpiration which would increase because of vegetative density increases until wildfire occurrence; soil moisture decreasing because of higher utilization; and water yield perhaps decreasing but this could be countered by activities on private lands. Soil productivity would remain at the current level or may improve over the long term, except for activities associated with the Clarkia Interface Fuels treatment, which calls for grapple piling on 27 acres. Grapple piling is estimated to cause 13% detrimental soil disturbance (see Soils section) or 3.5 acres of disturbance. Cumulatively, approximately 1,775 acres of soil would be detrimentally disturbed with the No-Action Alternative (Table 3-59).

Sediment and Water Yield

Water yield may increase due to timber harvest on non-Forest Service land and sediment may increase due to road construction, but analysis of gauge station data does not statistically show increased peak flows (SSW-28, 29, 32). Without full disclosure of spatial and temporal data associated with planned private and state activities, quantification of future cumulative effects is not possible.

Stream Channel

No improvement to stream channels or riparian areas would occur as proposed in the action alternatives. Stream channels are expected to remain in their present conditions: maintaining their existing trend of response in Rosgen C and F reaches with outside meander bank erosion and gradual

lateral migration but this is no different from natural channel evolution (Leopold, et al., 1964, Schumm, 1977).

Water Quality and Beneficial Uses

The sediment and temperature TMDLs for the St. Maries River and its tributaries (SSW-4) should be considered the result of the cumulative effects from all past activities through the date of its publication.

Non-National Forest System land activities of road building (about six miles), timber harvest and grazing would continue at current levels. Activities on non-NFS land are regulated by the State of Idaho by administrative rules such as the Forest Practices Act that are designed to protect the environment and decrease sediment generation. Current levels of sediment yield and water yield would remain or slightly increase (as modeled) from the activities.

Cumulatively there has been a net sediment reduction of over 100 tons/year (SSW-1) in the St. Maries basin within the project area due to activities not identified in the DEQ TMDL assessment or that occurred since the assessment. This recent past sediment decrease should improve support of assigned beneficial uses, but the No-Action Alternative would not further improve support of assigned beneficial uses.

The Idaho Forest Practices Act protects stream temperatures by requiring trees to be left in riparian areas on privately-own and state lands (IDL, 1996). Stream temperatures should decrease over time as riparian vegetation grows and provides shade to streams.

Alternatives B, C, D and F - Direct and Indirect Effects

This section concentrates on effects related to timber harvest, associated road building, and road decommissioning and storage that would occur at various levels in all alternatives except Alternatives A and E.

Proper Functioning of Basin Hydrology (Vegetation and Soil Conditions)

Basin hydrology maintains and responds to the hydrologic cycle. Alteration of this cycle occurs from vegetative, climatic and geomorphologic changes. The activities proposed in the action alternatives would change the vegetative makeup of the basin through harvest and hill slope condition (geomorphology) through road construction and decommissioning/storage. Basin hydrology may respond to vegetative changes through different melting and evaporation rates (Packer, 1971), change in snow pack or snow-water content and wind passage and velocity (Fowler et al., 1987); yet vegetative change is well within the realm of past conditions from wildfire. The role of roads in basin hydrology is generally that of increasing “flashiness” and runoff (Dunne and Leopold, 1978, MacDonald and Hoffman, 1995). The planned road decommissioning and storage (includes decompaction) in the action alternatives should ameliorate some of the increased flashiness and runoff compared to existing conditions. Returning vegetation to resemble states that reflect desired conditions (see Forest Vegetation section) should lead to basin hydrology that would also be more reflective of natural conditions.

No harvest treatments are proposed on landtypes with high mass failure potential. No ground skidding is proposed on landtypes with high surface soil erosion hazards. This helps ensure that the proposed

activities do not aggravate the existing primary water resource concerns in the project area. Considering the variable site factors which dictate hydrologic response, each treatment unit was analyzed to determine the degree of hydrologic change.

Soil productivity in relationship to roads would be increased by these alternatives because miles of road decommissioning/storage would exceed miles of new road construction (see Soils Section). Soil productivity and hydrologic function would improve from the existing condition by the approximately 15.9 miles of road decommissioned or put into long-term storage in Alternatives B and C, approximately 24.8 miles of road decommissioned or put into long-term storage in Alternatives D and E, and 25.2 miles in Alternative F. Soil productivity would increase on 64 acres (Alternatives B & C), 99 acres (Alternatives D & E) and 101 acres (Alternative F) due to road decommissioning/storage treatments. Restoration of hydrologic function (infiltration, subsurface flow) on these areas would begin through these treatments and is expected to be mostly restored once native vegetation becomes established (estimated at a year or two). New construction would reduce soil productivity on 50 acres in Alternative B; 9 acres in Alternatives C, D and E; and 36 acres in Alternative F.

Sediment

The overall sediment level from federal lands is expected to decrease in all action alternatives (Tables 3-74, 3-75, 3-85) because of roads to be decommissioned or put into long-term storage, which would remove stream crossings and recontour road segments that are encroaching on streams (within 50 feet of a stream).

The sediment analysis is based on the Idaho DEQ TMDL and subbasin assessment spreadsheet model (SSW-1, 24, 53, 54, 58). The use of this model is consistent with the St. Maries River TMDL. The data constitutes an initial level of analysis to be carried into the St. Maries River TMDL Implementation Plan that is under development through the St. Joe Watershed Advisory Group. The sediment values were estimated based on formulas in the TMDL spreadsheet model and Arcview GIS map overlays.

The sediment analysis for this project includes updates to information since the TMDLs were identified, sediment-reducing work accomplished under the 2002 Hidden Cedar Record of Decision, and proposed activities. Some road recontouring and storage treatments were not included in the Idaho DEQs TMDL subbasin assessment (SSW-26). Some roads were missed in the original assessment.

For roads, the Idaho DEQ's TMDL model identifies stream crossings and the adjacent 200 feet on either side as sediment sources. Table 3-71 identifies the stream crossing removals that occurred since the DEQ assessment or that were not identified in their assessment (SSW-1, 24, 53, 54, 58), and those proposed in each alternative. In the Alternative A value in Table 3-71, 22 crossing removals were completed under the 2002 Hidden Cedar decision. This equates to sediment reductions of 17.01 tons/year in the West Fork and 2.54 tons/year in Lower St. Maries River.

Table 3-71 Forest Service Stream Crossing Removals

Alternative	W Fork St. Maries River	Catspur	Lower St Maries River	Cedar	Total
A	46	8	3	0	57
B	54	8	15	0	77
C	54	8	15	0	77
D[1]	63	8	18	1	90
E[1]	63	8	18	1	90
F[2]	64	8	18	1	91

[1]*Alternatives D and E changed from SDEIS: 1 crossing not decommissioned in Wood Creek (SSW-20, 53)*
[2]*Alternative F value for WFK St. Maries R. changed from SDEIS (SSW-58)*

Table 3-72 identifies estimated sediment **additions** based on the Idaho DEQ TMDL and subbasin assessment spreadsheet model (SSW-1, 24, 53, 54, 58). The use of this model is consistent with the St. Maries River TMDL. Short-term additions (SW-43, SSW-17, SSW-33) include non-stocked stands, temporary road construction (SSW-79) and restoration, and culvert removal and stream crossing restoration (SSW-1, 24, 53, 54, 58, 69). The long-term sediment reduction for the Hidden Cedar Area would not include these short-term increases.

The majority of the proposed vegetative treatments are excluded from high sensitivity landtypes, which would reduce or keep sediment yield values at or very near their current levels. High sensitivity landtypes are determined through a matrix of ratings of surface and subsurface erosion potential, mass failure potential and sediment delivery potential (see Soils Section, Table: Ratings for Landtypes within Proposed Units, SW-15). There may be low surface erosion potential and low to moderate mass failure potential, but the other parameters may cause a high sensitivity rating. Sediment generation is not expected with a low to moderate surface erosion hazard rating and application of BMPs. The proposed harvest units would include RHCA buffers; and this should prevent sediment, if any is generated, from reaching the drainage.

Alternative C proposed harvest is very similar to Alternative B except for 25-acre increase in harvest proposed in Keeler Creek. The level of road construction in Alternative C is less than Alternative B, so sediment levels for Alternative C are lower than the value for Alternative B. Alternative F is similar to Alternative B but does not include 1.7 miles of construction and 89 acres of harvest in Cedar Creek. Alternative F also includes helicopter harvest of Units 50 and 51 (25 acres in Keeler Creek). Keeler and Cedar Creeks are expected to have lower levels of sediment generation in Alternative F compared to Alternative B.

Approximately 3.5 acres in Hidden Creek and 5.5 acres of ground/skyline units in Keeler are on high-sensitivity landtypes in Alternatives B and F. Approximately 3.5 acres in Hidden Creek and 8.6 acres in Keeler of helicopter/skyline units in Alternatives C and D are on high sensitivity landtypes. No effects are expected from harvesting the units in Alternatives C or D because of helicopter or cable harvesting systems (SSW-49) and the RHCA buffers on drainages (USDA Forest Service, 1995, p. A-5). In Alternatives B and F, the units in Keeler and Hidden Creeks are on Landtype 518. Landtype 518's rating is low for surface erosion hazard and moderate landslide potential. All alternatives contain 0.9 acres of Landtype 132 within Unit 13, which is also rated as a high sensitivity landtype. This landtype is rated with low mass failure potential and moderate surface erosion hazard. Both landtypes have high sediment delivery ratings because of the relative proximity to drainages,

which makes it a high sensitivity landtype. Sediment generation is not expected with a low to moderate surface erosion hazard rating and application of BMPs. These proposed harvest units are RHCA buffered and this should prevent sediment, if any is generated, from reaching the drainage (USDA Forest Service, 1995, p. A-5).

Table 3-72 Sediment Additions from Activities on NFS Lands (tons/year)

Alt	Long-term			Short-term			
	System Road Construction	Road Construction for Other Access	Long-term Total	Non-stocked Stands	Temporary Road Construction	Stream Crossing Removal*	Short-term 10-year Total**
West Fork St. Maries River							
A	-	-	0	-	-	-	0
B	7.7	3.9	11.6	0.4	3.2	1.1	16.3
C	0.0	3.9	3.9	0.4	0.0	1.1	5.4
D	0.0	3.9	3.9	0.1	0.0	2.4	6.4
E	0.0	3.9	3.9	0.0	0.0	2.4	6.3
F	6.1	3.9	10.0	0.4	3.2	2.4	16.0
Lower St. Maries River							
A	-	-	0	-	-	-	0
B	0.5	0.0	0.5	0.5	0.0	1.6	2.6
C	0.0	0.0	0.0	0.5	0.0	1.6	2.1
D	0.0	0.0	0.0	0.2	0.0	2.2	2.4
E	0.0	0.0	0.0	0.0	0.0	2.2	2.2
F	0.5	0.0	0.5	0.4	0.0	2.2	3.1
(Total) West Fork St. Maries River and Lower St. Maries River Combined							
A	-	-	0	-	-	-	0
B	8.2	3.9	12.1	0.9	3.2	2.7	18.9
C	0.0	3.9	3.9	0.9	0.0	2.7	7.5
D	0.0	3.9	3.9	0.3	0.0	4.6	8.8
E	0.0	3.9	3.9	0.0	0.0	4.6	8.5
F	6.6	3.9	10.5	0.8	3.2	4.6	19.1

**For analysis purposes additions from stream crossing removals are spread over a ten-year period. When crossings are removed sediment is expected to actually only be generated for up to two years, but crossings may be removed at different times.*

*** For analysis purposes short-term is considered ten years. Some short-term activities would add sediment for only a year or two, but they may occur anytime during the 10-year period, so the short-term total is likely an over-estimate. Short-term additions include Non-stocked Stands, Temporary Road Construction, and Stream Crossing Removal. Road construction is included in the short-term total and the long-term total.*

Table 3-73 displays the estimated sediment **reduction** achieved from accomplished and proposed restoration activities (SSW-1, 24, 53, 54, 58, 69).

Table 3-73 Sediment Reductions from Restoration Activities on NFS Lands (tons/year)

Alternative	Updates After TMDL was Identified*	2002 Hidden Cedar Decision Road Restoration	FSEIS Proposed	Total Hidden Cedar Project	Total Sediment Reduction Based on Updated Information
West Fork St. Maries River Sediment (tons/year)					
A	46.16	17.01	0.0	17.01	63.17
B	46.16	17.01	5.64	22.65	68.81
C	46.16	17.01	5.64	22.65	68.81
D	46.16	17.01	14.44	31.45	77.61
E	46.16	17.01	14.44	31.45	77.61
F	46.16	17.01	14.44	31.45	77.61
Lower St. Maries River Sediment Reduction (tons/year)					
A	0.13	2.54	0.0	2.54	2.67
B	0.13	2.54	25.49	28.03	28.16
C	0.13	2.54	25.49	28.03	28.16
D	0.13	2.54	28.19	30.73	30.86
E	0.13	2.54	28.19	30.73	30.86
F	0.13	2.54	28.19	30.73	30.86
Total St. Maries River Sediment Reduction (tons/year)					
A	46.29	19.55	0	19.55	65.74
B	46.29	19.55	31.13	50.68	96.87
C	46.29	19.55	31.13	50.68	96.87
D	46.29	19.55	42.63	62.18	108.37
E	46.29	19.55	42.63	62.18	108.37
F	46.29	19.55	42.63	62.18	108.37

**Updated sediment reductions are net result of additions and reductions to account for differences between information used to set TMDLs and information available at the time of this analysis. It does not include the work that was accomplished under the 2002 Hidden Cedar decision.*

Table 3-74 Net Short-term (ten years) Change in Sediment Production (tons/year)

Alternative	Addition	Reduction*	Net Change* Based on Updated Information	Net Change* Based on Hidden Cedar Project Only
West Fork St. Maries River				
A**	0	-63.17	-63.17	-17.01
B	16.3	-68.81	-52.51	-6.35
C	5.4	-68.81	-63.41	-17.25
D	6.4	-77.61	-71.21	-25.05
E	6.3	-77.61	-71.31	-25.15
F	16.0	-77.61	-61.61	-15.45
Lower St. Maries River				
A**	0	-2.67	-2.67	-2.54
B	2.6	-28.16	-25.56	-25.43
C	2.1	-28.16	-26.06	-25.93
D	2.4	-30.86	-28.46	-28.33
E	2.2	-30.86	-28.66	-28.53
F	3.1	-30.86	-27.76	-27.63
(Total) Combined West Fork St. Maries River and Lower St. Maries River				
A**	0	-65.84	-65.84	-19.55
B	18.9	-96.97	-78.07	-31.78
C	7.5	-96.97	-89.47	-43.18
D	8.8	-108.47	-99.67	-53.38
E	8.5	-108.11	-99.61	-53.32
F	19.1	-108.47	-89.37	-43.08

** negative number indicates a reduction in the amount of sediment produced*

*** reduction in Alternative A is the result of updated information since the TMDL was identified and the sediment-reducing work accomplished under the 2002 Hidden Cedar Record of Decision*

Table 3-75 Net Long-term Change in Sediment Production (tons/year)

Alternative	Addition	Reduction*	Net Change* Based on Updated Information	Net Change* Based on Hidden Cedar Project Only
West Fork St. Maries River				
A**	0	-63.17	-63.17	-17.01
B	11.6	-68.81	-57.21	-11.05
C	3.9	-68.81	-64.91	-18.75
D	3.9	-77.61	-73.71	-27.55
E	3.9	-77.61	-73.71	-27.55
F	10.0	-77.61	-67.61	-21.45
Lower St. Maries River				
A**	0	-2.67	-2.67	-2.54
B	0.5	-28.16	-27.66	-27.53
C	0	-28.16	-28.16	-28.03
D	0	-30.86	-30.86	-30.73
E	0	-30.86	-30.86	-30.73
F	0.5	-30.86	-30.36	-30.23
(Total) Combined West Fork St. Maries River and Lower St. Maries River				
A**	0	-65.84	-65.84	-19.55
B	12.1	-96.97	-84.97	-38.68
C	3.9	-96.97	-93.07	-46.78
D	3.9	-108.47	-104.57	-58.28
E	3.9	-108.47	-104.57	-58.28
F	10.5	-108.47	-97.97	-51.68

** negative number indicates a reduction in the amount of sediment produced*

*** reduction in Alternative A is the result of updated information since the TMDL was identified and the sediment-reducing work accomplished under the 2002 Hidden Cedar Record of Decision.*

The overall sediment level from federal lands is expected to decrease in all action alternatives from the Hidden Cedar Project (Tables 3-75) because of the stream crossings removed from road decommissioning or long-term storage. The sediment Total Maximum Daily Load (TMDL) for the West Fork St. Maries River calls for reducing sediment by 180 tons/year, and the sediment TMDL for the Lower St. Maries River calls for reducing sediment by 481 tons/year (SSW-4). Table 3-76 shows the amount of sediment reduction still needed to achieve the TMDL after all activities are completed.

Table 3-76 Sediment reduction still needed to achieve TMDL (tons/year)

Alternative	Hidden Cedar Project Net Sediment Reduction	West Fork St. Maries TMDL = 180	Lower St. Maries TMDL = 481
A	19.5	160.5	461.5
B	38.7	141.3	442.3
C	46.8	133.2	434.2
D	58.3	121.7	422.7
E	58.3	121.7	422.7
F	51.7	128.3	429.3

Water Yield

Gauging station data and a comparison of stream channels over time does not indicate substantial changes in stream channels from increases in peak flows. USGS discharge records of actual peak flows do not indicate a statistically significant trend of increases in St. Maries River peak flows over time for the period of record (1966-2005) and data extrapolated by the discharge/area relationship from St. Joe River gauge station data (for the years 1911-1912, 1922-1966) and applied to the St. Maries River, show decreasing peak flows (SSW-29, 32). A comparison of photos, taken over time since 1933 shows no substantial channel changes except in one area which is likely a response from flooding in 1964 and in two short reaches straightened by humans (SSW-9, 51).

Changes in water yield are not expected to result in changes to stream channels because 1) the transport reaches would not respond to the inconsequential level of water yield increase, and 2) in response reaches stream power is not expected to increase to levels that would cause channel adjustments (Schumm, 1977). Stream power, the rate of work done by a fluid, is proportional to the cube of velocity (Schumm, 1977). Although stream power may have a small increase, no consequential increase in stream power per unit area is expected, because channel area generally increases as stage increases and area greatly increases once stream flow accesses floodplains.

No consequential morphological adjustments to the St Maries River channel were noted from flooding in 1996, which was the highest level in the period of record (SSW-9, SSW-51). As mentioned above USGS discharge records of actual peak flows do not indicate a statistically significant increase in peak flows over time (SSW-28, 29). The water yield analysis does not model road decompaction or recontouring. The effects of commercial vegetation treatments on peak flows were estimated with three different methods, Kappesser (1991), Packer (1971) and WATSED (WATSED includes road construction). The parameters used include size of openings, canopy removal, aspect, slope and elevation. More detailed information on these methods and results by watershed can be found in the project file (SW-18, 19, 20, 26, 31, 33, 40, 47). Table 3-77 identifies (averaged) percent water yield increase modeled for each watershed by alternative.

Table 3-77 Average Estimated Percent (%) Water Yield by Watershed

Watershed	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Blair	1.2	1.2	0.0	0	1.2
Lower St. Maries	1.1	1.1	0.14	0	1.1
Cedar	12.2	12.2	5.1	0	10.3
Maize	2.9	2.9	0.0	0	2.9
Wood	0.3	0.3	0.5	0	0.4
Hidden	5.9	5.9	4.8	0	5.9
Keeler	1.1	1.6	1.9	0	1.6
West Fk. St. Maries	3.2	3.2	2.1	0	3.2
Bechtel	0.4	0.4	0.0	0	0.4

Because parameters are similar but not identical between methods, changes in peak flows differed slightly between calculation methods; however, all showed the same trends. In all methods, for Alternatives B, C, D and F, the change in peak flow was $\leq$6% for all watersheds **except** Cedar Creek, which ranged from 5.1% to 12.2% (Table 3-77) average increase and was high as 19.9% (Table 3-80).

The average estimated water yield increase over existing, from the activities proposed in the St Maries Basin within the project area are Alternative B: 3.1%, Alternative C: 3.2%, Alternative D: 1.6%, Alternative F: 3.0% as identified in Table 3-78.

Table 3-78 Water Yield Increase from Proposed Activities for St. Maries River

Method	Alt B	Alt C	Alt D	Alt E	Alt F
Kappesser	2.8%	2.8%	1.4%	0	2.5%
Packer	5.0%	5.1%	2.4%	0	4.8%
WATSED	1.7%	1.7%	1.1%	0	1.7%
Average	3.1%	3.2%	1.6%	0	3.0%

Table 3-80 Cedar Creek Water Yield Increases* from Proposed Activities

Method	Alt B	Alt C	Alt D	Alt E	Alt F
Kappesser	8.8%	8.8%	3.6%	0	6.4%
Packer	19.9%	19.9%	7.8%	0	16.5%
WATSED	8.0%	8.0%	4.0%	0	8.0%
Average	12.2%	12.2%	5.1%	0	10.3%

**over existing conditions*

The WATSED model is the only one of these three methods that estimated recovery. The increased water yield estimated by WATSED for Cedar Creek would return to the existing condition in two years, indicating that there would be no long-term effect.

Although the models used estimate increases in peak flow, measured discharge does not corroborate this nor do stream channel conditions over time show effects of increased peak flows (SSW-9, 28, 29,

32). One location where channel location changed is believed to be the result of flooding in 1964 (SSW-51). Peak discharge analysis was conducted for data from USGS gauging stations on the St. Maries River and the St. Joe River. Although linear regression of the St Maries River annual peak flow data for the period of record (1966-2006) appears to have a slight upward slope, the trendline is not statistically different from "no change." Additional assessments by the Forest Hydrologist of annual peak flow data and comparison of flows between both the St Joe and St Maries Rivers (SSW-28) further supports the conclusion that there is no observable change. The St. Joe River data (1911-1912, 1922-2005) shows a trendline of decreasing peak flow as does St. Maries River data (for the period of record, 1966-2005 and extrapolated by the discharge/area relationship from St. Joe River gauged data for the years 1911-1912, 1922-1965) (PF: SSW-29, 32).

Stream Channels

The amount of proposed canopy reduction is not likely to increase water yields, but models indicate slight increases in water yield. If modeled increases in water yield were to occur they are not expected to cause significant channel morphologic change because of the small magnitude of estimated increase (Leopold et. al., 1964, Gordon, 1995) and the presence of transport reaches (Montgomery and Buffington, 1997). The relationship described by Schumm (1977) of stream power being proportional to the cube of velocity indicates that small increases in water yield would not consequentially increase stream power per unit area because channel area generally increases as stage increases and area greatly increases once streamflow accesses floodplains.

The small variances in estimated water yield (as modeled) from vegetation management are not likely to affect the stream channels in most tributaries or in the lower reaches of the West Fork St. Maries River, because of the order of magnitude increases necessary to affect channels. (Schumm 1977; Leopold et al., 1964; Gordon, 1995).

Stream channels were rated by response potential (Montgomery and Buffington, 1993, Rosgen, 1996) to changes in flow. No changes to stream channels are expected, from proposed activities in Alternatives B, C, D, and F in tributary streams (Rosgen B and E channels, Montgomery-Buffington step-pool, cascade and plane-bed channels) because transport reaches are resilient to most discharge or sediment-supply increases because of high transport capacities and generally supply-limited conditions (Montgomery and Buffington, 1997, 1998). The lower reaches of the main stem of the West Fork and the St. Maries River (Rosgen C and F channels, Montgomery-Buffington pool-riffle channels) are more responsive to altered discharge and sediment supply (Montgomery and Buffington, 1997, Rosgen, 1996), and they also are adjusting to loss of riparian vegetation and human-caused channel straightening. These lower reaches are experiencing gradual lateral migration, some areas of deposition where obstructions or lower gradients aid in sediment storage and some areas of degradation where gradients or entrenchment is high.

The main effect on channel morphology has been the loss of riparian vegetation and human-induced channel changes in the West Fork and lower reaches of the St. Maries River. Analysis of aerial photographs of the St. Maries River channel from 1933-2002 indicates that most channel changes occurred prior to 1933 (SSW-9) with the exception of channelization near the town of Clarkia and also the post-1964 flood adjustment in the reach just downstream of the highway-railroad crossing of the river just north of Cedar Creek (SSW-9, 51).

The relationship described by Schumm (1977), of stream power being proportional to the cube of velocity indicates that small increases in water yield would not increase stream power per unit area.

As channel area increases, stage increases and area greatly increases once streamflow accesses floodplains. The relationship of channel width being proportionate to the square root of discharge (Leopold et al., 1964, and as reported in Gordon, 1995) indicates that these small increases in water yield – peak flow would have inconsequential effects. In areas where stream banks are currently eroding (i.e., outside meander bends in Rosgen C reaches or incised areas of Rosgen F channels (SSW-2) some additional erosion may take place. However, Leopold et al, (1964, p. 324) found [cross] "Sections show concomitant erosion on the concave bank and deposition on the point bar. The cross sections show that during the time the channel moved laterally a distance equal to one channel width, the concurrent deposition on the point bar kept the channel width about constant. Various sections measured over the 8-year period showed that the net volume of deposition was about equal to erosion. At the point of maximum curvature, erosion exceeded deposition; just downstream from this point deposition exceeds erosion." Schumm (1977, p. 132) concluded that one-half of the Little Missouri River's flood plain was reworked during a 69 year period. These latter conclusions indicate that normal progression of rivers is to migrate across their floodplains. The gradual lateral migration of the St. Maries River is within natural river evolution and there does not appear to be consequential levels of deposition or degradation (entrenchment) (SSW-9).

Although models estimate slight increases in water yield for the alternatives, it is unlikely that the proposed activities will increase water yields to levels that will cause appreciable changes to stream channels or sediment transport. Gauging station data and a comparison of stream channels over time do not indicate substantial changes in stream channels from increases in peak flows. USGS discharge records of actual peak flows do not indicate a statistical increase in peak flows over time (PF: SSW-28, 29, 32). A comparison of photos taken over time since 1933 shows no substantial channel changes except in one area (PF: SSW-9, 51), which may have resulted from flooding in 1964. There are obvious human-caused alterations, but these are likely not a result of changes in water yield.

If water yields are in the higher range (20% or greater increase in snowmelt - Packer) for Cedar Creek some channel morphological adjustment may occur. WATSED estimates an eight percent increase with a return to pre-existing condition within two years (SW-31). No areas of instability were noted in reconnaissance surveys of Cedar Creek except small areas where cattle have caused bank damage on portions of the lowest reach (SW-5, Hallisey, Owen, field notes). Wetland meadow areas would not be affected because increased flows would spread over the sedge bottom, but the discontinuous reaches of pool-riffle or Rosgen "C"-channel may experience some channel degradation or lateral migration with subsequent deposition downstream. Rosgen (1996) suggests that channel evolution includes degradation ("F" or "G" channels) moving to pool-riffle ("C" channel) to a hydraulically efficient "E" channel. Schumm and others (1984), also describe incised channel evolution that reestablishes a new floodplain within the incised channel. Channel widening, except as part of incised cannel evolution, is not likely to occur because of point bar deposition that would maintain channel width (Leopold et al., 1964); and these small estimated increases in water yield translate to small increases in stream power per unit area. The "E" portion of the channel should not be affected by increased peak flows because they are considered hydraulically efficient channel forms (Rosgen, 1996, p.5-126, 6-13). With the estimated level at 5-12% (Table 3-80), and the short-term duration of estimated peak flow increase, no effects are likely from this modeled water yield increase **(**Schumm, 1977, Leopold et al., 1964, Gordon, 1995) and these values are not expected to be outside the variability of natural peak flows.

Levels of sediment generation and delivery (from National Forest System lands) are expected to decrease (Table 3-75) in the action alternatives because of road decommissioning and storage. Decreased levels of sediment would allow channels to move toward dynamic equilibrium.

Riparian plantings are expected to provide future large woody material to channels for stability, aquatic habitat, moderated sediment transport rates, and increased shading of stream channels.

Water Quality and Beneficial Uses

The estimated minor water yield increases (as modeled) would not cause further beneficial use impairment in the St. Maries River or its tributaries. Sediment reductions as predicted from road decommissioning in all action alternatives would improve water quality, improve habitat conditions and improve support of beneficial uses.

BMPs would be implemented in all action alternatives to prevent sediment generation or movement from proposed activities (IPNF, 2002, SSW-61). The overall effectiveness for all BMPs is expected to be high (Lynch and Corbett 1989; Seyedbagheri 1996; Idaho DEQ 2001; SSW-61 (USDA Forest Service IPNF Forest Plan Monitoring Reports); SSW-14 (Dutch Cat TS monitoring); BMP Effectiveness Monitoring Report, USDA Forest Service, Lolo NF, (USDA Forest Service, 2002). Road BMPs appear to be effective in controlling sediment (rated little or no sediment) on 94% of the 144 miles assessed in Idaho in 2000 (Idaho DEQ, 2001). Only 0.5 miles (0.3%) was rated as a serious sediment delivery problem (Idaho DEQ, 2001). On all federal land monitored stream buffers had no harvest activity and 50% of the 11 Federal sites were above the target canopy cover for Stream Protection Zones (Idaho DEQ, 2001). Areas of canopy cover below the target are likely to have been the result of practices prior to the Idaho Forest Practices Act and in some cases may be an unachievable target (Idaho DEQ, 2001). BMP monitoring of four completed harvest units in the Dutch Cat Timber Sale estimated overall BMP effectiveness at 80%, 85%, 93% and 95% (SSW-14). The 80% estimated effectiveness was at this level because of rutting on the road adjacent to Unit 1B (SSW-14). Additional monitoring of 11 timber sale units was also conducted for BMP implementation (SSW-14).

INFS interim RHCA widths were established as design feature to prevent temperature increases and to provide future shading to reduce temperatures. Since there are no significant reductions in vegetation proposed within these zones (aside from incidental cutting of snags to facilitate safe logging and during road crossing construction), stream temperatures would not be affected. Proposed riparian planting may moderate stream temperatures slightly; but it may not be a detectable change, and it is anticipated to take five to ten years or more.

No other pollutant levels are expected to increase from the proposed activities. The risk of accidental and malicious introduction of pollutants should decrease because of the reduction in number of entry points – stream crossings – available (see Forest Service Effects Summary Table 3-85).

Alternative E - Direct and Indirect Effects

Proper Functioning of Basin Hydrology (Vegetation and Soil Conditions)

Road Treatment: Soil productivity would improve on 99 acres through decommissioning and storage of roads. These areas would be seeded with native seed mix that would begin restoration of hydrologic function.

Thinning: This alternative does not have any commercial thinning: only pre-commercial thinning, and that is not expected to affect basin hydrology as discussed previously.

Riparian Planting: Proposed riparian planting would restore riparian areas over the long term and enhance channel stability on the reaches proposed for planting once deep-rooted shrubs and trees become established. Future recruitment of large woody material for channel stability, fish habitat and sediment storage would also occur from the riparian planting.

Sediment

Road Treatment: No road construction is proposed, except for 2.0 miles associated with access to non-Forest Service land. Road management prescriptions would be the same as Alternative D.

In Wood Creek and Hidden Creek, four and six stream crossings would be eliminated, respectively. If the Hidden Creek Road were recontoured without alternate access and no new road construction on FS lands would occur, there would be an isolated existing road system in the head of Hidden and Little East Fork Emerald Creeks. This road system has existing culverts and would have increased risk of failure at culverts and other locations without proper maintenance. Increased sediment levels would be likely in both Hidden and Little East Fork Emerald Creeks from this lack of maintenance. Therefore, prior to the recontouring of the Hidden Creek Road an alternative access to this road system would be identified and developed. Minor temporary increases in sediment levels would also be expected from road obliteration (PF: SSW-12, SW-43), but this would be a short-term, small sediment addition compared to the continual sediment additions from road encroachment and road surface delivery if the road and crossing were left in place.

Thinning: This alternative does not have any commercial thinning: only pre-commercial thinning, and that is not expected to affect basin hydrology as discussed previously.

Riparian Planting: Proposed activities will help stabilize stream banks and reduce sediment transport.

Water Yield

Road Treatment: There would be no increase in water yield form proposed Forest Service activities in this alternative.

Thinning: The pre-commercial thinning is not expected to affect basin hydrology as discussed previously; and no water yield increase would occur.

Riparian Planting: Proposed riparian plantings may utilize slightly more water resulting in undetectable reduced water yield.

Stream Channels

Stream channels would remain the same as the existing condition except where riparian plantings are proposed and encroaching roads and stream crossings are removed. Riparian planting would improve stream channel stability on Hidden and Wood Creeks and the Lower St. Maries River. The long-term strategy for improving stream shade and providing future large woody debris to the stream system would occur through the riparian plantings. Removal of encroaching roads would allow more access to floodplains during peak flow periods. At stream crossings, culverts would be removed and the risk of mass failure at these sites significantly reduced. Culvert removal would improve channel

conditions by removing flow restrictions, decrease potential sources of pollutant sediment from fill failure, and decrease the number of potential sediment entry points to the stream system.

Water Quality and Beneficial Uses

The overall sediment budget from NFS lands is expected to decrease in Alternative E and would help meet the TMDL because of the level of roads being decommissioned and put into long-term storage (Table 3-74). An additional reduction of 33 stream crossings would be achieved with this proposal and a reduction of sediment by an estimated 40+ tons/year (SSW-1, 24, 53, 54, 58).

Cumulative Effects for Alternative E

Proper Functioning of Basin Hydrology (Vegetation and Soil Conditions)

The only vegetative treatments to occur would be pre-commercial thinning and riparian planting. As discussed above, no effects are expected from the thinning. Ongoing non-Forest Service land activity including timber harvest, grazing recreation, road construction (including the 5.6 mi. associated with the access request) would continue.

Sediment

Restoration of roads through decommissioning and storage on NFS lands would reduce sediment levels, and after factoring in increases from proposed new construction on both Forest Service and non-Forest Service land, sediment would be reduced by about 58 tons per year (Tables 3-75 and 3-85). The potential of sediment generated during road fill failure would be further reduced through elimination of an additional 33 stream crossings eliminating their possible failure (SSW-34, 56, 57, 59).

Water Yield

No increase in water yield would occur from federal lands, and the current levels of modeled increased water yield would continue and are estimated to be in the 5-15% range (see water yield discussion in “Summary and comparisons of cumulative effects” below). Water yield may increase due to timber harvest on non-Forest Service land, but analysis of gauge station data does not show statistically increased peak flows (SSW-28, 29, 32). Without full disclosure of spatial and temporal data associated with planned private and state activities, quantification of future cumulative effects is not possible.

Stream Channels

In a comparison of aerial photographs no consequential channel changes were noted in the lower St. Maries River even after the highest peak flow of 36 years of record occurred in 1996 or in a comparison of 1933 to 2002 aerial photographs (SSW-9, SW-15). Therefore, it is expected that there would be no change in the stream channel associated with this alternative.

Water Quality and Beneficial Uses

Sediment reduction from Forest Service road decommissioning and storage with the associated removal of stream crossings would improve water quality and move toward beneficial use support. Non-Forest Service activities of timber harvest, road construction and grazing would continue; and

these activities may contribute sediment to the stream system. Non-Forest Service land activities may offset some of the sediment reduction from the proposed restoration occurring on federal land (Table 3-85 compared to Table 3-86) or non-Forest Service land management may begin removing stream crossings and decommissioning roads, which would continue the improvement in water quality and meet the TMDL for the St. Maries River.

Private and state landowners have their own assigned level of necessary sediment reduction to achieve support of beneficial uses.

Effects Common to All Action Alternatives (B - F)

These activities include road decommissioning and storage, riparian planting and pre-commercial thinning. Road construction to provide access to other lands is common to all action alternatives and is discussed in separate sections above. Cumulative activities include road maintenance, minerals exploration, grazing, railroad maintenance, the FS-proposed Clarkia Interface Fuels Reduction Project, and some non-Forest Service activities.

Direct and Indirect Effects for All Action Alternatives (B – F)

Proper Functioning of Basin Hydrology (Vegetation and Soil Conditions)

Road Treatment: No change to vegetative or soil conditions is expected from road maintenance. Decommissioned road segments would restore subsurface flow continuity, reestablish infiltration, and re-vegetate. This would improve hydrologic function in watersheds with high road densities, and improve soil productivity over the long-term through recontouring and decompacting. Culverts would be removed at stream crossings and would greatly reduce the risk of mass failure at these sites.

Thinning: The proposed pre-commercial thin is not expected to detrimentally affect soil condition because the work will be accomplished through manual activities without large mechanized equipment. The pre-commercial thin would reduce the stocking level, but basal area and cover would return to pre-treatment levels over the short-term, about 5-10 years (pers. comm. Ware, Tuel) and water yield is not expected to consequentially increase.

Riparian Planting: Another activity proposed for the Hidden Cedar area is riparian planting along approximately 15 acres of Wood Creek, Hidden Creek, and the St. Maries River. The areas would be planted with cottonwood, conifers, willow, dogwood, shrubs and possibly sedge. This vegetation change would increase riparian functionality, help stabilize channels as deep roots establish over time, and provide for future large woody debris incorporation into the stream channel system for stability and habitat improvement. This treatment would provide net benefit to overall hydrologic conditions and the aquatic ecosystem. The short- and long-term benefits would be most noticeable in the areas where plantings occur, but downstream benefits in the West Fork and main stem St. Maries River would also occur as large woody material becomes incorporated through stream transport and deposition.

Sediment

Road Treatment: Proper maintenance can reduce or eliminate erosion and mass failure hazards on roads. Some road failure hazards were repaired and the rest will be repaired with the proposed action (SSW-70). The intent is to repair some of these sites with road reconstruction work associated with the vegetative treatments. These sites are on roads proposed for decommissioning, roads going into

long-term storage, or on roads identified for reconstruction /maintenance. Treatment would reduce failure hazard and associated risk of pollutant sediment delivery to streams. However, untreated sites would remain hazards, and risks for pollutant sediment delivery would remain high until maintenance occurs.

Pollutant sediment would be generated and would likely be entrained in streams during culvert placement, replacement, or removal. This would occur over short periods of a few hours to up to one or two days (SSW-12, SW-43). Some suspended pollutant sediment would show up as temporary turbidity. Sediment additions from road culvert removal and stream crossing restoration are included in the estimated sediment budget for the Hidden Cedar Project (SSW-1, 24, 53, 54, 58, Tables 3-72 and 3-75). The potential for sediment entering the stream systems, if stream crossings were to fail on sites proposed for recontouring or road storage, is estimated to range from 517-878 tons/year for a ten-year period (SSW-56, 57). For a comparison by alternatives of the number of stream crossings and road miles rehabilitated, see Tables 3-71 and 3-84. The amount of sediment reduction achieved, in the long-term, by decommissioning and storing roads is greater than the estimated sediment addition from new road construction (temporary and permanent) and from non-stocked stands (Tables 3-72, 3-73, and 3-75).

Thinning: No long-term effects to sediment levels are expected from these activities because areas identified for precommercial thinning are spread across a number of watersheds (Table 3-81), vegetative cover would rapidly increase to pre-treatment levels, and all activities are non-mechanical (hand work) in both falling and planting. Minimum 50-foot buffers to channels and wet areas are required (see Design Criteria and Features – Soil and Water).

Riparian Planting: Proposed activities will help stabilize and reduce sediment transport.

Table 3-81 Pre-commercial Thinning Acres by Watershed

Watershed	Acres
Lower St. Maries River	204
Maize Creek	43
Wood Creek	31
West Fork St. Maries River	38
Bechtel Creek	8

Water Yield

Road Treatment: No change to water yield is expected from road maintenance. A minor reduction in water yield may be achieved from the proposed road decommissioning and storage because of increased infiltration. Unneeded roads would be decommissioned to allow increased infiltration, subsurface flow continuity, and re-vegetation which will help reduce the water yield. This would restore hydrologic function of the sites and more importantly of hillslope processes where many road acres would be rehabilitated.

Thinning: Pre-commercial thinning is not likely to increase water yield because acres to be treated are spread across a number of watersheds (Table 3-81), vegetative cover would rapidly increase to pre-

treatment levels, and all activities are non-mechanical (hand work) in both falling and planting. Minimum 50-foot buffers to channels and wet areas are required (see Design Features – Soil and Water).

Riparian Planting: Proposed riparian plantings may utilize slightly more water resulting in undetectable reduced water yield.

Stream Channels

In the project area, stream channels are located adjacent to floodplains and are most commonly associated with the wetland areas which are either associated with stream channels or are smaller than ¼ acre and are not mapped. All of these areas would be protected by Riparian Habitat Conservation Area (RHCA) buffers; therefore no detrimental effects to stream channels or the wetlands are anticipated from the proposed actions. Improvement activities including proposed riparian planting and removal of encroaching roads should improve floodplain conditions by providing for more storage of sediment, attenuating flood peaks, and providing a larger floodplain for peak flow accessibility. Riparian planting would begin increasing shade to stream channels.

Culvert removal would improve channel conditions by removing flow restrictions, decreasing potential sources of sediment from fill failure, and decreasing the number of potential sediment entry points to the stream system.

No substantial change in water or sediment yield is anticipated from the proposed activities common to all alternatives, therefore stream channels are not expected to change.

Water Quality and Beneficial Uses

Water quality and beneficial uses should improve from the proposed common activities. The sediment budget (SSW-1) shows movement toward meeting the sediment load reduction identified in the sedimentary TMDL. Proposed activities common to all action alternatives are not expected to increase pollutant levels, except for a short-term increase in sediment from road decommissioning activities (PF: SSW-12, SW-43). No increase in stream temperature is expected from the proposed activities common to all alternatives because no stream-shade reduction would occur due to implementation of RHCA buffers. Proposed riparian plantings are expected to increase stream-shade and move toward meeting the temperature TMDL. The long-term effect of these activities is to reduce sediment levels and stream temperatures and improve aquatic habitat. Improved support of beneficial uses is expected (Table 3-85).

Some sediment entrainment is expected in the very short-term during road obliteration (SSW-12, SW-43). No consequential aggradation in channels is expected and long-term benefits from these activities are expected to reduce sediment levels (Tables 3-75).

Cumulative Effects for All Action Alternatives (B – F)

Past, present, and reasonably foreseeable future activities considered in this analysis include timber harvest, road construction and maintenance, gopher control, grazing, railroad and its associated maintenance, Clarkia Interface Fuels Reduction Project, and minerals exploration.

Timber Harvest: Timber harvest has occurred throughout the cumulative effects analysis area. The majority of previous logging began in the 1950s and continues today. Reasonably foreseeable Forest Service actions include the Clarkia Interface Fuel Reduction project south and west of Clarkia.

Roads: Routine road maintenance would occur throughout the Hidden Cedar Area. Incidental sediment may be generated from this activity, but is not expected to affect water quality because effects are temporary and these activities are intended to prevent substantial erosion from occurring.

Non-NFS land: Road building and harvest activities would likely occur on private lands. These activities' sediment production levels were estimated in DEQ's TMDL model (PF, SSW-1, 24, 53, 54, 58). Models estimated water yield increases in smaller tributaries, but analysis of gauge station data for the St. Maries River above Santa, Idaho does not show increased peak flows (SSW-28, 29, 32). Ongoing and future activities on non-NFS land are similar in spatial and temporal scope as activities that occurred in the past and are modeled in WATSED. The values identified for water yield in WATSED are expected to be similar if modeled for future activities as well (PF: SSW-13), because non-federal activities are expected to continue at about the same rate (SSW-13**).** TMDLs apply to activities on non-Forest Service land within the watershed.

Gopher Control Project: Treatment of gophers is proposed for the Hidden Cedar Area. Design features require that treatment will not occur within INFISH buffers (INFISH, 1995, p. A-12); in areas where the soil is saturated; or during periods of or forecasted periods of heavy precipitation. No effect to water quality or beneficial uses is expected from this treatment because of these design features, the pesticide's rapid degradation (Hegdal and Gatz, 1977) and the chemical agent's placement within gopher tunnels (underground) will prevent dispersal of the chemical control agent to the stream system. Also strychnine, the chemical control agent would be used in very low concentrations – 0.5% and it is mostly insoluble in water (SSW-71). The Environmental Protection Agency found that below-ground placement of strychnine is unlikely to contaminate ground or surface water (SSW-71).

Grazing: Current levels of grazing are likely to continue under Forest Service permits and on non-Forest Service land. Effects to soil and water are reflected in the existing condition. The District prepared a grazing Environmental Assessment with a signed decision in 2005. Effects of grazing are identified and discussed in the EA and Decision Notice. Monitored grazing sites on Federal land administered by the St Joe Ranger District found that there was about a 5% impact to the soil resource from compaction attributable to cattle grazing (SSW-44). This monitoring was conducted on areas in the Hume Creek drainage where cattle grazing was very evident from the existence of trails and cow manure. Observations during the field seasons of 1999-2001 show other areas with permitted grazing do not have the concentrated use evident in Hume Creek (SSW-44). In areas with more dispersed grazing, soil impacts are less than that found in Hume Creek. Selection of the alternative identified in the grazing decision notice is expected to move area streams toward beneficial use support (USDA FS, 1999a, St. Maries Grazing Allotment EA, p. 73-74). The St. Joe Ranger District monitors "greenline" vegetation adjacent to the riparian line annually (SB-12). In Catspur Creek monitoring shows median end-of-season stubble height to be greater than six inches high (usually greater than 12 inches). This indicates good riparian health and good ground cover.

Clarkia Interface Fuels Project: The proposed Clarkia Interface Fuels treatment calls for grapple piling on 27 acres. Grapple piling is estimated to cause 13% detrimental soil disturbance (see Soils section) or 3.5 acres of disturbance. Water yield increase is not expected from this proposed thinning (see discussion under Pre-commercial Thinning).

Railroad: Ongoing maintenance of the railroad tracks and bridges would occur. Maintenance activities are not expected to affect water quality or beneficial uses. The railroad grade is on private

land through acquisition of easements and most of the railroad right of way passes through private land.

Minerals Exploration: Past, present and reasonably foreseeable minerals exploration activities affect limited areas. Previous minerals exploration activity negatively affected soils on one acre at the most. Ongoing and proposed activities in Catspur Creek and near Bechtel Butte are estimated to result in less than one acre of detrimental soil disturbance.

Proper Functioning of Basin Hydrology (Vegetative and Soil Conditions)

As described above, basin hydrology may be affected by vegetative and soil conditions. The cumulative activities in the St. Maries Basin within the project area have changed vegetative structure, but it is not much different than achieved by wildfires in the past. A comparison of vegetative conditions in 1933 and 2002 aerial photographs and 2004 composite aerial photographs shows increased vegetation in 2004 in many areas within the project area (SSW- 9, 51). Vegetative conditions are modeled to reflect changes in water yield from past and proposed activities. WATSED modeling includes non-Forest Service activities. No consequential change in basin hydrology is expected because estimated water yield increases (as modeled) are relatively low and proposed restoration activities would improve conditions.

Cumulatively, on National Forest System lands in the Hidden Cedar Project Area, there may be disturbance or reduced soil productivity on approximately 1,784 to 1,910 acres (depending on alternative) including past, present, and reasonably foreseeable activities (Table 3-59). Road decommissioning and storage would improve soil conditions on 64 to 101 acres (Soils section). Proposed new road construction would remove some acreage from existing soil productivity. A reduction of productivity would occur on 50 acres in Alternative B, nine acres in Alternatives C & D, and 36 acres in Alternative F. The net change in <u>increased</u> soil productivity related to roads would be 14 acres in Alternative B, 55 acres in Alternative C, 90 acres in Alternatives D and E, and 65 acres in Alternative F.

Sediment

Cumulative watershed effects are particularly difficult to predict and identify because individual water and sediment inputs are delivered to the stream system at different points in time and space, and these interact with the water and sediment already in the stream (NCASI, 1999).

Activities are expected to continue on other lands in the Hidden Cedar Area. These include grazing, road construction, timber harvesting, motorcycle racing, off road vehicles and fuels treatment. Identified non-Forest Service land activities were modeled utilizing the DEQ TMDL model. The results are displayed in Tables 3-82 and 3-83. Other future activities on non-Forest Service land, for instance how many miles of road obliteration versus how many miles of road construction have not been identified, but these activities are almost certain to continue at levels similar to the past. If there were more road construction and road-stream crossings, sediment levels would cumulatively increase.

The following tables display cumulative sediment levels for the Hidden Cedar Project Area based on the Idaho DEQ TMDL spreadsheet model using identified non-Forest Service activities (SSW-7, SSW-18) combined with activities on NFS lands. The value displayed for Alternative A includes

road activities since 1999 and some previous road activities not accounted for in the DEQ TMDL model (SSW-26).

Both non-stocked stands and temporary roads (following removal) are short-term increases (one to two years) (SSW-17, SSW-79). Removing these short-term increases would give the estimated long-term sediment reduction for the Hidden Cedar Area. Table 3-82 identifies short-term sediment amounts from NFS lands and other lands. Table 3-83 displays values with no short-term sediment.

Table 3-82 Short-term Addition from Temporary Roads & Non-stocked Stands: All Lands

Alternative	Cumulative Sediment Addition (Tons / Year)				
	West Fork St. Maries R	Catspur	Lower St. Maries R	Cedar	Total
A	4.74	0.98	0.45	1.22	7.39
B	29.28	2.43	1.12	1.54	34.37
C	18.37	2.43	0.63	1.54	22.97
D	18.06	2.43	0.45	1.44	22.38
E	17.95	2.43	0.45	1.22	22.05
F	26.83	2.43	1.12	1.39	31.77

Table 3-83 Long-term Cumulative* Sediment Change: All Lands**

Alternative	Cumulative Change in Tons/Year				
	West Fork St. Maries R	Catspur	Lower St. Maries R	Cedar	Total
A	-74.39	-10.79	-8.14	-10.68	-104.00
B	-59.08	-9.34	-33.13	-10.68	-112.23
C	-66.82	-9.34	-33.63	-10.68	-120.47
D	-76.12	-9.34	-35.83	-11.19	-132.48
E	-76.12	-9.34	-35.83	-11.19	-132.48
F	-65.74	-9.34	-35.33	-11.19	-121.6

**Cumulative includes information updates, Hidden Cedar Project activities, connected actions, and known activities on other lands*

***Includes reductions and long-term additions. Does not include short-term additions. Negative numbers indicate reduction in sediment*

Water Yield

Cumulatively water yield may be causing minor gradual lateral migration of the low-gradient stream reaches of the West Fork and St. Maries River, but this could be considered part of natural channel evolution (Leopold et al., 1964; Schumm, 1977), and analysis of yearly peak flow values indicates that there is no statistically significant trend of increases in peak flow values (SSW-28).

Non-Forest Service land activities, within the Hidden Cedar area, including road construction and timber harvest are expected to continue increased water yield (as modeled) compared to reference (untreated) conditions, but this may be contradicted by the fact that analysis of gauge station data does not statistically show peak flows increasing over time (SSW-28, 29, 32). Although models estimate slight increases in cumulative water yield, it is unlikely that the proposed activities combined with non-FS managed land activities will increase water yields to levels that will cause appreciable changes to stream channels or sediment transport. Gauging station data and a comparison of stream channels over time does not indicate substantial changes in stream channels from increased peak flows. USGS discharge records of actual peak flows do not indicate a statistical increase in peak flows over time (SSW-28, 29, 9). A comparison of photos taken over time since 1933 shows no substantial channel changes except in one area (SSW-9, 51), which may have resulted from flooding in 1964. There are obvious human-caused alterations, but these were not a result of changes in water yield.

These Non-Forest Service land activities are almost certain to continue at levels similar to the past (SSW-13: Potlatch and Idaho Department of Lands information). The result of water yield estimates from the WATSED model includes past activities and the values are cumulatively expected to remain in the same range because non-Forest Service timber harvest would continue at about the same level (SSW-13) as that modeled (Table 3-86). The WATSED model estimated a 5% increase prior to Forest Service proposed activities in the Cedar Creek drainage. With proposed Forest Service activities it is estimated at 13%. One year following Forest Service activities, it is estimated at 6%. The second year following, it returns to the 5% level (SW-31). State and private industry identified activities for 2006 and 2007 within the Hidden Cedar Analysis Area and these were included in quantitative estimates of water yield for Cedar Creek and the West Fork and St. Maries River. Cumulatively, activities identified as occurring on non-Forest Service land (SSW-7, NAIP photo with Potlatch activity delineation) in Cedar Creek for 2006 may increase peak flow (Kappesser rain-on-snow analysis) from an average of approximately 9% to 18% for Alternative B and from an average of approximately 9% to 16% for Alternative F (SSW-15).

For the West Fork cumulative peak flow (Kappesser rain-on-snow analysis) may increase from an average of approximately 4.1% to 7.2% in Alternative B and from an average of 4.3% to 7.6% for Alternative F (SSW-15). Other alternatives fall in this range or below.

For the St. Maries River the cumulative peak flow (Kappesser rain-on-snow analysis) may increase from an average of approximately 3.1% to 8.6% in Alternative B and from an average of 3.0% to 8.6% for Alternative F (SSW-15). Other alternatives fall in this range or below.

Without full disclosure by non-Forest Service landowners of anticipated activities beyond 2007 – mapped locations and timing – cumulative effects from many future activities are speculative and cannot be quantified.

Stream Channels

Cumulatively, response reaches may be experiencing gradual lateral migration in the lower St. Maries River and lower West Fork St. Maries River. However, there is no evidence of accelerated lateral migration in a comparison of channels in 1933 and 2002 aerial photographs (SSW-9, SW-51) even after the highest discharge for the 36 year period of record occurred in 1996. The comparison of photos shows no substantial channel changes except in one area (SSW-9), which is likely a response from flooding in 1964, and two other human-induced channelized reaches near Clarkia Idaho. Additionally, the comparison of 1933 to 2002 photos shows that most channel modifications and changes occurred prior to 1933 and very little channel adjustment has occurred in the 69 years between photos (SSW-9, 51).

Gauging station data and a comparison of stream channels over time does not indicate substantial changes in water yield or stream channels from increases in peak flows. USGS discharge records of peak flows measured on the St. Maries River at Santa do not indicate a statistically significant increase in peak flows over time (SSW-28, 29); rather, it shows high variability and that the stream channel accommodated these peak flows without substantial adjustment (SSW-11, 9).

Estimated water yield (as modeled) increases from the proposed federal activities combined with non-Federal activities are not expected to impact stream channels because the increase in stream power per unit area is basically negligible (Schumm, 1977), and channel widening is not expected (Leopold et al. 1964). Although Schumm's "stream power" and Leopold's "square root law" indicate small to no changes to Cedar Creek, some effect to the channel may occur in the lowest reach where small areas of cattle trampling of streambanks occurred. Streambank trampling is discontinuous over about 0.4 miles in the lowest reach (SW-5, Hallisey, Field Notes). The greatest extent of past activities within this drainage are on private land in the lower portion of the drainage where most of the roads are located and the past harvest level is about 60-75% (estimated from aerial photography (SSW-7, 9). Although all areas where past activities have occurred are considered stocked (SSW-17), about 212 acres with ongoing and near-term (1-2 yr) future activities were included in the sediment spreadsheet model as contributing short-term sediment amounts in the 'non-stocked' category (SSW-1, 24, 53, 54, 58).

Stream power, the rate of work done by a fluid, is proportional to the cube of velocity (Schumm, 1977). Although stream power may have a small increase, no consequential increase in stream power per unit area is expected, because channel area generally increases as stage increases and area greatly increases once streamflow accesses floodplains.

Leopold's "Square Root Law" can be summed up as: Channel width increases downstream in proportion to the square root of discharge (Leopold, et al., 1964, p. 248). This indicates that small increases in water yield have little potential to affect channels.

Some channel adjustment may be occurring in the lower reaches of Cedar Creek, but no instability was noted except some areas of cattle streambank trampling (Fisheries section; SSW-81).

Although a decrease in overall sediment is expected from Forest Service proposed activities (Tables 3-75 and 3-85), and a decrease in sediment has occurred from federal land (Alternative A) since the DEQs subbasin assessment, sediment generation from non-Forest Service activities in the Middle Fork St. Maries River and estimated sediment from non-Forest Service road construction within the Hidden Cedar Area may enter stream channels and move through downstream reaches. In headwater areas increased sediment would not affect transport reaches (Rosgen B and E channel types,

Montgomery and Buffington cascade and step-pool channel types) because the sediment would be rapidly transported through the system. Downstream response reaches (Montgomery and Buffington pool-riffle and Rosgen F & C channel types) may experience deposition in the form of pool filling, bar formation and lateral channel migrations above natural conditions (Montgomery and Buffington, 1997). As identified above, the comparison of aerial photographs over a 69-year time frame shows no substantial changes in the St. Maries River channel (SSW-9), and this can be extrapolated to the tributaries because cumulative effects are expected to increase in the downstream direction (NCASI p.18). Because there has been no substantial change to the St. Maries River channel (SSW-9, 51), neither water yield levels nor sediment levels appear high enough to cause a substantial response: bank erosion, changed reach morphology, etc., as identified by Montgomery and MacDonald (2002, pp. 10-12). Furthermore, previous and proposed riparian plantings and previous large woody material placement are expected to improve channel conditions.

Water Quality and Beneficial Uses

The existing overall sediment level and high stream temperatures within the St. Maries River are considered to have caused water quality limited reaches where assigned beneficial uses are not being met (SSW-3).

For all action alternatives the amount of sediment generated from the FS proposed activities is expected to decrease (Tables 3-74 and 3-75) because of the proposed road decommissioning/storage and associated crossing removals (Table 3-73). The trend toward attainment of beneficial use support related to sediment would increase from FS activity.

Comparing Table 3-85 (FS sediment level) to Table 3-86 (cumulative sediment level) indicates that non-Forest Service activities have sedimentary effects that would offset some of this benefit. Sediment budgets on non-Forest Service land need to consider additions from road construction, non-stocked stands, and reductions from crossing removals to meet their assigned sediment reduction identified in the TMDL. The increases of sediment on private/state land need to be accounted for by private/state land managers in the TMDL assigned to their lands. Table 3-83 display cumulative sediment levels from estimates based on activities identified by non-Forest Service land managers.

Forest Service activities would not increase stream temperature because of adequate stream buffers. Eventual temperature decreases are expected from the Forest Service previous and proposed riparian plantings. If non-Forest Service land activities are meeting the Idaho Forest Practices Act and the approved TMDL, no increase in stream temperature is expected. Idaho Water Quality Standards (IDAPA 58.01.02.350) identifies that BMPs such as the FPA are intended for “protecting designated beneficial uses and ambient water quality.” The Forest Service is not responsible for documenting or monitoring IDAPA approved best management practices listed at 58.01.02.350.03 on other lands.

Riparian plantings and previous large woody material placements are anticipated to reduce stream temperatures and improve habitat conditions in the long term. However, non-Forest Service land activities may offset any gains from this proposed activity (such as construction of roads in riparian areas on non-Forest Service land).

Directly or cumulatively, activities are not expected to change nutrient levels unless higher levels of grazing occur or effluent systems on non-NFS land increase or become non-functioning.

Overall Summary & Comparison of Effects

Summary of Effects (Forest Service Activities)

Alternatives B and C propose 20 additional crossing reductions. In Alternatives D and E, 33 crossings would be removed. Alternative F would remove 34 crossings (SSW-45). Alternatives D, E, and F would remove the riparian road in Hidden Creek and Wood Creek. The following table identifies miles of 'encroaching roads' based on the definition of encroaching roads used in the DEQ TMDL model (roads within 50 feet of a stream channel SSW-47).

Table 3-84 Miles of Road Proposed to be Recontoured w/in 50 Feet of Stream Channel

Drainage	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Keeler	0.2	0.2	0.2	0.2	0.2
Long Slim	0.0	0.0	0.0	0.0	0.0
Log	0.1	0.1	0.1	0.1	0.1
Kitten	0.0	0.0	0.0	0.0	0.0
Cat Spur	0.1	0.1	0.1	0.1	0.1
West Fork St. Maries River	0.5	0.5	0.5	0.5	0.5
Hidden	1.3	1.3	1.5	1.5	1.5
Wood	0.3	0.3	0.4	0.4	0.4
Mazie	0.6	0.6	0.6	0.6	0.6
Bechtel	0.2	0.2	0.2	0.2	0.2
Cedar	0.0	0.0	0.0	0.0	0.0
Staples	0.0	0.0	0.0	0.0	0.0
Blair	0.0	0.0	0.0	0.0	0.0
Lower St. Maries River	1.6	1.6	1.7	1.7	1.7
Total	4.9	4.9	5.3	5.3	5.3

A summary of effects on the watershed from proposed federal activities on National Forest land is presented in the table below. The following information is pertinent to Table 3-85:

- All values are related to effects from activities on National Forest System land.
- New road construction mileage is from the GIS road layer.
- Values for sediment increases (from road construction) and sediment reductions (from road decommissioning/storage) are based on Idaho DEQs TMDL spreadsheet model (SSW-1, 18, 24, 53, 54, 58).
- Water yield increases are an average using Packer (1971), Kappesser, (1991) and WATSED.
- Sediment reduction values by alternative are for the portion of the St. Maries River included in the project area.

Table 3-85 Summary of Forest Service Activity Effects on the Watershed*

Parameters	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Miles of new road construction[1]	0.0	11.1	2.0	2.0	2.0	8.8
Sediment increase from road construction (tons / year)	0	12.1	3.9	3.9	3.9	10.5
Miles of road decommissioned or stored[2]	0.0	15.9	15.9	24.8	24.8	25.2
Sediment decrease from roads decommissioned or stored[3] in the St. Maries River (tons / year)	0.0	31.3	31.3	42.6	42.6	42.6
Long-term sediment decrease (tons / year)[5]	0.0	19.1	27.2	38.73	38.73	38.73
Long-term sediment decrease accomplished under 2002 Hidden Cedar decision (tons / year) [6]	19.5					
New stream crossings from road construction	0	17	5	5	5	16
Stream crossing removed[7]	0	20	20	33	33	34
Stream temperature increase[8]	0	0	0	0	0	0
Other pollutant increase[9]	0	0	0	0	0	0
Modeled Water yield increase in West Fork St. Maries River[10]	0.0%	4.1%	4.3%	2.7%	0.0%	4.3%
Modeled Water yield increase Cedar Creek[10]	0.0%	12.2%	12.2%	6.8%	0.0%	10.3%
Modeled Water yield increase for the St. Maries River[10] (Project Area)	0.0%	3.1%	3.2%	1.6%	0.0%	3.0%
Acres of soil returned to productivity from decommission of existing roads[11]	0	64	64	99	99	101
Acres of riparian planting[12]	0	15				

** Watershed as defined in Analysis Area of the Water Section*

[1] New road construction (includes temporary roads) on NFS administered land only.

[2] Miles of road that change to road management prescriptions C, D and E (see FEIS, Appendix D for definitions). The values for Alternatives B & F appear higher than other alternatives, because numbers displayed for these Alternatives includes new road construction that is then stored or decommissioned.

[3] Sediment reduction is for restoration activities only.

[5] Long-term sediment reduction includes new construction but not the short-term increase from temporary roads and non-stocked stands.

[6] This includes activities accomplished under the 2002 Hidden Cedar decision.

[7]57 crossings removed since DEQ TMDL assessment, of which 22 were removed under 2002 Hidden Cedar decision. No reduction in the potential of sediment entering stream channels from crossing failures was used in the sediment spreadsheet model (SSW-1, 18, 24, 53, 54, 58,), but on the ground there would be substantial reduction of potential crossing failure and tons of sediment entering the stream.

[8]Stream temperature values are not expected to increase because of RHCA buffers. Temperatures may decrease in the long term because of riparian plantings.

[9]Other pollutant levels are not expected to increase from activities associated with the alternatives, because no chemical additives to the stream system are expected. Pollutant entries into the stream system are possible, at stream crossings or roads close to streams, from accidental occurrences, or purposeful or ignorant injurious introductions.

[10]Water yield increase (from proposed activities) displayed is the average of Packer & Kappesser (harvest only) and WATSED (harvest and roads). As discussed throughout this chapter stream gauge peak flow data analysis did not show a statistical trend of increasing peak flows (SSW-28).

[11]Soil acres returned to productivity are estimated from the level of road decommissioning and long-term storage. Restoration of hydrologic function would also occur over these same acres once native vegetation becomes established on the recontoured and decompacted surfaces.
[12]15 acres of riparian planting were accomplished under 2002 Hidden Cedar Decision.

Summary of Cumulative Effects (Non-Forest and Forest Service)

Table 3-86 displays estimated cumulative effects on the St. Maries watershed from the activities proposed on National Forest System land and those occurring and expected to occur on non-Forest Service land within the Hidden Cedar Project Area.

The following statements are pertinent to Table 3-86:

1) Idaho State DEQ regulations and the establishment of a TMDL for the St. Maries watershed requires reduced sediment levels.

2) Because harvesting and road building would continue on non-Forest Service lands all values in Table 3-86 with a (+) sign are likely to increase.

3) With the assumption that State BMPs and the Idaho Forest Practices Act are followed on non-Forest Service land, no increase in stream temperature or other pollutants (except sediment) is expected, but it is not known if this will occur. An example of road management on non-National Forest System lands is the 2.7 miles in Cedar Creek and 3.3 miles in Keeler Creek that were put into long-term storage. This entailed six stream crossings removed in Cedar Creek and 18 stream crossings and 2.9 miles of RHCA road decommissioned in Keeler Creek. Soil returned to productivity on non-Forest Service land is about 21 acres, although additional non-Forest Service road building may remove this much or more acreage from productivity.

4) The effects from increases in sediment and water yield (as modeled) may be increased lateral migration of the West Fork and main St. Maries River in response (Rosgen C and F reaches, Montgomery and Buffington pool-riffle reaches) classified reaches. Water yield modeling by WATSED ranges from 3% to 15% compared to natural conditions for watersheds in the cumulative effects area and this includes past non-Forest Service land activities. The level of harvest in the Middle Fork St. Maries River was not modeled by WATSED, but non-Forest Service activities there are comparable to roading and harvest levels within Cedar Creek, which had water yields at 5% above natural prior to FS activities 10-13% as response to FS activities and a lowering to 6% the year following FS activities; or Blair Creek which is modeled at 15% prior to proposed FS activities and no change in response to FS activities and dropping to 14% the year following. This would give an estimated cumulative water yield increase to the Lower St. Maries Watershed of 8% to 18%. But analysis of gauge station data does not statistically show an increased peak flow trend (SSW-28, 29, 32). In a comparison of aerial photographs no consequential channel changes were noted in the lower St. Maries River even after the highest peak flow of 36 years of record occurred in 1996 or in a comparison of 1933 to 2002 aerial photographs (SSW-9, SW-15), although human activity straightened two reaches near Clarkia and there was one meander cutoff likely the result of flooding in 1964.

5) Sediment reduction values by Alternative are for the portion of the St. Maries River included in the project area.

Table 3-86 Combined FS and Non-Forest Service Activities

Parameter	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
New road construction (miles)[1]	0.0	16.7+	7.6+	7.6+	7.6+	14.4+
Road construction sediment increase (tons /year)	0.0	22.9	14.7	14.7	14.7	21.3
Road decommissioned or stored[2] (miles)	0.0	15.9	15.9	24.8	24.8	25.2
Sediment decrease from roads decommissioned or stored[3] (St.Maries River in tons/year)	104	135	135	147	147	147
Long-term sediment decrease (tons / year)[5]	0.0	8.2	16.5	28.0	28.0	20.1
Long-term sediment reduction done under 2002 Hidden Cedar decision (tons / year) [6]	19.5					
New stream crossings	0	33+	21+	21+	21+	32+
Stream crossing removed[7]	82	20+	20+	33+	33+	34+
Stream temperature increase	Non-Forest Service land has a temperature TMDL in place that requires increased stream canopy cover.					
Other pollutant increase[8]	It would be speculation to address other pollutants on non-FS land					
Modeled water yield increase for West Fork St. Maries R.[9, 10]	6.5+%	7.2+%	7.2+%	<7.2+%	6.5+%	7.6+%
Modeled Water yield increase Cedar Creek[9, 10]	5.0+%	17.4+%	17.4+%	<17.4+%	5.0+%	<17.4+%
Modeled Water yield increase for the St. Maries River (Project Area) [9, 10]	7.3+%	8.6+%	8.6+%	<8.6+%	7.3+%	8.6+%
Riparian planting[11]	0 ac.	30+ ac.				

[1] *Includes road construction on non-Forest Service land associated with access requests*

[2] *Miles of road that change to road management prescriptions C, D and E (storage and recontouring).*

[3] *Sediment reduction is for restoration activities only from project file document SSW-1Sediment Budget Worksheet, Cumulative Total Restoration Reduction*

[4] *Short-term sediment decrease factors in the increases from new construction, temporary roads and non-stocked stands.*

[5] *Long-term sediment reduction includes new construction but not the short-term increase from temporary roads and non-stocked stands.*

[6] *This row includes all activities proposed in the original decision for the Hidden Cedar Area, which were accomplished, reducing sediment by 19 ton/yr in the St. Maries basin within the project area.*

[7] *82 crossings removed since or not counted in the DEQ TMDL assessment and 22 removed under 2002 Hidden Cedar decision.*

[8] *It is unknown whether other pollutants (chemical) would increase or decrease on non-Forest Service land and it would be speculation to try and determine this.*

[9] *Water yield increase displayed is the average of Kappesser (harvest only) and WATSED (harvest and roads). Alt. A & Alt. E are WATSED values only.*

[10] *The water yield values in Table 3-86 include all streams in the project area but do not include the estimated 15% water yield increase for activities in the Middle Fork St. Maries River. Alt. A & Alt. E are WATSED values only.*

[11] *15 acres of riparian planting were accomplished under 2002 Hidden Cedar Decision.*

Values that have a + sign after the number indicate that there could be further increase or decrease from non-Forest Service land activities beyond those identified by the State of Idaho and Potlatch Corp for 2006-2007.

Consistency with Forest Plan and Laws

The Idaho Panhandle National Forests' Forest Plan

Management activities on NFS lands will not significantly impair the long-term productivity of the water resource and state water quality standards will be met or exceeded. All action alternatives would result in a long-term net decrease in sediment production (Table 3-75) which would improve water quality, improve habitat conditions and improve support of beneficial uses. Stream temperatures would not be affected (FSEIS p. **293**). BMPs would be implemented in all action alternatives (Chapter 2 Design Features and SSW-2), and their effectiveness should be high (FSEIS pp. 54, 222, 238, 255, 262, 282, 298). The Idaho Forest Practices Act is applied through BMPs and timber sale contract provisions (SW-49). Although models estimate slight increases in water yield for the Alternatives B, C, D, and F; it is unlikely that the proposed activities would increase water yields to levels that would cause appreciable changes to stream channels or sediment transport (FSEIS p. 292).

RHCAs are identified for watersheds of the Hidden Cedar Area. Landslide-prone areas and streams would have buffers applied to them to provide stream shading and prevent sediment entry into the stream system, as required by the Inland Native Fish Strategy Forest Plan Amendment.

Clean Water Act

The Clean Water Act objective is to restore and maintain the physical, chemical and biological integrity of the nation's waters. All alternatives meet the Clean Water Act considering all activities proposed in the Hidden Cedar Project including completed activities approved with the 2002 decision.

The chemical integrity of the water would not be affected by activities under the alternatives because no toxic pollutants are expected to enter the stream system, except through accidental occurrences. No fueling of equipment would occur within RHCA buffers.

Buffer strips would protect the physical integrity of the water within the Hidden Cedar Area from temperature modification and sediment routing. Sediment production would be reduced for the St. Maries River in the project area for all alternatives, both from FS proposed activities and cumulatively (SSW-1, 24, 53, 54, 58).

The biological integrity of the water in the Hidden Cedar area would be protected and enhanced from activities proposed in the action alternatives. See the FS Effects Summary Table 3-85 for number of stream crossing removals and sediment reductions that would enhance water quality. Riparian plantings proposed for all action alternatives may eventually decrease stream temperature and provide aquatic habitat improvements.

Idaho Water Quality Standards

The action alternatives would meet Idaho Water Quality Law, with the reasoning stated above for the Clean Water Act. Overall for the Hidden Cedar area there is an estimated reduction of sediment from all action alternatives due to road decommissioning and long-term storage. Best management practices will be utilized during road construction, road recontouring and stream crossing rehabilitation consistent with IDAPA 58.01.02.350. The short-term sediment generated during this work was included in the sediment budget. The sediment budget shows a net decrease of sediment in the impaired watershed, which is consistent with the TMDL for sediment reduction. The short-term sediment generated during road recontouring and stream crossing rehabilitation is not expected to cause further beneficial use impairment because; 1) it is short-term at each crossing whereas the TMDL reduction is long-term; 2) the activity is essential to the promotion of public interest; 3) it is a soil stabilization measure; and 4) it is activity which results in overall enhancement or maintenance of beneficial uses.

Water Quality Limited Segments & TMDLs

The West Fork St Maries River and the St. Maries River are listed on the State 303(d) list of impaired streams and have a Total Maximum Daily Load allocation for reducing sediment and stream temperature. Overall sediment production for the St. Maries River would be reduced by 19-39 tons/year from National Forest System lands after implementation of all action alternatives through road decommissioning and storage (see Table 3-85) when considering all activities completed with the 2002 Hidden Cedar Record of Decision and the activities proposed in the current Hidden Cedar SEIS. However, Alternative B would directly increase sediment in the long-term in the West Fork and would not meet the sediment TMDL within those reaches because the proposed road construction would produce more sediment than the sediment-reducing activities would remove. Proposed riparian plantings should move toward meeting the temperature TMDL in place for the St. Maries River. These activities are expected to improve water quality and move toward support of beneficial uses.

Executive Orders 11988 and 11990

Proposed activities would be in compliance with these executive orders because only restoration activities and activities exempt from the Clean Water Act under 33 CFR 323.4 (roads for silvicultural activities) are proposed on floodplains or wetlands.

Wildlife

Changes Between the Draft SEIS and the Final SEIS

The analysis was updated to reflect the following changes in Alternative F:

- new road construction and decommissioning below Bechtel Butte, and
- decommissioning/storage of Wood Creek Road 341.

Minor updates and corrections were made in descriptions of some activities – e.g. treatments in some proposed units were updated to reflect the execution of the design features for goshawks around the nest that was found during ongoing field monitoring and reconnaissance. Minor changes/additions were also made in response to comments and to correct minor discrepancies found during the supplemental analysis for the final version of Alternative F.

Changes Between the 2002 EIS and this SEIS

The analysis was supplemented to account for changes in conditions that have occurred between now and the initial analysis. These changes include such things as updates to various databases, new species lists (e.g. Regional Foresters Sensitive Species List), implementation of some activities (e.g. road decommissioning and storage), changes in implementation of some planned activities (e.g. road construction on non-NFS lands), and changes in the state of our knowledge (e.g. based on recent scientific literature). Some acre values have changed due to updates to the TSMRS/FSVeg databases and road locations/miles have changed due to use of a new database for roads and updates based on new information. Examples of changes include: re-delineation of some stands, updated stand information based on new field data, roads have been decommissioned, and/or road locations/miles have been refined. Another source of change is the use of a new database for roads that stores, retrieves, and displays data in a different way than what was used in the initial analysis. All changes were reviewed for their potential to change results, effects, and/or determinations on wildlife. All consequential (and some inconsequential) differences between the initial analysis and this supplement have been accounted for and have been changed in the document. In addition, some editing for clarification or to correct such things as typographical errors has occurred.

Regulatory Framework

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

The Endangered Species Act of 1973 as amended (ESA)
The National Forest Management Act of 1976 (NFMA)
The Forest Plan for the Idaho Panhandle National Forests (FP)

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

NFMA provides for balanced consideration of all resources. It requires the Forest Service to plan for diversity of plant and animal communities. Under its regulations, the Forest Service is to maintain

viable populations of existing and desired species, and to maintain and improve habitat of management indicator species.

The Forest Plan, in compliance with NFMA, establishes Forest-wide and Management Area direction, goals, objectives, standards, and guidelines for the management and protection of wildlife habitat and species. Forest-wide standards that to one degree or another apply to this project level analysis include:

Elk - Utilize the "Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho" to evaluate effects on elk habitat.
MIS - Maintain viable populations distributed throughout the Forest.
Cavity Habitat - Maintain habitat by implementing the IPNF Snag and Woody Down Timber Guidelines.
Sensitive Species - Manage habitat to prevent further declines in populations that could lead to federal listing.
Old Growth Habitat – (to provide for viable populations of old-growth dependent and management indicator species) maintain at least 10 percent of the forested portion of the IPNF as old growth and maintain at least 5% of the forested portion of Old Growth Management Units that have 5% or more existing old growth.

Management Area direction is described in Chapter 1. Direction concerning implementation of the ESA and NFMA are found in Forest Service Manuals (FSM) and various letters/memos from the Forest Service's Washington Office, Regional Office, and the IPNF Supervisor's Office.

Geographic Scope

The Hidden Cedar Project Area was defined early in the planning process and was delineated based on watershed boundaries. The geographic scope of potential effects on wildlife for this project level analysis was determined based on the spatial distribution of proposed federal actions and the home range of species that may be impacted. The Hidden Cedar Wildlife Analysis Area (Figure 1) is approximately 21,485 acres with 54 percent under Forest Service administration.

For some species habitat adjacent to the wildlife analysis area has been considered in the analysis. Also, for some species, due to the nature of species occurrence, distribution of capable/suitable habitat, the scope of the alternatives and lack of impacts throughout the wildlife analysis area, the geographic scope of the analysis is restricted to the area of potential impact. A more specific description of the geographic scope of the analysis – if it varies from the wildlife analysis area - is found under each habitat or species/guild section of this document.

Analysis Methods

The appropriate methodology and level of analysis needed to determine potential effects is influenced by a number of variables, including the potential for impacts, the risk to resources and species, available information, the ability to differentiate between alternatives, and the information necessary for an informed decision. This analysis starts at a course/medium level and proceeds to a finer level of analysis as needed to determine potential effects.

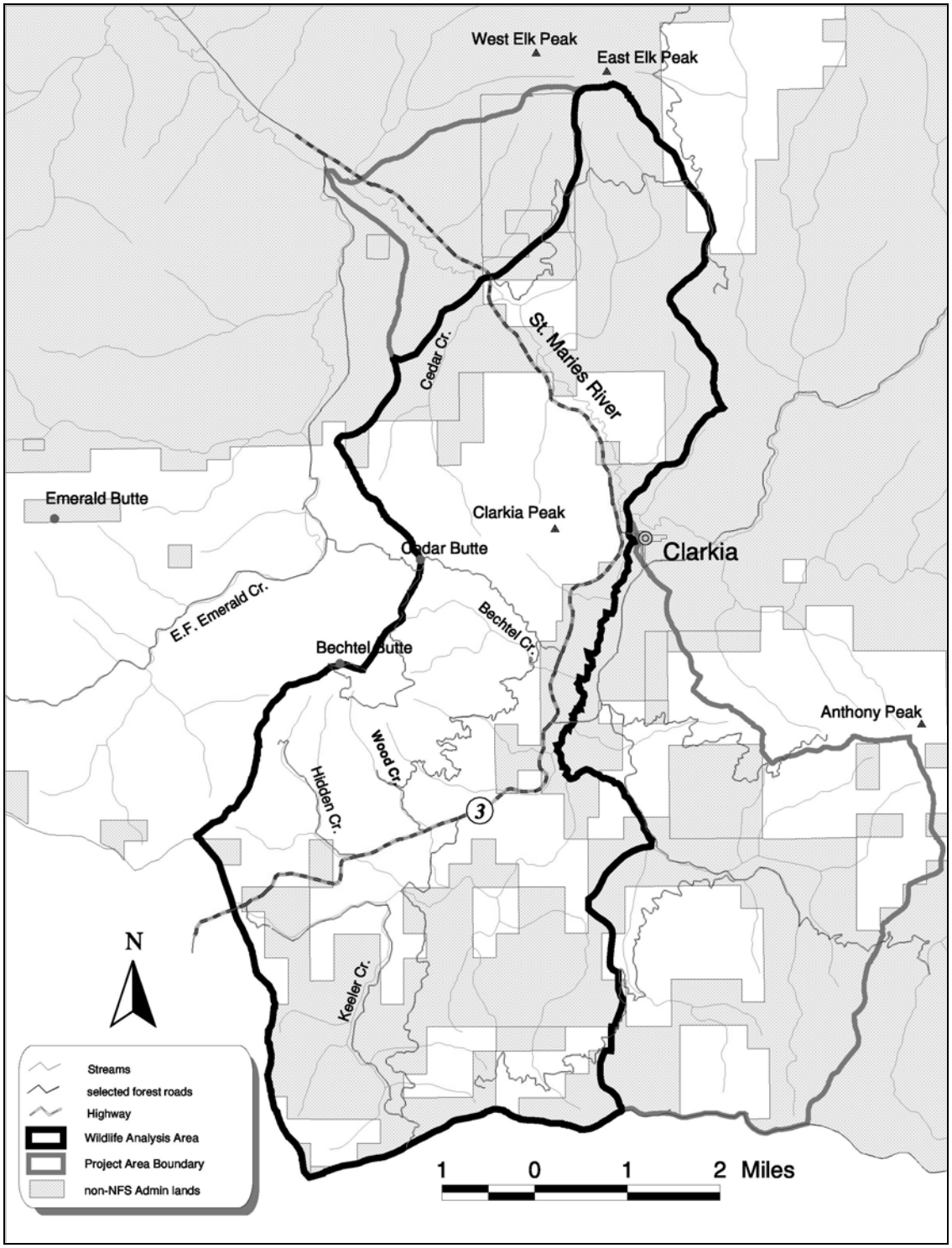

Figure 1- Wildlife Analysis Area

The following documents provided the primary information used to develop the analysis for potential effects on wildlife:

Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin (ICB Assessment)
Integration of Forest Planning into Ecosystem Management: Toward a Forest Ecosystem Approach: An Assessment for the St. Joe Area (St. Joe Geographic Assessment)
Available Conservation Assessments and Strategies for wildlife species.
Additional scientific literature as appropriate.

The analysis also incorporates the concepts in documents such as the *IPNF Standardized Effects Analysis Method for some Sensitive and Management Indicator Species* to help develop and conduct the analysis. The analysis is done at different levels of intensity (i.e. course filter - medium filter - fine filter) as appropriate to address the issues and concerns.

With acknowledgement and due consideration of differing/contrary views (e.g. regarding goshawk - Greenwald et al., 2005 [SPI-5]) and/or seemingly contrary information (e.g. regarding black-backed woodpecker - Hillis et al., 2002 [SPI-5]) the analyses for each habitat/species are based on the best available scientific information that is the most appropriate for the IPNF and the project (e.g. Samson, 2005). The analyses methodologies provide for disclosure of potential effects with as high a degree of certainty as is reasonable and necessary for an informed decision.

This analysis is organized by habitat and/or species. The main sections are:

Terrestrial Habitat – including forest structure (i.e. successional stages), old growth, dry site habitat, riparian habitat, access/disturbance, and connectivity.
Management Indicator Species (MIS)
Threatened, Endangered, and Sensitive Species (TE&S)

All current and foreseeable actions listed at the beginning of Chapter 3 are considered in the wildlife analysis; however, those actions vary in their potential for impacts on wildlife and the consequences of potential impacts.

Some actions listed may influence impacts but have no measurable effects on wildlife that need to be directly attributed to the action. For example, campground operations and outfitter permits may contribute to disturbance levels but are a part of the impacts measured by open road densities; and transmission line maintenance may impact vegetation but in terms of effects is essentially maintaining existing open/seedling conditions. Some actions – e.g. grazing – have the potential for impacts, however, the recent Grazing EA shows minimal impacts on wildlife from grazing and there is no need for additional analysis for most species.

Habitat associations provide the foundation for assessing habitat capability/suitability and assessing potential effects. The IPNF has developed queries of TSMRS/FSVeg databases for select species to represent those factors, including biotic (variable attributes such as stand structure) and abiotic (fixed attributes such as slope and aspect) components. Interpretation of key habitat components for determining habitat suitability is in the project file (SWL-27).

Aerial photos (1933 to 2004, located in the photo files at the St. Maries District Office) and stand exam data (stand files and timber stand data bases located at the St. Joe District office) were used as the basis for habitat analysis. Additional field reviews, walk-through exams, and data reviews were

conducted to validate and update this information (project file (PF): SWL-19, 20, 21, and 35). This information was compiled into spreadsheets and evaluated to determine habitat suitability (PF: SWL-7, 9, 10). The databases used to determine habitat capability and suitability were updated for the supplement and reviewed for accuracy and applicability for the analysis (PF: SWL-19, 20, 21, 35, and 36).

The analysis evaluates habitat in terms of human disturbance and the capability and suitability of vegetation (e.g. structure and composition) for wildlife species or groups of species with similar habitat needs. For the purposes of this analysis, capable habitat is wildlife habitat that has the fixed attributes that enable it to produce the habitat requirements for a given species currently or in the future. These fixed attributes include soils (or parent material, or landtype), slope, aspect, elevation, and habitat type. Suitable habitat is wildlife habitat that currently has both the fixed and variable stand attributes that enable it to provide the habitat requirements for a given species. Variable attributes change over time and may include seral stage, cover type, stand density, tree size, stand age, or stand condition.

Detailed data (i.e. size class, forest type) is available only for National Forest System (NFS) administered lands within the wildlife analysis area. The ownership pattern (i.e. relatively large and relatively contiguous blocks of NFS land surrounded by other land) allows for adequate analysis of direct, indirect and cumulative effects for most species with the data from NFS lands only. Where information on non-NFS land is needed to analyze effects (primarily for cumulative effects), data was developed via a combination of visual evaluation, photo interpretation, and extrapolation from data on NFS land.

Acre figures displayed in the wildlife section come from the TSMRS and FSVeg database and the calculations are documented in the project file (SWL -7). All values are approximate due to such factors as rounding of acres and combining/grouping of stands. There are differences between resources (e.g. Vegetation and Watershed) in how effects on the same action/feature are counted. The differences are due to the scale at which the analysis is conducted (e.g. stand vs. within a stand), the level at which effects become noteworthy, and the consequences of the effects on different resources. For example, the shelterwood preparatory prescription does not change forest structure at the stand level (vegetation section); however in this section the small openings created by this type prescription are taken into account.

When needed, cumulative effects from possible impacts on non-NFS lands are evaluated based on past/present practices, management objectives, available information, and assumptions of probable activities. Due to the lack of detailed data, the effects from activities on non-NFS lands are more difficult to quantify and qualify. They are therefore measured in more general terms than effects from activities on NFS lands. The assumptions regarding activities on non-NFS land and the possible impacts represent a conservative approach (from a species perspective) for analyzing effects on wildlife species and habitat.

The interaction of disturbance (both human-caused and naturally-occurring) and forest succession, in large part, determines the quality and quantity of habitat on a spatial and temporal scale. The existing condition and availability of habitat in the landscape will change regardless of management actions. This change could be sudden and readily apparent (e.g. a stand-replacing wildfire) or slow and subtle (e.g. stand aging). As they pertain to this analysis, natural changes are random and unpredictable. Forest succession normally takes place at a rate that is essentially too slow to measure within the

temporal scale of this project level analysis. However, because of its long-term effect and the existing condition of stands in the project area (e.g. ages close to but not yet mature) its effects are discussed.

The fire history and human activities in the Hidden Cedar Wildlife Analysis Area and surrounding landscape have influenced the availability and distribution of wildlife habitat present today, particularly the level of late-successional habitat. The emphasis of the proposed action in moving timbered stands closer to historic conditions and avoiding old growth influences the level and intensity of analysis.

At a landscape scale, land ownership patterns influence the availability of suitable habitat for some species, particularly species with large home ranges. The landscape encompassing the Hidden Cedar wildlife analysis (e.g. the Sherwin Staples LAA) area is predominately non-National Forest System (NFS) land (approximately 63%) and includes lands owned, managed and administered by private timber companies, state agencies, and private individuals (PD -2). The dominant influences (e.g. road densities, amount and distribution of forest structures) on the abundance and distribution of many threatened, endangered, sensitive, and socially important/desirable species are the result of past and current management activities on both non-NFS and NFS land. The management objectives on most non-NFS forested lands emphasize timber management and much of the land owned by private individuals is not forested (e.g. open fields). Subsequently, these lands do not contribute to wildlife habitat such as mature/old forest structures or provide it at inherently low levels. Also, management objectives and practices on non-NFS lands tend to limit secure areas away from open/used roads. These conditions then influence the species present in the wildlife analysis area and the methodology and/or need to analyze potential effects.

Predictive models were used to help assess the suitability and availability of habitat and the potential effects of forest management activities. This was done using habitat-based wildlife suitability. Also, the *Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho (*Leege *1984)* was used to evaluate effects of management activities on elk habitat quality. Habitat suitability analysis is based on identifying capable and suitable habitat that are in turn based on and supported in the scientific literature. The analyses then go on to predict the effects of proposed actions on the important habitat parameters that are used to determine suitability. The analyses and models are based on the referenced literature where the statistical details are discussed. The literature cited section provides the references for the analyses.

The best available and most suitable data was used to conduct the analysis (e.g. FIA data is not suitable for the scale of this analysis). The habitat parameters used to develop habitat suitability and analyses methodologies for the project are based on scientific literature. The professional judgment and consensus of the wildlife biologists on the IPNF (SWL 27) were used to assure the applicability of habitat parameters on the IPNF. This allows for any needed adjustments in literature habitat parameters to more closely represent conditions on the IPNF thereby adding to the accuracy of and confidence in the habitat suitability analyses.

The existing conditions were field reviewed to assess both the accuracy and validity of the data (WILD 1, 2, 22, 23, and 25). The data was updated and reviewed to be as accurate as reasonably possible (SVEG 3 – 7, and 10, SOG 3, 5, 6, and 9) and field reviewed to assess the validity of the habitat based modeling (SWL-19, 20, 21). This again added to the accuracy and confidence in the habitat suitability analyzes. The field review initiated a re-assessment of suitable habitat (SWL-36)

which documented the appropriateness of the habitat associations and suitability used in the analysis again in an effort to assure the most accurate analyses possible.

The analysis takes a cautious approach in assessing/modeling habitat when the data and situation warrants it. For example, in the fisher and marten analysis the potential that some immature size stands may provide suitable habitat was discussed and the reasoning for considering only mature/sawtimber sized stands was disclosed.

There are inherent limitations in the ability of any model to – with 100% accuracy – predict use by any given species, to intimate or expect otherwise is unrealistic. None the less, the wildlife analyses in the project utilize the best available information, display the availability of suitable habitat (making use of the best and most appropriate data), distinguish the differences between alternatives, determine potential effects, and provide the information needed to make an informed decision.

More specific discussions of analysis methods can be found under the section for each species or group of species.

Species Relevancy Screen

The National Environmental Policy Act directs the agency to focus on a full and fair discussion of significant issues, and identify and eliminate from detailed study the issues that are not significant. Some elements of wildlife habitat require a detailed analysis and discussion to determine potential effects. Other elements may not be impacted; may be impacted at a level that does not influence use, occurrence, or the decision to be made; or can be adequately addressed through design of the project. These elements then do not necessarily require detailed analysis.

TE&S species, MIS, and other wildlife species of interest or concern known to occur on the IPNF were reviewed for their relevancy to the proposed actions and the wildlife analysis area. Relevancy was determined if there is evidence of species occurrence, capable and/or suitable habitat present, or potential for the proposed actions to affect a species or its habitat.

The assessments of the potential for effects made in this screen consider the scope and nature of the activities associated with the proposed action and alternatives, the potential risks for adverse impacts, and the ability to determine potential effects based on available information at the time of this phase of the analysis. Some species or habitats do not occur in the wildlife analysis area and no further analysis is necessary.

If the potential for effects could not be determined with a reasonable degree of confidence in this process then additional analysis was conducted.

Table 3-87 displays the results of the species relevancy screening process. Further information on species not requiring further analysis and the rationale is discussed following the table.

Table 3-87 Species Relevance Screen

Species/Habitat	Species or Habitat Present in St. Joe Drainage?*	Potential for Measurable Effects in Analysis Area?	Need for Detailed Further Analysis?	Rationale for No Further Analysis**
Endangered				
Gray wolf***	Y	Y	Y	
Woodland caribou	N	N	N	1
Threatened				
Bald eagle	Y	N	N	2
Grizzly bear	N/I	N	N	1
Canada lynx	Y	N	N	1&2
Sensitive				
Black-backed woodpecker	Y	Y	Y	
Boreal toad aka western toad	Y	Y	Y	
Coeur d'Alene salamander	Y	Y	Y	
Common loon	N/I	N	N	1
Fisher	Y	Y	Y	
Flammulated owl	Y	U	Y	
Harlequin duck	Y	N	N	1
Northern bog lemming	N	N	N	1
Northern goshawk	Y	Y	Y	
Peregrine falcon	I	N	N	1&2
Townsend's big-eared bat	Y	N	N	1&2
Wolverine	Y	Y	Y	
Black swift	U	N	N	1
Pygmy nuthatch	Y	U	Y	
Fringed myotis	U	U	Y	
Management Indicator				
Elk	Y	Y	Y	
Moose	Y	Y	N	3
Marten	Y	Y	Y	
Pileated woodpecker	Y	Y	Y	
Other				
Forest land birds	Y	N	N	3
Cavity / snag habitat	Y	Y	N	2

** Yes, No, Unknown or Incidental (if at all).*

***1 Rationale and documentation is provided in the project file for the determination that the species or habitat is not present within the St. Joe/St. Maries River drainages and/or wildlife analysis area.*

2 Species or habitat may be present, but due to the scope of the proposed actions - including design criteria - there would not be any effect on habitat or the species (e.g. harvest of trees would not impact habitat for species associated with lakes). Rationale is provided in the project file and in this document.

3 Species does not apply, is not appropriate for the project, or indicators for other habitats/species measure the potential impacts. Rationale is provided in the project file and in this document.

****South of Interstate 90, the gray wolf is classified as nonessential experimental populations; this classification treats wolves as proposed for listing under the ESA.*

Rationale for No Further Analysis

Bald Eagles occupy riparian or lacustrine habitat almost exclusively during the breeding season (USDI, 1994). They select isolated shoreline areas with larger trees for nesting, feeding, and loafing. Components of nesting habitat include proximity to sufficient food supply, the presence of dominant trees, and line-of-sight to a large body of water (often within 0.25 mile of water). Nest sites are commonly distributed around bodies of water ≥80 acres or major rivers.

Species/Habitat Presence: The lower St. Maries River (outside of the project/analysis area) receives occasional incidental and opportunistic migrating or wintering bald eagle use. District sighting information indicates very limited use during winter, and the area is not considered bald eagle wintering habitat. There are no bald eagle nests within 20 miles of the analysis area. Based on the above information, bald eagles are not expected to occur in the project or analysis area.

Much of the riparian habitat adjacent to the St. Maries River is in non-NFS ownership. This limits the Forest Service's ability to manage nesting habitat for bald eagles and the potential for effects from Forest Service actions.

Rationale for No Further Analysis: There are no large bodies of water in the project area and no bald eagle nesting habitat. Based on the lack of capable habitat and design features of the proposed action and alternatives (e.g. Riparian Habitat Conservation Areas buffers) the potential for effects on bald eagle habitat in areas adjacent to water is inconsiderably small. Project activity would have no effect on the bald eagle or capable habitat under any alternative. No further analysis or discussion is warranted.

Canada Lynx occur in mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare. In northern Idaho lynx habitat generally occurs above 4,000 feet in subalpine fir forests or cedar/hemlock habitat types when in association with subalpine fir and spruce habitat types. Habitats that support their primary prey include early successional stages resulting from natural disturbance and timber harvest. Characteristics of foraging habitat include a dense, multi-layered understory that provides cover and browse at ground level and at varying snow depths throughout the winter. Older forests with a substantial understory of conifers or small patches of shrubs and young trees also provide lynx foraging habitat.

The common component of natal den sites appears to be large woody debris. Den sites may be located within older regenerating stands or in mature conifer. For denning habitat to be functional it must be in or adjacent to foraging habitat.

Species/Habitat Presence: The "Canada Lynx Conservation Assessment and Strategy" (Ruediger et. al. 2000) provides direction for management of lynx on federal lands. As part of the programmatic planning standards, Lynx Analysis Units (LAUs) were delineated (in collaboration with the United States Fish and Wildlife Service (USFWS)) to facilitate project planning. Based on the forest types, potential vegetation, and elevation the Hidden Cedar area was not included in any LAU and is not considered capable of providing sufficient habitat for lynx (WL -11 & 22).

Rationale for No Further Analysis: The geographic location of the project – and the associated lack of capable habitat - precludes the potential for effects on the species. Therefore, activities in the Hidden Cedar Project will have no effect on lynx under any alternative. No further analysis or

discussion is warranted and the project is consistent with the Canada Lynx Conservation Assessment and Strategy.

Peregrine Falcons are seasonal migrants to northern Idaho, nesting in the northern temperate regions while wintering in the U.S. and southward. They nest on cliffs that are typically higher than 100 feet, with overhanging ledges or potholes and a vertical surface that provide protection from predation. Foraging areas associated with nest sites can include wooded areas, marshes, grasslands and open water.

Species/Habitat Presence and Rationale for No Further Analysis: There are no known historic aeries or capable/suitable nesting habitat in the wildlife analysis area. The species is not known or suspected to occur in the area. Existing habitat capability and suitability and the nature and scope of the project preclude the potential for effects on habitat or the species. No further analysis and discussion is warranted.

Townsend's Big-Eared Bat: Caves and cave-like structures are a critical habitat for this species, both as hibernacula in the winter and as roosts for summer nursery colonies. They occasionally use bridges and old buildings for roosting and in some places have been known to use building attics as nursery sites (Perkins, 1992 p. 9). In northern Idaho, Townsend's big-eared bats primarily roost in abandoned mines. Loss and disturbance of hibernacula and roosting habitat is the limiting factor for Townsend's big-eared bats.

Species/Habitat Presence and Rationale for No Further Analysis: There are no abandoned mines or caves in the wildlife analysis area that may serve as potential habitat (Minerals section). The species is not known or suspected in the project area. Based on the lack of suitable habitat and occurrence there would be no impact on habitat or the species.

Black Swifts require moist cliff environments for nesting. They nest behind or next to waterfalls and wet cliffs, or in shallow caves (Wiggins, 2004). Generally, there are five factors present at nest sites: water, high relief, inaccessibility, no direct sunlight, and unobstructed flyways. Black swifts feed on insects and forage over forests and in open areas. Risks to the species include decreases in water flow and recreational use of nest sites (e.g. rock climbers and hikers).

Species/Habitat Presence and Rationale for No Further Analysis: There are no waterfalls, wet cliffs or caves in the wildlife analysis area that may serve as potential habitat. The species is not known or suspected in the project area. Based on the lack of suitable habitat and occurrence there would be no impact on habitat or the species.

Moose were identified in the Forest Plan as a MIS associated with mature timber stands. Moose eat a variety of plants with shrubs and trees being the most important winter forage. Components of moose habitat include riparian areas and old harvest units or brushfields. The level of human disturbance is considered to be the most limiting habitat component effecting moose in the analysis area.

Species/Habitat Presence*:* Moose are known to occur and are relatively common in the wildlife analysis area.

***Rationale for No Further Analysis*:** The parameters used to evaluate effects on elk and other MIS (e.g. road density, security, and changes in forest vegetation) are applicable and sufficient for addressing potential effects on moose. Therefore, no analysis specifically for moose is warranted.

Forest Land Birds include all the avian species sometimes collectively termed as 'Neo-tropical migratory birds', 'migratory songbirds' and 'resident songbirds'. This group of birds is an extremely diverse group of species, with divergent habitat associations and potential effects (Idaho PIF, 2000).

Species/Habitat Presence & Rationale for No Further Analysis: Various land birds are known to be present in the wildlife analysis area. Any treatment, including no action, can have adverse effects on some species and beneficial effects on others. Species likely to be affected by activities are represented by other habitat elements and species addressed in this screen and/or analyzed further, including: general forest species (elk), dry-site species (flammulated owl), wetlands/riparian habitat (Coeur d'Alene salamander, see also the hydrology and fisheries sections), old growth (flammulated owl, fisher, pileated woodpecker and northern goshawk), and snag dependent species (pileated and black-backed woodpeckers). The potential impacts on this group of species are reflected in the impacts on the various components of terrestrial wildlife habitat (e.g. forest structure/size class, old growth, dry site habitat, and riparian habitat), by potential impacts on representative species (e.g. pileated woodpecker, flammulated owl, black-backed woodpecker, harlequin duck), and by potential impacts on other wildlife species (e.g. elk and western toad).

This group of species is best addressed at the programmatic level or a larger scale. Monitoring, research, management, and education efforts are ongoing at both the state level (Idaho Partners in Flight) and Regional level in the Forest Service (USFS Northern Region Songbird Monitoring Program). Because potential effects on habitat(s) for forest land birds and representative species are included in project-level analyses, there is no benefit or need to specifically include this group of birds. Analysis for this group of species is beyond the scope of a project-level analysis and would not provide additional information critical to the decisions being made.

Cavity Habitat: The amount of snags and down woody material present has been identified as a measure of forestland integrity (Quigley et. al. 1996). Snags of varying size, condition, and tree species provide habitat for a variety of wildlife species (Bull et al. 1997).

The species totally or largely dependent on cavity habitat include some sensitive species (e.g. black-backed woodpecker, flammulated owl) and MIS (e.g. pileated woodpecker).

Species/Habitat Presence & Rationale for No Further Analysis*:* Existing cavity habitat is a function of past and present disturbances (e.g. fire, insects, disease, and timber harvest), stand initiation, and succession. There is a relatively low amount of seedling/sapling forest structure (i.e. <13% of wildlife analysis area) with reduced cavity habitat potential due to past activity (SWL-7). Conversely, there is a relatively large amount of sawtimber/mature sawtimber and immature sawtimber forest structure (78% of wildlife analysis area) well distributed in the analysis area (SWL-7).

At a coarse/medium scale the existing condition of cavity habitat in the Hidden Cedar analysis area is reduced from 100% of potential but occurs at a level (78%) that exceeds Forest Plan standards (40% to 60% of potential) and is not of major concern at this time.

A recent analysis of the density and distribution of snags on the IPNF estimates the average number of snags per acre on all forested lands on the IPNF with a dbh of ≥10" and <20" is 10.4 snags. The average number of snags per acre with a dbh of ≥20" is 1.4 snag per acre. Estimates for the landscape area within which the Hidden Cedar analysis area lies are 6.3 snags per acre >10" and < 20" and 2 snags per acre ≥20" (SWL-37).

Providing numbers of snags that have been shown to support viable populations is a prudent approach to managing for viable/sustainable populations of woodpeckers and other species that use snags. Recent studies indicate that viable woodpecker populations occurred in areas with about four snags per acre (Bull et al. 1997). Bull et al. (1997) recommends providing snags in every 5- to 25-acre stand to satisfy distribution needs.

In all action alternatives, some snags (i.e. cavity habitat) would be lost. However, the potential impacts on snags, down wood, and cavity users are alleviated by a number of factors. Areas outside of proposed treatment units would continue to provide snags at existing levels in the short term and the number of snags and down woody material in these areas would increase as stands succeed. Areas would be reserved from treatment within Inland Native Fish Strategy buffers. Design features of the project were devised to ensure the retention and selection of snags at a level and distribution which has been shown to support viable populations of species that use snags and down logs (design features, Chapter 2). Snags and snag replacements would be retained in all treatment units at levels recommended by scientific literature based on recent studies (12 per acre in most units) which would exceed Forest Plan standards of three to four per acre. While acknowledging notable differences, the treatments (e.g. commercial thins) and design features for snag retention are similar to treatments that have been shown to maintain cavity habitat and wildlife use (Quesnel and Steeger, 2002).

The analysis for terrestrial habitat (i.e. old growth, dry site, and riparian), black-backed woodpecker, flammulated owl, pileated woodpecker, and also forest carnivores provides a level of analysis specific to those cavity/mature forest structure associated species.

The project would meet Forest Plan goals and objectives for cavity habitat, and Forest Plan standards and more recent recommended levels for snag densities would be met or exceeded in all alternatives. No further analysis is warranted.

Issue Indicators

Changes in forest vegetation and human disturbance/access could impact existing habitat for wildlife species, and project activities could cause or increase risk of mortality. Based on habitat relationships, indicators of potential impacts on relevant species are measured. Indicators and units of measurement for habitat and species are displayed in the following table. Queries of the timber stand data base (TSMRS/FSVeg) and information from field reviews/surveys were used to identify types of habitat and capable and suitable habitat for wildlife species (SWL -7, 19, 20, 21, & 27). The changes in habitat conditions and habitat for species are disclosed, and a discussion of the effects is displayed. Analysis of effects on species is tiered to the analysis of effects on the types/components of habitat and is displayed in the table below. To facilitate analysis and to most accurately reflect habitat for some species it was necessary to combine size classes differently depending on the species addressed.

Table 3-88 Issue Indicators for Wildlife

Habitat/Species	Indicator of Effects	Measurement
Terrestrial Habitat		
Size Class	Amount and percent of successional stages present in the area.	Acres and percent of size classes.
Old Growth	Amount, patch size, distribution & Forest Plan Standards	Acres impacted, maintained and future options for management
Dry-Site Habitat	Changes in type of habitat	Acres of habitat impacted, maintained and/or improved
Riparian Habitat	Changes in riparian vegetation	Acres/miles impacted or improved
Disturbance/Access	Changes in human access	Road density & changes in road status
Connectivity	Changes in vegetation in travel routes & barriers to movement	Maintenance of vegetation along ridges and riparian areas
Threatened and Endangered Species		
Gray wolf	Changes in disturbance & prey availability	Road density and potential elk use
Sensitive Species		
Fisher (and Marten)	Changes in suitable habitat* and security	Acres of suitable habitat and road density
Wolverine	Disturbance of denning habitat* and security	Activity near denning and road density
Northern Goshawk	Changes in suitable habitat* and nest disturbance	Acres of suitable habitat and activity in nest stands
Black-backed Woodpecker	Changes in suitable habitat*	Acres of suitable habitat
Flammulated Owl	Changes in suitable habitat*	Acres of suitable habitat
Coeur d'Alene Salamander	Disturbance of microhabitat*	Sites disturbed and risk of habitat disturbance
Boreal Toad aka Western Toad	Impacts on breeding habitat* and direct mortality	Impacts to riparian habitat &risk of mortality
Pygmy Nuthatch	Changes in suitable habitat*	Acres of suitable habitat
Fringed Myotis	Changes in suitable habitat* and disturbance of roost sites*	Acres of suitable habitat and risk of habitat disturbance
Management Indicator Species		
Pileated Woodpecker	Changes in suitable habitat*	Acres of suitable habitat
Elk	Changes in potential elk use* and vulnerability*	Potential elk use and acres of security

**suitable habitat, denning habitat, etc. are defined in the section for each species.*

Terrestrial Wildlife Habitat

This section of the analysis uses a medium-/course-filter level of analysis to display existing conditions and effects at the scale of the wildlife analysis area. Data displayed in this section provides context for the project and is used in the analysis for some wildlife species.

Vegetation/Habitat/Successional Stages

Plant communities at various successional stages provide habitat for wildlife species. For example, some wildlife species are associated with late successional stages/large trees and others may require or are associated with combinations of young and late successional stages.

The St. Joe Geographic Assessment and the ICB Assessment (at their respective scales) revealed that late-seral habitat has decreased from historic levels. Many MIS and sensitive wildlife species are associated with this type of habitat. Therefore, one of the issues/concerns regarding the proposed action and alternatives is any further decline in the amount of overmature and old growth stands.

The Forest Plan (page II-5) states that "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. To obtain the desired distribution, the IPNF will be managed to maintain approximately 5 percent of each old-growth unit as old growth where it exists."

Affected Environment

Table 3-89 Existing Vegetation by Size Class Group (NFS lands) in Wildlife Analysis Area

Size/Structure	Acres	Percent of Area
Mature / Sawtimber	1,664	14%
Immature Sawtimber	7,366	64%
Multistory	48	0.4%
Pole	883	8%
Shrub / Seed / Sapling	1,489	13%
Open (field / riparian)	136	1%

In the wildlife analysis area, there are 507 acres of allocated old growth, 137 acres that fully meet old growth criteria and 370 acres of "potential" old growth (do not fully meet criteria) allocated to create blocks or logical old growth units. Across the Forest and the St. Joe Ranger District Forest Plan standards for old growth are met (See Old Growth, Chapter 3).

Environmental Consequences

All Alternatives

Direct Indirect and Cumulative Effects

For the purposes of this analysis it is necessary to approximate the acres of openings that would be created in the shelterwood treatments. Based on prescription objectives and stand conditions following treatment the silviculturist and biologist assigned the following percents to show changes in size class by prescription.

Clear cut with reserves	100%	Shelterwood preparatory	25%
Commercial thin*	0%	Shelterwood seed	100%
Group shelterwood	50%	Shelterwood removal	100%
Shelterwood	33%	Precommercial thin	0%

**This percentage is consistent with information regarding maintenance of cavity habitat (Quesnel and Steeger, 2002)*

Table 3-90 below shows the acres of size classes that would result from each alternative and the resultant percent of each size class/size class grouping in the analysis area (SWL-7 & SWL-8). Due to varying losses in size class from road construction (with no corresponding gain in another size class) total acres in the table do not remain consistent between alternatives.

Table 3-90 Size Class by Alternative

Size/Structure	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
	acres %	acres %	acres %	acres %	acres %	acres %
Mature/Sawtimber	1,664 14%	1,603 14%	1,610 14%	1,633 14%	1,664 14%	1,624 14%
Immature Sawtimber	7,366 64%	7,067 61%	7,102 61%	7,212 62%	7,358 64%	7,099 61%
Multistory	48 0.4%	48 0.4%	48 0.4%	48 0.4%	48 0.4%	48 0.4%
Pole	883 8%	899 8%	899 8%	882 8%	883 8%	898 8%
Shrub/Seed/Sap	1,489 13%	1,783 15%	1,783 15%	1,665 14%	1,489 13%	1,741 15%
Open (field/riparian)	136 1%	136 1%	136 1%	136 1%	136 1%	136 1%

The activity that has the greatest impact on size class is the proposed timber harvest. This activity would reduce the amount of forest in the Mature/Sawtimber (SAWT, MHRS & MLRS) and Immature Sawtimber (IMSA) size classes with a corresponding increase in the amount of forest in the seedling size class (in one unit the existing understory of pole size trees would become the size class).

Table 3-91 displays the total acres in each size class group that would be treated by proposed harvest in this project and the acre changes in size class due to treatment (SWL-8).

Table 3-91 Acres Proposed for Harvest Treatment by Size Class

	Alt. A & E		Alt. B		Alt. C		Alt. D		Alt. F	
Forest Structure	treated	changed	treated	changed	treated	changed	treated	changed	treated	changed
Mature/SAWT	0	0	254	54	264	54	117	30	199	36
IMSA	0	0	1090	256	1105	256	466	146	1081	232
Pole	0	0	22	0	22	0	22	0	22	0

Reasonably foreseeable actions include approximately 27 acres of fuels reduction treatment (i.e. St. Maries River Basin Fuels Reduction Project – Treatment Area 3). This treatment (e.g. removal of

understory fuels) would not change the size class designation of the treated stands (27 acres of immature sawtimber size class).

In each alternative at least 61 % of the analysis area would succeed naturally from immature sawtimber forest to sawtimber/mature sawtimber size classes over time (this represents 96+% of the existing immature sawtimber size class). This change would be slow and subject to a multitude of variables (e.g. natural fires, insect & disease) that could affect the acres.

In addition to the effects from timber harvest Table 3-85 displays reductions (there is no category to show corresponding increases) from proposed new road construction that would impact existing forest structure. The effects on sawtimber, immature sawtimber and pole size class forest structure from new road construction is as follows:

- Alternative B - approximately 43 acres of immature forest structure and 7 acres of mature/old forest structure,
- Alterative C, D, & E – approximately 8 acres of immature forest structure,
- Alternative F – approximately two acres of pole, 27 acres of immature forest structure, and four acres of mature/old forest structure.

There would be no change in existing old growth (See the Old Growth Section). All alternatives were designed to maintain old growth habitat and would allow the majority of both existing mature and immature forest habitat in contiguous blocks to naturally succeed (see the previous discussion regarding impacts on successional stages). Options for an increase in the amount of sawtimber/mature sawtimber habitat in the future would be maintained in all alternatives (as succession of existing small/medium/immature stands occurs).

Cumulative Effects

Data displayed in Table 3-84 and Table 3-85 and the discussion pertaining to impacts from proposed road construction depict existing conditions that resulted from all past, present and reasonably foreseeable activities on NFS land. In addition, pre-commercial thinning would occur on 324 acres and gopher control treatment would be applied in regeneration areas (units with proposed regeneration harvest methods). These activities would not change the size class of the treated stands. Succession would continue to proceed and slowly affect the amount of acres in each size class.

Pocket gopher populations would be controlled by hand applying strychnine-treated oats (0.5%). The treated oats would be deposited into the gopher's underground burrows at a rate of one-fourth to one-half pound per acre. Approximately one teaspoon to one tablespoon would be deposited in each burrow.

Strychnine is a pesticide that is highly toxic to wildlife with no known effects on vegetation. Strychnine-treated bait placed below ground is effective for a limited time (1 Week to 1½ months). Data suggests a half-life of strychnine in baits of about eight days (Hegdal & Gatz, 1977).

There is a possibility of non-target mortality from strychnine baiting. The main species that could be affected are mice and other small rodents that may consume treated bait in gopher burrows and seed-

eating birds that may consume spilled bait. Also, secondary poisoning could occur if predators consumed bait-killed gophers and consume toxic levels of poison.

Strychnine is not assimilated into tissues or bone and does not accumulate in the body; and it may be consumed at very low dosages over prolonged periods with little or no ill effect. However, residues in the gastrointestinal tract of animals poisoned with lethal doses are known to be potentially hazardous if the gastrointestinal tract is consumed (US Fish & Wildlife Service) and; secondary poisoning may occur from ingestion of material stored in the gopher's cheek pouches. Studies by the EPS and the US Fish & Wildlife Service of strychnine baiting for gopher control found very minor losses to other than the target species when bait was correctly placed. Most of these losses were to burrowing animals (Black 1994). Fagerstone and others found that although some small mammals (primarily deer mice) may be killed by strychnine during a baiting operation, live trapping before and after baiting found no differences in populations. They also found no evidence of secondary poisoning. Although non-target mammals - deer mice, chipmunks, ground squirrels, and other rodents - have been inadvertently poisoned during underground baiting operations, long-term adverse effects on populations appear to be minimal (Evans 1987).

Strychnine-killed gophers appear to present little hazard to mammalian or avian predators. Because gopher predators have a greater body mass, they must consume many strychnine-killed prey for them to accumulate a lethal dose. Carcasses of poisoned gophers contain low levels of strychnine (less than 0.3 mg. per carcass) and are usually found below ground (Evans 1987).

Based on the lack of effect on vegetation and on non target species (including secondary poisoning) discussed above; the control of gophers would have no direct, indirect, or cumulative effect on habitat or populations of relevant wildlife species

A more detailed analysis of potential effects from pre-commercial thinning and gopher control can be found in the project file (WL-69 & 70).

It is expected that the majority of non-NFS land would be actively managed and, therefore, no stands on non-NFS land would remain in the sawtimber/mature sawtimber forest size class for any appreciable length of time before being treated. NFS lands would provide the vast majority of mature/sawtimber size forest with non-NFS lands being in younger successional stages.

Activities on non-NFS land are expected to retain little if any old growth. Because of ownership patterns, harvest activity on non-NFS lands could indirectly impact up to five patches of existing old growth on NFS land. As much as 17,200 feet adjacent to existing old growth could be indirectly impacted. However, fire and topographic diversity in the West (and the St. Maries River Drainage) have historically combined to produce a temporally dynamic, naturally fragmented landscape (Dobkin, 1992). Natural patch sizes and differences in structure (e.g. edge) resulting from the interaction of disturbance and succession varied considerably. The resulting landscape was complex, with the patterns of vegetation being a function of the frequency and severity of disturbance, environmental gradients, soil potential, seed source and other factors. Forest plan standards for old growth patch size would continue to be met (See the Old Growth Section of this document) and the amount of indirect effects from the treatment would not have a meaningful or measurable affect on habitat values (e.g. edge has historically been a part of the landscape that wildlife occur in).

Succession would continue to occur, untreated stands on NFS lands would become older and contain larger trees, and natural disturbances (e.g. insects, disease, wind throw) would continue to set back succession – at some indeterminable level.

Dry-Site Habitat

The ICB Assessment and St. Joe Geographic Assessment identified that dry-site, open forests with large trees are in short supply compared to historic conditions.

Affected Environment

In the wildlife analysis area there are 108 acres (1% of NFS land) of dry habitat types (existing forest types include 83 acres of Douglas-fir and 25 acres of larch) and an additional 21 acres of ponderosa pine on moister habitat types. Approximately 63 acres of the dry habitat type are immature size class, 45 acres are pole size, and the ponderosa pine is in the immature size class. There are also scattered small areas (less than ten acres) of ponderosa pine that are minor components of larger stands.

Environmental Consequences

Common to All Alternatives

Direct and Indirect Effects

Opportunities for improvement and expansion of mature dry-site habitat (the forest type of primary interest is ponderosa pine) were explored. At this time there are no existing dry-site stands of ponderosa pine that would benefit from active management to improve/expand this habitat.

Cumulative Effects

Fire suppression under existing policy is not expected to allow fire to perform its historic function of creating/maintaining dry site, mature, open forest conditions.

Alternative A, D, and E

Direct and Indirect Effects

There would be no impact on dry habitat in these alternatives.

Alternative B, C, and F

Direct and Indirect Effects

One dry-site stand would be treated. The existing forest type is larch. The treatment prescription would create about four acres of opening and thin 12 acres to open the stand and improve growth.

Riparian Habitat

The St. Joe Geographic Assessment identified that, compared to historic conditions, changes in riparian zones have occurred (e.g. loss of mature cottonwood).

Affected Environment

The Ecosystem Analysis at the Watershed Scale (PD -2) identified that much of the riparian vegetation in the Hidden Cedar Wildlife Analysis Area has been impacted by human activities such as timber harvesting (and associated road/railroad activity), agriculture and cattle grazing.

Environmental Consequences

The analysis in this section does not measure all stream crossing impacts on riparian habitat (road construction or road removal). This analysis focuses on the roads in the riparian area that are parallel with the stream. See the Watershed and Fisheries Sections of this document for a more detailed display and discussion of effects related to road removal in RHCAs.

Common to All Action Alternatives

Direct and Indirect Effects

A total of approximately 15 acres of the riparian area in Wood Creek, Hidden Creek, and the West Fork of the St. Maries River would be planted to trees and/or brush. This would begin the process of restoring/moving the riparian habitat closer to historic conditions.

Alternative A

Direct and Indirect Effects

There would be no impact on riparian habitat associated with this alternative.

Alternatives D, E, & F

Direct and Indirect Effects

These alternatives would remove approximately 0.7 mile of existing road that is encroaching on the riparian habitat in Wood Creek and approximately 0.2 miles in Hidden Creek. This (along with the riparian planting) would begin the process of restoring/moving the riparian habitat closer to historic conditions.

Common to All Alternatives

Cumulative Effects

Cattle grazing would continue to impact riparian habitat. The analysis of effects in the Grazing EA for the St. Maries allotments has determined, based on factors such as lack of species occurrence and minimal impacts on suitable habitat, that the effects on wildlife from cattle grazing are negligible.

Activity on non-NFS land would continue and may impact riparian habitat. Activity on non-NFS land is subject to compliance with the Idaho Forest Practices Act. Any potential effects are not measurable at this time.

Disturbance/Access

Many wildlife species are sensitive to human disturbance and/or adversely impacted by human access (Joslin and Youmans, 1999). Potential temporary disturbance of wildlife is inherent in most human activity (e.g. project implementation) and may include alteration of normal use patterns and potential

relocation to avoid disturbance (e.g. using alternate forage areas). This type of disturbance is not based on loss or long-term alteration of habitat and would not appreciably affect populations

Most potential adverse impacts from human disturbance are associated primarily with access levels and roads. Effects on wildlife are caused by roads themselves and by the increased contact with humans that they afford. High levels of open roads (or roads and trails used by motorized vehicles) can affect wildlife species by increasing their vulnerability to mortality and displacing them from preferred habitats for one or more seasons. The ICB Assessment identified that those species vulnerable to human disturbance have relatively low amounts of secure habitat. The St. Joe Geographic Assessment also identified security as a concern.

The degree of effects on wildlife from roads is related to the amount and type of use on them. For the purpose of assessing impacts on wildlife from roads on NFS land, only roads that impact or potentially impact wildlife are included in the wildlife analysis. For example, an old road that is re-vegetated to the same composition and size class as the surrounding forest would have no measurable impact on wildlife (but may constitute an impact on other resources). Detailed information regarding the status of roads on other than NFS lands is not readily available. Therefore, the information displayed for roads on all ownerships may include roads that do not impact wildlife.

The ICB Assessment categorized road density levels (expressed as mi/mi^2) of 0.7 to 1.7 as moderate, 1.7 to 4.7 as high and more than 4.7 as extremely high. Road density goals for wildlife vary depending on the species, area under consideration and the objectives and designation assigned to the drainage. For example, there is a high risk to trapping-vulnerability for fisher when road densities are more than 1 mi/mi^2 (Heinemeyer and Jones, 1994).

Data displayed in this section represents conditions in the wildlife analysis area and therefore does not match the figures displayed elsewhere for the larger project area.

Affected Environment

Many of the current and foreseeable actions in the analysis area do/would influence disturbance and access (see Chapter II). However, regardless of the cause for any disturbance or impact on access, the effect is best measured by road miles and densities.

In the wildlife analysis area there are approximately 65 miles of roads under Forest Service jurisdiction (or other jurisdictions that impact NFS lands) that, based on existing condition (primarily management prescriptions “open”, “A”, and “B”), may impact wildlife (SWL-1).

For the wildlife analysis this results in a total *wildlife* road density on NFS land in the Hidden Cedar Wildlife Analysis Area of approximately 3.6 mi/mi^2. There are approximately 40 miles of open road that results in an open road density of 2.2 mi/mi^2.

On all lands there are approximately 158 miles of roads of all types (main paved highway to primitive road) and status (open, gated, barriered) in the Hidden Cedar Wildlife Analysis Area (SWL-1). For the wildlife analysis this results in a total road density of 4.7 mi/mi^2. There are approximately 62 miles of open road that results in an open road density of 1.8 mi/mi^2.

Environmental Consequences

Table 3-92 displays the total road miles, total road densities, open road miles, and open road densities in the wildlife analysis area for each alternative (SWL-1). Road densities are displayed as mi/mi^2. The data displayed on NFS land includes only roads that may impact wildlife (i.e. roads that aren't accessible (Road Management Rx C, D or E or their equivalent)).

The indirect effects of approving access requests across NFS land are included in the cumulative effects displayed in the table.

Table 3-92 Road Densities and Miles

	Existing	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
NFS lands	**Direct Effects**						
Total road miles	65.3	65.3	52.7	51	45.3	45.5	46.1
Total road densities	3.6	3.6	2.9	2.8	2.5	2.5	2.6
Open road miles	39.7	39.7	39.4	38.7	36.2	36.4	36.4
Open road densities	2.2	2.2	2.2	1.8	1.8	1.8	2.1
All ownership	**Cumulative Effects**						
Total road miles	157.6	157.6	143.3	143.3	137.6	137.8	138.4
Total road densities	4.7	4.7	4.3	4.3	4.1	4.1	4.1
Open road miles	62.1	62.1	61.9	61.9	59.3	59.5	59.5
Open road densities	1.8	1.8	1.8	1.8	1.8	1.8	1.8

The following discussions by alternative describe the activities that would lead to the conditions displayed in Table 3-92.

Alternative A

Direct, Indirect, and Cumulative Effects

There are no reasonably foreseeable activities that would affect road miles or road management on NFS or non-NFS lands in this alternative.

Alternative B

Direct, Indirect and Cumulative Effects

This alternative would build a total of 11.1 miles of new road on NFS land in the wildlife analysis area. This includes 9.1 miles to access proposed treatment units and 2 miles associated with requests to access non-NFS lands. When activities are complete all of the 9.1 miles of new road for access to proposed treatment units would be put in a state that would not provide access or appreciably disturb wildlife.

The alternative also includes an increase of 5.6 miles of road on non-NFS land that is connected to the access requests. Approximately1.5 mile of this new construction is outside of the wildlife analysis area (by from approximately 70 feet to less than 400 feet). It is, however, counted in this analysis because of the proximity and the access to the analysis area afforded by the road and the associated potential impacts.

New construction, road rehabilitation, and changes in road management (which reduce the miles of road that may impact wildlife) would combine to decrease the total road density and open road density on all ownerships in the wildlife analysis area.

Alternative C

Direct, Indirect and Cumulative Effects

Two miles of cost-share roads would be constructed on NFS lands (Common to All Action Alternatives). Those roads are required for access to private and State land and would also provide access for the management of National Forest System lands. Approximately 0.9 miles of the 2.0 miles would also be used for timber harvest proposed on National Forest System lands. There would be no other new road construction for Forest Service activities proposed at this time. The alternative would result in an increase of 5.6 miles of road on non-NFS land that is connected to the access requests.

New construction and changes in road management (which reduce the miles of road that may impact wildlife) would combine to reduce the existing total road density on all ownerships in the wildlife analysis area and reduce the open road density.

Alternative D

Direct, Indirect and Cumulative Effects

Two miles of cost-share roads would be constructed on NFS lands (Activities Common to All Action Alternatives). Approximately 0.9 miles of the 2.0 miles would also be used for timber harvest proposed on National Forest System lands. There would be no other new road construction for Forest Service activities proposed at this time. The alternative also includes an increase of 5.6 miles of road on non-NFS land that is connected to the access requests.

New construction and changes in road management (which reduce the miles of road that may impact wildlife) would combine to reduce the total road density on all ownerships in the wildlife analysis area and reduce the open road density.

Alternative E

Direct, Indirect and Cumulative Effects

In association with the access requests the alternative would require the building of 2 miles of road on NFS land. The alternative also includes an increase of 5.6 miles of road on non-NFS land that is connected to the access requests.

New construction and changes in road management (which reduce the miles of road that may impact wildlife) would combine to reduce the total road density on all ownerships in the wildlife analysis area and reduce the open road density.

Alternative F

Direct, Indirect and Cumulative Effects

This alternative would build a total of 9.5 miles of new road on NFS land in the wildlife analysis area. This includes 6.9 miles to access proposed treatment units, 0.6 miles to maintain access to roads and areas affected by the decommissioning of existing roads, and 2 miles from the approval of

requests to access non-NFS lands. The alternative also includes an increase of 5.6 miles of road on non-NFS land that is connected to the access requests.

New construction and changes in road management (which reduce the miles of road that may impact wildlife) would combine to reduce the total road density on all ownerships in the wildlife analysis area and reduce the open road density.

Connectivity

Review of historic photos (c. 1933) indicate that: (1) relatively wide and open riparian areas adjacent to some streams (e.g. Middle Fork St. Maries) occurred at that time, and (2) fires created large expanses of open forest conditions. These areas most likely continue to influence movement of some wildlife species (e.g. fisher) in the analysis area. The spatial arrangement of existing forest structure, human settlements, land uses (e.g. grazing/pastures and log landings), and roads (especially State Highway 3) affect movement of wildlife and have most likely created impediments to movement for some species. Maintenance of connectivity was one consideration in the development and design of the proposed action and alternatives.

Affected Environment

Past and present actions continue to affect wildlife movement in and through the analysis area.

Areas typically used by wildlife for travel include ridges, riparian areas, and saddles. Prominent ridges that provide potential corridors and connectivity have been mapped (WL -44). Areas that create an impediment to travel for some species have also been identified and mapped (WL -44).

Past harvest (on both NFS and non-NFS land), existing roads (e.g. State Highway 3), and other human activities have reduced the amount of mature/old forest structure in the landscape surrounding the Hidden Cedar Wildlife Analysis Area. This is affecting connectivity/travel corridors for some species.

Environmental Consequences

Common to All Alternatives

Direct and Indirect Effects

Proposed harvest activity would not create permanent barriers to movement. The proposed action and alternatives were designed with an objective of minimizing impacts on traditional areas of wildlife movement (Design Feature 12E). Where feasible proposed new road construction was placed lower on the hillside to avoid impacts to ridges and saddles. Proposed harvest units were also designed to minimize impacts to ridges and saddles.

In addition, design features of the project - i.e. avoiding or limiting openings on ridges designated as potential travel areas - would further minimize impacts on wildlife travel/movement and would provide for continued use of typical travel ways. All alternatives would maintain areas for travel/movement for potential use by wildlife.

Cumulative Effects

Harvest on non-NFS land would continue to impact the potential for movement in and through the wildlife analysis area. The magnitude and extent of this impact would vary depending on the harvest method and prescription.

It is unlikely that there would be any further changes in permanent impediments to movement. Past, present, and reasonably foreseeable actions would continue to affect wildlife movement in and through the analysis area. Based on existing and foreseeable conditions on NFS lands and anticipated activities on non-NFS lands the area would maintain areas for movement (WL -44 & 45).

Alternative A and E

Direct and Indirect Effects

There would be no impact on the travel corridors on NFS land identified and mapped for analysis.

Alternative B and C

Direct and Indirect Effects

In these alternatives, four clearcut units would partially cross identified travel ways (WL 45). This likely would affect wildlife movement. However, design features of the project would minimize impacts and would provide for continued use. Alternative areas for movement by wildlife exist and opportunities for movement/travel would be maintained (WL - 44 & 45).

Alternative B

Direct and Indirect Effects

The road construction associated with the proposed thinning harvest in upper Keeler Creek (Unit 49) would adversely impact the movement of big game through that area. This would impact a potential travel way identified for this analysis.

Alternative D

Direct and Indirect Effects

In this alternative, two clearcut units would partially cross identified travel ways (WL - 45). Design features of the project would minimize impacts and would provide for continued use. Alternative routes of travel exist and opportunities for travel would be maintained (WL - 44 & 45).

Alternative F

Direct and Indirect Effects

In this alternative, three clearcut units would partially cross identified travel ways (WL - 45). Design features of the project would minimize impacts and would provide for continued use. Alternative routes of travel exist and opportunities for travel would be maintained (WL - 44 & 45).

All Alternatives

Cumulative Effects

The consequences of impacts to potential travel in upper Keeler Creek are aggravated by the relatively new road construction and ongoing/pending harvest on non-NFS land to the north of NFS

land. This same activity on non-NFS land while contributing to adverse impacts could also render the value of the area for travel through the NFS land somewhat moot by creating conditions that may alter big game movement patterns regardless of activity on NFS land.

Given the relatively limited scope of the proposed actions in the alternatives, design features of all alternatives (Chapter 2, Design Features) and the conscious desire to minimize impacts through alternative design, it is unlikely that any alternative would have unacceptable, irreversible and irrevocable adverse impacts on connectivity. Alternative areas for movement by wildlife exist and opportunities for movement/travel would be maintained (WL-44 & 45).

Management Indicator Species

Management indicator species (MIS) are species selected to estimate the effects of management activities on wildlife populations. The Forest Plan identified the MIS for the Forests. They include several categories of species including: threatened, endangered and sensitive, commonly hunted or trapped, and species whose population changes are believed to indicate effects of management on other species or biological communities. Those species in the Forest Plan applicable to the St. Joe District and project area are displayed in Table 3-93. MIS that are also threatened or endangered species are addressed in the Threatened and Endangered Wildlife Species section of this document.

MIS were screened for their relevancy to the wildlife analysis area and proposed action. See the Species Relevancy Screen (Table 3-87) and Rationale for no Further Analysis section above for more discussion regarding MIS analysis needs. More information can be found in the project file (WL-5 through WL-9).

Marten and potential effects on their habitat are addressed under Sensitive Species along with Fisher and are not addressed further in this section. The goshawk is analyzed as a sensitive species and is not addressed further in this section. The Species Relevancy Screen determined that there was no benefit to analyzing potential impacts on moose and that further analysis is not warranted.

Table 3-93 Wildlife MIS for the St. Joe District

Species	Remarks	Existing Habitat / Need for Further Analysis
Pileated Woodpecker	Primary cavity excavator, old growth indicator because of dependence on large snags, associated with mature forests.	Habitat and species present, further analysis conducted.
Marten	Trapped, associated with mature and late successional mesic conifer forest habitat.	Habitat exists, analysis is documented in section with fisher.
Goshawk	Old growth indicator because prefer mature old growth for nesting, use variety of forest structural conditions.	Habitat exists, analysis is documented in sensitive species section.
Elk	Hunted, important big game species, affected by human disturbance and human use of roads.	Habitat and species present, public issue, further analysis conducted.
Moose	Hunted, relatively unique big game species, occurs in low numbers throughout the IPNF.	Habitat and species present, elk analysis meets analysis needs, no analysis specifically for moose will be completed.

Old Growth Associated MIS -Pileated Woodpecker

The pileated woodpecker is an old growth indicator in the Forest Plan because of its strong tie to the availability of large snags. The pileated woodpecker also uses young and fragmented forests with abundant remnant old structure (Mellen et al. 1992) and may nest in relic dead trees in younger forests (Bull and Jackson 1995). Pileated woodpeckers require tall, large-diameter dead or live defective trees within forested stands for nesting (USDA, 1990). The minimum nest tree diameter is 15 inches with no upper limit (Samson, 2005). Carpenter ants make up the bulk of their diet. Feeding habitat includes large snags with advanced decay, the moist decaying butts of live trees, logs greater than 10 inches diameter, and natural or cut stumps. Large trees, canopy cover and the number and size of feeding sites (e.g. dead trees greater than 10 inches diameter) are all important features of quality pileated habitat (USDA, 1990). Activities that reduce these habitat features may affect pileated habitat suitability.

Methodology and Geographic Scope

The analysis of effects on pileated woodpeckers is based on direction in *Old-Growth Habitat and Associated Wildlife Species in the Northern Rocky Mountains* (USDA, 1990) and *A Conservation Assessment of the Northern Goshawk, Black-backed Woodpecker, Flammulated Owl, and Pileated Woodpecker in the Northern Region, USDA Forest Service* (Samson, 2005). This analysis is tiered to the analysis done for size class and old growth. The geographic scope for direct, indirect, and cumulative effects is the wildlife analysis area.

Habitat values from the HSI models (USDA, 1990) and TSMRS data can be and were used to identify potentially suitable habitat and assess the potential for effects.

The analysis methodology for determining potential effects on pileated woodpeckers involved mapping old growth and mature forest stands (i.e. suitable nesting habitat based on 15-inch minimum tree size) in the wildlife analysis area and delineating hypothetical 1,000-acre home ranges around suitable nesting stands/groups of stands (Figure 2).

Based on relative habitat values and the acres of suitable nesting habitat a home range should have (USDA, 1990), areas with at least 100 acres of contiguous mature and/or old growth forest habitat and an additional contiguous 100 acres of immature/sawtimber size tree habitat were identified as having sufficient suitable nesting habitat.

Once home ranges with suitable nest stands were identified, the suitability of surrounding stands in the home range to provide adequate feeding habitat was evaluated. Within each home range at least 500 acres of sawtimber/mature sawtimber forest and/or immature sawtimber habitat is needed to provide adequate feeding habitat (USDA, 1990). Impacts on suitable habitat were then determined for each home range.

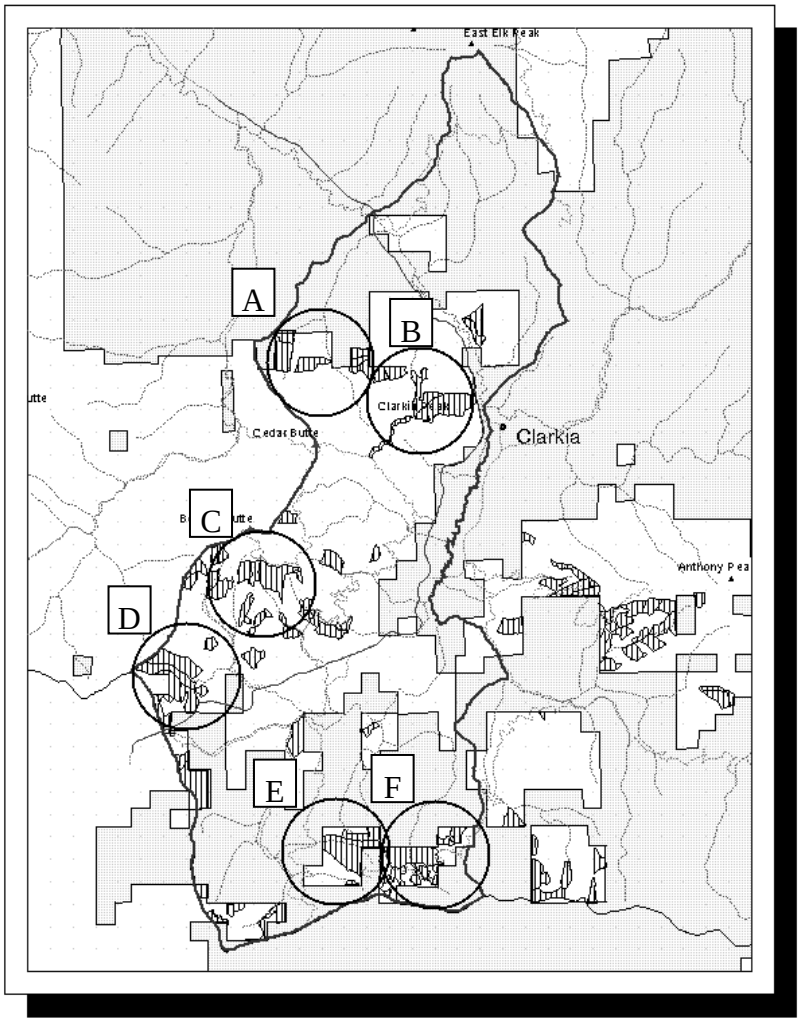

Figure 2 - Pileated Woodpecker Home Range

Affected Environment

There are 507 acres of allocated old growth in the wildlife analysis area. Forest Plan standards are being met for old growth across the St. Joe Ranger District (see the Old Growth Section). Approximately 14 percent (1,664 acres) of the NFS land in the Hidden Cedar Wildlife Analysis Area is sawtimber/mature sawtimber. These stands (along with stands in the "immature" size class) provide structure and attributes used by pileated woodpeckers (USDA, 1990).

A total of six home ranges (A – F, see Figure 2) on NFS land were delineated. All six of these home ranges contain sufficient feeding habitat. Four home ranges (A – D) provide sufficient feeding habitat on NFS land. The other two home ranges (E and F) provide sufficient feeding habitat only when both NFS and non-NFS lands are included in the calculations.

Environmental Consequences

Common to All Alternatives

Direct and Indirect Effects

No alternative would impact existing old growth (see Old Growth, Chapter 3) or suitable habitat on NFS (see following analysis) to an extent that would affect the availability of suitable pileated woodpecker habitat or populations.

Cumulative Effects

The St. Maries River Basin Fuels Reduction Project (Area 3) would impact a total of approximately 27 acres of immature sawtimber size class (SWL-16). None of this activity is within any Pileated Home Range delineated for this analysis.

There would be no cumulative effects associated with this project or analysis area that would jeopardize populations of pileated woodpeckers. This is based on the limited effects from this project, the maintenance of existing suitable habitat and home ranges in the analysis area, the retention of existing immature sawtimber stands that would succeed to suitable habitat, and the abundance and distribution of nest site habitat and winter forage habitat across Region 1 and the IPNF (Samson, 2005).

Samson (2005) concluded that short-term viability of the pileated woodpecker in the Northern Region is not an issue for the following reasons:

- No scientific evidence exists that the pileated woodpecker is decreasing in numbers.
- Increases in the extent and connectivity of forested habitat have occurred since European settlement.
- Well-distributed and abundant pileated woodpecker habitat exists on today's landscape.
- The level of timber harvest ([in 2004] 0.0009% of the forested landscape in the Northern Region) is insignificant.

Consequently, none of the alternatives would likely result in appreciable adverse habitat modification or a perceptible change in populations of pileated woodpeckers.

In the analysis area at least 61% of NFS lands would succeed naturally from immature sawtimber forest to sawtimber/mature sawtimber size classes over time. This represents 96+% of the existing immature sawtimber size class (Table 3-84). These areas would increase (over 10+ years) the potential suitable habitat and the number of home ranges.

It is expected that the majority of non-NFS land would be actively managed and therefore no stands would remain in the sawtimber/mature sawtimber size class for any appreciable length of time before being treated. NFS lands would provide the vast majority of mature/old forest with non-NFS lands being in younger successional stages.

Potential harvest on non-NFS land may result in insufficient quantity (and quality) of feeding habitat in the two home ranges for which NFS land does not provide sufficient. No federal action is proposed within these home ranges (WL- 47 & SWL - 14 - 16).

Alternative A and E

Direct and Indirect Effects

There would be no effect on suitable pileated woodpecker nesting habitat or feeding habitat on NFS lands within delineated home ranges (WL - 47 & SWL - 14 - 16).

Alternatives B and C

Direct and Indirect Effects

These alternatives would maintain suitable habitat to support pileated woodpeckers in a minimum of three home ranges - B, C, and D (WL - 47 & SWL - 14 - 16).

Proposed harvest treatment would impact ≈148 of the 178 acres of mature suitable nesting habitat in Home Range A. This could result in insufficient suitable nesting habitat in Home Range A. However, design features (i.e. snag retention levels), prescriptions (i.e. thinning), pileated woodpecker use of areas with 10% forest cover (Samson, 2005), information that indicates that cavity

habitat and pileated woodpecker us can be maintained in partially treated stands (Quesnel and Steeger, 2002), and the amount of immature size class maintained reduce the risk of loosing sufficient suitable nesting habitat.

Alternatives D and F

Direct and Indirect Effects

These alternatives would maintain suitable habitat to support pileated woodpeckers in a minimum of four home ranges - A, B, C, and D (WL - 47 & SWL - 14 - 16).

Proposed harvest treatment would impact ≈79 of the 178 acres of mature suitable nesting habitat in Home Range A. The acres of mature nesting habitat remaining, design features (i.e. snag retention levels), prescriptions (i.e. thinning), pileated woodpecker use of areas with 10% forest cover (Samson, 2005), and the amount of immature size class remaining would maintain the suitability of Home Range A.

Elk

Elk are an important big game species within the analysis area. Elk were identified in the Forest Plan as general forest seral species easily affected by management activities. Land management activities, particularly timber harvest and associated roads affect elk habitat quality, potential elk use of habitat, and elk mortality from hunting.

Some parts of the wildlife analysis area are not in either of the elk analysis areas. These areas are predominately non-NFS lands within which NFS lands have limited contributions to elk habitat. In these areas, it is not possible for the Forest Service to provide security or mitigate the impacts on elk from roads on private lands, which the Forest Service has no jurisdiction over.

For the reasons discussed above a detailed analysis of impacts on elk in areas outside of the elk analysis areas is neither practical nor meaningful in evaluating potential effects from Forest Service actions. Therefore, the areas outside of the elk analysis areas are not analyzed in detail.

Geographic Scope

The analysis area for elk was determined by considering the proposed actions, land ownership, logical topographic boundaries (i.e. ridges and streams), and existing road systems. To display effects from Forest Service actions and to display the differences between alternatives, the analysis area was broken into two separate evaluation areas based on home range size.

The Hidden Cedar Wildlife Analysis Area is in Elk Habitat Unit 1, which includes the wildlife analysis area, Keeler Creek, Cat Spur Creek, Dutch Creek, Blair Creek, and Staples Creek. The two evaluation areas are used as the cumulative effects area and are discussed in context with EHU1.

Methodology

To disclose how the proposed action and alternatives would affect elk and potential elk use of habitat, the *Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho* (Leege, 1984) was used. The procedure evaluates various factors affecting elk habitat quality (e.g. road miles, security acres, cover, forage, and other factors) and assigns a numerical rating. This rating is used to determine elk habitat quality (expressed as a percent of potential elk use or Elk Habitat Potential - EHP).

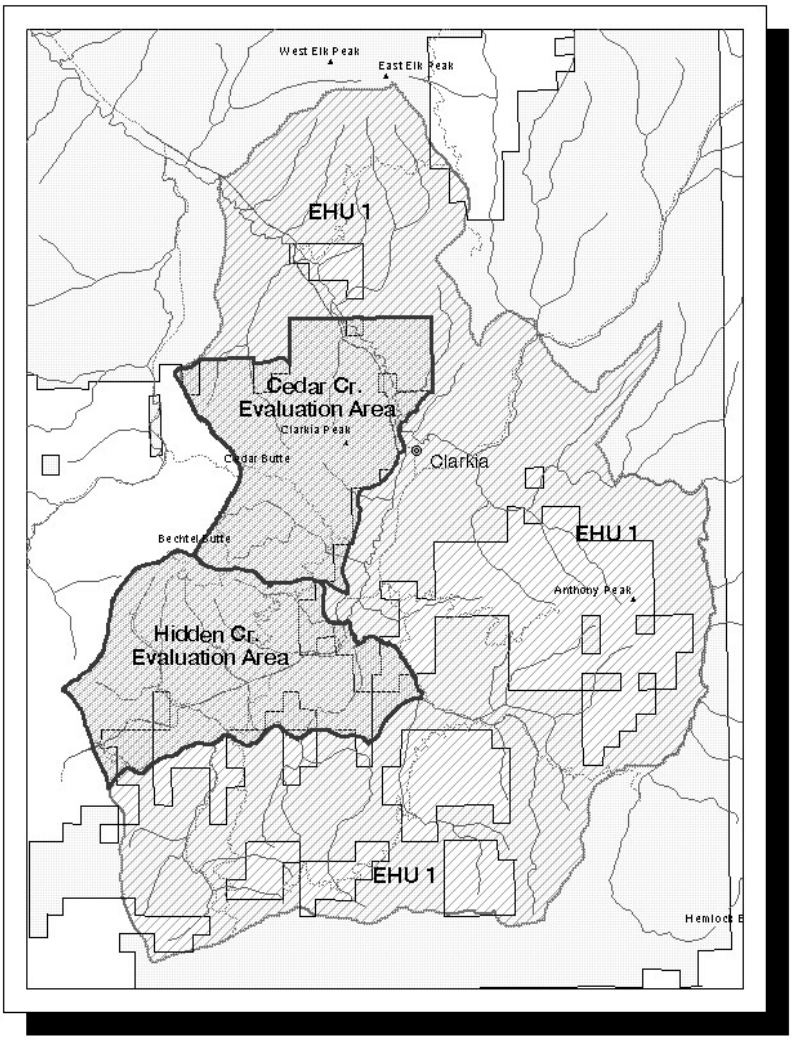

Figure 3 - Elk Evaluation Areas

If all habitat factors were in optimum abundance and distribution, habitat would be rated at 100% of potential. If the procedure calculates the habitat to be at 50% of potential, this indicates that the area can support 50% as many elk as it could if all factors were optimal.

Optimum conditions are rarely met - especially if roads are present. The most important factor usually regulating use of habitat by elk is disturbance by people. Most disturbance (and hunting mortality) is related to roads (Leege, 1984).

To meet Forest Plan goals and objectives for elk habitat, EHP goals were established by District. The goal for the St. Maries District was set at .53. To distribute elk habitat potential a target of .39 was identified for EHU 1.

Affected Environment

Past disturbances, forest succession, the existing road systems, and present management of roads combine to affect existing elk habitat quality.

Much of the wildlife analysis area is identified in the Forest Plan as big game winter range (i.e. MA-4). However, the project area is used by elk throughout the year. Goals for wildlife in MA-4 are to provide sufficient forage and cover. Cover, forage, and their availability are not thought to limit big game habitat in the project area. Areas that typically are used by wildlife (including elk) for travel include ridges, riparian areas, and saddles. Areas in the wildlife analysis area that provide suitable conditions for travel have been mapped and considered in the development and design of the proposed action and alternatives (WL - 44 & Design Feature 12E), see also the prior section on Connectivity.

Analysis of potential elk use related to livestock indicates that the presence of cattle in the project area - at current levels - is not conflicting with elk use on NFS land (WL - 54 & SWL - 24 & 25). Cattle use is primarily confined to existing roads with occasional use of portions of existing clear cuts. There is no forage conflict between elk and livestock. There is no change in livestock proposed under any alternative; and livestock effects on wildlife are not specifically addressed further.

A total of approximately 49.2 miles of road affect potential elk use and security within the elk analysis areas (e.g. open, gated, or barriered roads). The following table displays the existing conditions for elk in the elk analysis areas.

Table 3-94 Existing EHP, Security Acres, and Road Miles by Elk Analysis Area

Area	EHP	Security	Road miles		
			Open	Gated	Barriered
Cedar Creek	.47	333 acres	13	4.5	10.5
Hidden Creek	.45	327 acres	13.5	9.3	2.4
Cedar + Hidden	.46	660 acres	26.5	13.8	12.9

The EHP on the St. Maries District is above the established goal of .53 – the last calculations put the number at .58. The EHP on NFS land in EHU 1 was last calculated at .46 – above the target of .39 with projects implemented between then and now that were designed to improve elk habitat (e.g. road management in Dutch Cat) and/or watershed improvement projects with secondary benefits for elk habitat potential (e.g. implemented road decommissioning in Hidden Cedar) all of which continue to improve conditions in EHU 1.

Environmental Consequences

Long-term impacts are displayed for the period following completion of proposed federal actions and cumulative actions (e.g. approximately 5-7 years following the decision). For Alternatives B, C, D, and F effects are also displayed for the time period during implementation when all proposed and cumulative actions would be occurring. Alternative A and E do not have proposed federal actions that would adversely impact big game habitat for any appreciable length of time in any one area (e.g. <1 year), therefore there is no measurable difference during implementation and following implementation.

Data displayed for the period during implementation represents the maximum potential effects actual effects would most likely be less. Although design criteria would be implemented that would minimize adverse effects on elk by specifying the timing of activities, the analysis assumes all action would occur at the same time. This is because of the uncertainty in trying to predict the variables that influence sale configuration and timing.

Direct, Indirect and Cumulative Effects are broken out and discussed by alternative. In general, direct effects include effects from the federal actions (e.g. road construction/use on NFS lands), indirect effects include effects that would occur as a result of the decision (e.g. road construction/use on non-NFS land resulting from granting of access requests) and cumulative effects include all past, present and reasonably foreseeable actions on NFS and non-NFS lands in the analysis areas.

Common to All Alternatives

Cumulative Effects

Because of the relatively small magnitude and short duration of adverse effects there would be no long-term effects that would decrease the EHP in EHU1 or cause the EHP to fall below the district goal.

Table 3-95 EHP and Security by Alternative

Area	Alt. A	Alt. B		Alt. C		Alt. D		Alt. E	Alt. F	
Habitat	Long term	During	Long term	During	Long term	During	Long term	Long term	During	Long term
Cedar Cr.										
EHP	.47	.38	.53	.42	.52	.42	.54	.54	.38	.54
% change	0	-21	+12	-10	+10	-10	+15	+15	-19	+15
Security acres	333	0	817	0	817	0	1024	1024	0	1024
Hidden Cr.										
EHP	.45	.37	.43	.41	.45	.42	.58	.58	.35	.57
% change	0	-19	-5	-10	0	-8	+28	+28	-22	+26
Security acres	327	0	192	0	192	0	1216	1216	0	1216
Cedar/Hidden										
EHP	.46	.37	.48	.41	.48	.42	.56	.56	.36	.56
% change	0	-20	+4	-11	+4	-9	+22	+22	-22	+22
Security acres	660	0	1009	0	1009	0	2240	2240	0	2240

Alternative A

Direct and Indirect Effects

There are no present or reasonably foreseeable federal actions that would measurably affect big game habitat.

Cumulative Effects

There are no reasonably foreseeable actions on non-NFS lands in the analysis area that would measurably affect big game habitat.

Alternative B

Direct and Indirect Effects

During implementation of the proposed federal actions the use of existing closed/restricted roads for harvest activity on NFS lands would cause a loss of all existing security and reduce EHP by 21% in the Cedar Creek elk area. The use of existing closed/restricted roads for harvest activity on NFS lands and increases in road miles/use (on NFS and non-NFS lands) from the granting of access requests would combine to cause a loss of all existing security and reduce EHP by 19% percent over the no action alternative in the Hidden Creek Elk Analysis Area.

Following completion of all activity and implementation of proposed restoration actions, the EHP would increase by 12% in the Cedar Creek Elk Analysis Area and decrease by an additional 5% over the no action alternative in the Hidden Creek elk area. The decrease in Hidden Creek elk area is due to the increase in road effects on NFS and non-NFS land from the granting of access requests and the loss of 135 acres of security.

Cumulative Effects

There would be an increase of 349 acres in security and an increase in the EHP from .46 to .48 and 4% improvement for the combined Cedar/Hidden Elk Analysis Area. This would not cause a measurable change in EHP in EHU 1 or on the district.

Alternative C

Direct and Indirect Effects

During implementation of the proposed federal actions the use of existing closed/restricted roads and helicopter use for harvest activity on NFS lands, and increases in road miles/use (on NFS and non-NFS lands) from the granting of access requests would cause a loss of all existing security and reduce EHP by 10% in the Cedar Creek elk area and 10% percent in the Hidden Creek Elk Analysis Area.

Following completion of activity and implementation of proposed restoration actions, the EHP would increase by 10% in the Cedar Creek Elk Analysis Area and return to existing levels in the Hidden Creek elk area. The loss of 205 acres of security in the Hidden Creek Elk Analysis Area is offset by an overall decrease in road miles.

Cumulative Effects

There would be an increase of 349 acres in security and an increase in the EHP from .46 to .48 and 4% improvement for the combined Cedar/Hidden Elk Analysis Area. This would not cause a measurable change in EHP in EHU 1 or on the district.

Alternative D

Direct and Indirect Effects

During implementation of the proposed federal actions the use of existing closed/restricted roads for harvest activity on NFS lands would cause a loss of all existing security and reduce EHP by 10% in the Cedar Creek elk area.

The use of existing closed/restricted roads for harvest activity on NFS lands and increases in road miles/use (on NFS and non-NFS lands) from the granting of access requests would cause a loss of all existing security and reduce EHP by 8% percent from the existing condition in the Hidden Creek Elk Analysis Area.

Following completion of all activity and implementation of proposed restoration actions, the EHP would increase by 15% in the Cedar Creek Elk Analysis Area and increase by 28% over the no action alternative in the Hidden Creek elk area.

Cumulative Effects

There would be an increase of 1580 acres in security and a 22% increase in EHP for the combined Cedar/Hidden Elk Analysis Area.

Alternative E

Direct, Indirect and Cumulative Effects

Implementation of proposed restoration actions would increase security by 691 acres and increase EHP by 15% in the Cedar Creek Elk Analysis Area.

In the Hidden Creek elk area the combination of the decrease in road miles from restoration work and the increase in road miles (on non-NFS and NFS lands) from the access requests would cause an increase in security of 889 acres and increase EHP from .45 to .58 (a 28% change).

There would be an increase of 1580 acres in security and a 22% increase in EHP for the combined Cedar/Hidden Elk Analysis Area.

Alternative F

Direct and Indirect Effects

During implementation of the proposed federal actions the use of existing closed/restricted roads and helicopter use for harvest activity on NFS lands, and increases in road miles/use (on NFS and non-NFS lands) from the granting of access requests would cause a loss of all existing security and reduce EHP by 19% in the Cedar Creek elk area and 22% percent in the Hidden Creek Elk Analysis Area.

Following completion of all activity and implementation of proposed restoration actions, the EHP would increase by 15% in the Cedar Creek Elk Analysis Area and increase by 26% over the existing condition in the Hidden Creek elk area.

Cumulative Effects

There would be a 1,580-acre increase in security and a 22% increase in EHP for the combined Cedar/Hidden Elk Analysis Area.

Threatened and Endangered Wildlife Species

The project is primarily in Shoshone County with smaller portions in Latah and Clearwater Counties. The U. S. Fish and Wildlife Service (USFWS) in their Species Lists for those three counties (www.fws.gov/easternwashington/county%20species%list, 2006) identified three listed wildlife species that may occur in those counties: Bald Eagle, Canada Lynx, and Gray Wolf. The initial analysis was based on a Forest-wide species list that also included grizzly bear and woodland caribou. In the interest of avoiding confusion this supplemented analysis retains the analysis for listed species that were addressed in the initial analysis (as applicable).

Species requiring analysis were identified based on the Species Lists, review of the area, a search of district records, scientific literature, professional knowledge of the area, the EAWS, and a review of information from the Conservation Data Center (CDC). See Table 3-87 and Rationale for No Further Analysis section for additional discussion regarding analysis needs of listed species in the wildlife analysis area. The following table displays a synopsis of habitat and existing conditions.

The Hidden Cedar Wildlife Analysis Area does not provide nesting or wintering habitat for the bald eagle - bald eagle occurrence in the drainage is considered incidental.

The Hidden Cedar Wildlife Analysis Area is not within any Lynx Analysis Unit on the St. Joe Ranger District and is not considered capable of providing sufficient habitat for resident lynx. The project is consistent with direction in the Lynx Conservation Assessment and Strategy. There would be no effect on these species and no further analysis is needed or required (see Relevancy Screen).

Table 3-96 Listed Wildlife Species

Common Name	Habitat	Existing Condition in the Assessment Area
Bald Eagle	Nest in large dominant trees near large bodies of water in areas relatively free from disturbance. Perch sites, roost sites and access to prey are essential components of winter habitat.	No large bodies of water are present in the wildlife analysis area. There are no nests or reported sightings in the project assessment area.
Canada Lynx	Mesic conifer forests that provide a prey base of snowshoe hare (generally above 4,000' & in association with subalpine fir and spruce habitat types). Late and early successional stages.	Based on elevation, forest type, and potential vegetation (habitat type) the WL analysis and project area do not contain a sufficient amount of capable habitat to support resident lynx. The area is not in any Lynx Analysis Unit.
Gray Wolf	Large areas with high prey densities and isolation from human activities. Availability of den and rendezvous sites.	There is no evidence of den or rendezvous sites in the assessment area. The geographic location relative to surrounding human disturbances reduces the likelihood of occurrence.
Grizzly Bear	Large areas of undisturbed habitat. Low elevation riparian areas, meadows, snowchutes, shrubfields, grasslands, and open timbered stands.	Project area is not in a Grizzly Bear Management Unit or area of known grizzly bear use. No known or suspected suitable habitat in analysis area.
Woodland Caribou	Mature to old growth forests with dense canopies over a large elevation gradient. High elevation timbered ridges with abundant lichens.	The project area is outside of the woodland caribou recovery area. The species is not known or suspected on the St. Joe Ranger District.

The grizzly bear and woodland caribou are not present in the project area and are not included on the species lists for the affected counties. Based on the species not being present, the existing condition of habitat (i.e. low elevation, lack of remoteness), and the nature of the proposed activities, there would be no effect on grizzly bear or woodland caribou and no further discussion for those species is needed.

Gray Wolf

Historically wolves were distributed throughout most of Idaho in unknown populations. Wolf packs of four to ten animals appear to have ranged widely in the mountains of northern and central Idaho. A decline of native ungulates, control programs designed to eradicate wolves, and conflicts with livestock and humans caused the decline of wolf populations in Idaho and led to the absence of a breeding population in Idaho (Hansen, 1986).

High prey densities, particularly big game, and minimal conflict with human interests and uses characterize wolf habitat. Human disturbance, as measured by open road densities, is used to disclose potential effects in this analysis. Other important habitat features for wolves include den and rendezvous sites (Hansen, 1986).

Affected Environment

The Hidden Cedar Wildlife Analysis Area falls within the Central Idaho Reintroduction Area where gray wolves are classified as nonessential experimental populations (USDI, 1994). This classification treats wolves as proposed for listing under the ESA. The reintroduction of wolves in central Idaho did not envision conflicts with current or anticipated management actions. No changes in land use restrictions (other than the possibility of temporary restrictions near den sites) are required because of the reintroduction (USDI, 1994).

Existing biophysical habitat does not preclude the presence of wolves in the drainage. However current road densities, human presence, and existing land uses reduce the likelihood of wolves occurring in the area. The area was not identified as a "dispersal corridor" or as a "key area for wolf conservation" (Hansen, 1986).

There are no known wolf dens or rendezvous sites in the wildlife analysis area or the St. Maries River Drainage (Mack et al, 2005). The nearest wolf territory is approximately eight miles from the project area. Existing road density in the wildlife analysis area is 4.7 mi/mi^2 on all ownerships and 3.6 mi/mi^2 on NFS lands.

The potential elk use value in the Cedar Creek Elk Analysis Area is .47 and in the Hidden Creek Elk Analysis Area it is .45. Potential elk use is a measure of prey availability (see the section on elk in this document).

Environmental Consequences

Table 3-97 Density and Prey Availability by Alternative

	Existing	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
NFS Lands	**Direct & Indirect Effects**						
Total Road Density	3.6	3.6	2.9	2.8	2.5	2.5	2.6
Open Road Density	2.2	2.2	2.2	1.8	1.8	1.8	2.1
All Lands	**Cumulative Effects**						
Total Road Density	4.7	4.7	4.3	4.3	4.1	4.1	4.1
Open Road Density	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Elk Analysis Areas	**EHP**						
Weighted Avg.	.46	.46	.48	.48	.56	.56	.56

Common to All Alternatives

Direct and Indirect Effects

There are no known dens or rendezvous sites in the project area, and the likelihood of direct effects on gray wolves is very low. There would be no impact on any known wolf den or rendezvous site (the nearest wolf territory is approximately eight miles from the project area), no adverse impact on any linkage or connections between habitats, no consequential increase in the likelihood of human wolf conflicts, and a decrease in road densities.

Alternatives B through F would adversely impact EHP due to the indirect effects associated with the granting of access requests and the road construction on non-NFS lands. These effects are

compensated for to varying degrees in the action alternatives by the changes in road management and road obliteration/storage on NFS land. The differences in EHP would not appreciably affect prey availability. For more discussion on EHP see the elk analysis section.

Cumulative Effects

Historically, gray wolf occurred throughout northern Idaho. An intensive campaign to eradicate wolves led to wolves being essentially eliminated from the West by the 1930s. Reintroduction of wolves in Idaho has resulted in approximately 450+ wolves in the experimental population area (Mack et al. 2005). The federal actions evaluated in this proposal would not add to any adverse cumulative effects nor contribute to the loss of populations or adversely affect critical or important habitat for gray wolves. This conclusion is based on the analysis of direct and indirect effects presented in the evaluation, design features which would avoid adverse impacts (e.g. maintenance of corridors/linkages), the likelihood and nature of occurrence of wolves, and the relative lack of preference for special habitat exhibited by wolves.

Sensitive Wildlife Species

Sensitive species are determined by the Regional Forester (FSM 2670.5) and are those species for which population viability is a concern. The National Forest Management Act directs the Forest Service to review programs and activities to ensure that species do not become threatened or endangered as a result of Forest Service actions.

The ICB Assessment found that species that are likely in decline (includes many Sensitive species) are associated with landscape and habitat components that are declining. Forest Plan direction for the Idaho Panhandle National Forests (IPNF) states that habitat of sensitive species will be managed to prevent further declines in populations which could lead to federal listing.

This analysis identified capable and suitable habitat based on the latest scientific literature for each species and available data in the TSMRS/FSVeg databases. Impacts on acres of suitable habitat are measured by alternative and discussed for each species as appropriate.

Sensitive species on the Regional Foresters list were screened for their relevancy to the wildlife analysis area and the proposed action. See the Species Relevance Screen (Table 3-81) and the Rational for No Further Analysis section earlier in this document. Further information is also located in the project file (WL-5 through WL-9).

Based on species occurrence, habitat capability and suitability, and the likelihood or risk of potential impacts on habitat and the species, there would be **no impact** on species identified in the Species Relevancy process as needing no further analysis (see Appendix F –Summary of Conclusion of Effects).

Table 3-98 displays the sensitive species that require further analysis, a brief description of their habitat, and comments regarding capable/suitable habitat in the analysis area.

Table 3-98 Sensitive Wildlife Species and Habitats

Common Name	Habitat	Comments
Fisher (and Marten)	Mature and old growth forests (riparian linkages)	Suitable habitat available within wildlife analysis area. Marten occupy similar habitat.
Wolverine	Areas of adequate food supply in large remote areas	Limited capable or suitable habitat in wildlife analysis area.
Northern goshawk	Nest stands - mature to old growth forests	Suitable habitat in wildlife analysis area. Known nest sites.
Black-backed woodpecker	Conifer forests, dead/dying trees from fire or insect/disease	Suitable habitat in wildlife analysis area
Flammulated owl	Mature to old growth,open, Douglas-fir and ponderosa pine	Limited capable or suitable habitat within wildlife analysis area
Coeur d'Alene salamander	Fractured rock, seeps, waterfall spray zones, & streamsides	Limited capable or suitable habitat in wildlife analysis area
Boreal toad aka western toad	Breed in lakes, ponds, streams and persistent water sources	Potential habitat present in wildlife analysis area
Pygmy nuthatch	Mature to late seral, open, ponderosa pine and Douglas-fir	Limited capable or suitable habitat within wildlife analysis area
Fringed myotis	Prefers dry coniferous forests, roosts - caves, large cavities	Limited capable or suitable habitat within wildlife analysis area

Fisher and Marten

Fisher and marten occupy similar habitat (Ruggiero et al. 1994). Both prefer late-successional forests in western habitats (Heinemeyr and Jones, 1994, Ruggiero et al. 1994). Given the mesic nature - as evidenced by habitat types - and elevation of the analysis area the overlap of habitat in the wildlife analysis area is especially marked (see the following descriptions of habitats). Potential impacts are analyzed for both species using the same methodology (the marten is a MIS and not a sensitive species but is addressed in this section of the document).

Fisher are considered rare through most of Idaho. They prefer late-seral stage coniferous and mixed forest habitat. Fisher use riparian habitats as resting sites and extensively for travel. Fisher appear to avoid high elevations (> 4,000 ft.) and non-forested areas (Ruggiero, et. al. 1994). Extensive alteration of forest structure through logging (i.e. reduction in canopy closure, snags, and down woody material) may reduce its habitat value for fisher (Heinemeyer and Jones, 1994).

Marten associate closely with late-successional stands of mesic conifers (Ruggiero et al., 1994). In the western United States martens are most abundant in mesic mature to over-mature spruce-fir forests where small mammal prey species are most abundant (USDA, 1990). In general, marten prefer forest stands with greater than 40 percent tree canopy closure and with large, down logs; stumps; and snags which provide access to prey under the snow and denning sites. Use or selection of riparian zones by marten has been reported in the literature (Ruggiero et al., 1994).

Methodology

The analysis uses management guidelines from *Fisher Biology and Management in the Western United States* (Heinemeyer and Jones, 1994). The percent of the area in mature/old forest structure (i.e. suitable habitat) are displayed and compared to the guidelines. Changes from the existing condition relative to guidelines for forest structure are discussed.

The goal at the scale of this analysis (i.e. the Hidden Cedar Wildlife Analysis Area or "subdrainage") is to maintain functional home ranges (Heinemeyer and Jones, 1994). However, there are many elements (such as the percentage of private lands and the amount of agricultural lands) that conflict with and limit the "suitability" of fisher/marten habitat in the surrounding landscape and St. Maries River Drainage. If the NFS lands were to be managed to meet objectives for high-quality subdrainages, it is debatable whether the surrounding subdrainages could/would be managed to provide multiple home ranges. The resolution of this situation is beyond the scope of a project level analysis.

It is difficult to put the habitat in the St. Maries River Drainage and Hidden Cedar Wildlife Analysis Area into a landscape perspective due to the existing ownership pattern of the landscape and the lack of a large-scale management strategy. However, current literature can be (and was) used to establish existing conditions, and assess potential effects at the project scale.

While trapping is a parameter affecting habitat for forest carnivores, the Forest Service has no jurisdiction concerning trapping; and it is beyond the scope of this project analysis. However, road densities affect vulnerability (to trapping) and are addressed.

Affected Environment

Vegetation/Habitat

Late-successional habitat is an essential component of forest carnivore habitat. The physical structure of the forest appears to be more important for fisher and marten then the species composition (Ruggiero et. al., 1994).

Habitat management considerations for fisher and marten emphasize maintaining late-successional forest habitat. Mature riparian forest is especially important for denning sites and travel ways for fisher. Based on habitat requirements, the quality, amount and distribution of late successional forest habitat within the drainage is considered the most important factor for fisher and marten.

There are approximately 11,365 acres of capable fisher/marten habitat on NFS land in the Hidden Cedar Wildlife Analysis Area. There are 1,664 acres of mature/sawtimber size habitat that provide potentially suitable fisher/marten denning habitat.

The existing condition of forested habitat on NFS lands in the Hidden Cedar Wildlife Analysis Area and the guidelines for forest structure by subdrainage (Heinemeyer and Jones, 1994) are displayed in the following table.

Table 3-99 Guidelines for Forest Structure

Forest Structure	Existing Condition*		Subdrainage Guidelines		
			High Quality	Moderate Quality	Low Quality
Mature/Sawtimber	1,664 ac	14%	65-75%	≥40%	30-40%
Imsa**	7,414 ac	64%	10-25%	na***	na
Pole/sapling	1,489 ac	13%	10-25%	na	na
Open/seed	1,019 ac	9%	na	na	na

** % of NFS capable habitat in the wildlife analysis area*
*** includes multistory stands*
**** not applicable – no guidelines identified*

Based on the amount of mature/sawtimber forest structure, the existing condition of the Hidden Cedar Wildlife Analysis Area is below the criteria needed for a low-quality subdrainage. This is due primarily to the fire and harvest history that results in the majority of the stands being classified as immature sawtimber. See the discussion in the Forest Vegetation section of this chapter.

In addition to the 1,664 acres of mature/sawtimber habitat, approximately 3,907 acres of immature sawtimber size forest stands have a number of large trees (>20/acre at least 14-15 inches d. b. h.) that may also provide suitable fisher/marten habitat. Based on these figures, there are as many as 5,571 acres (48% of NFS capable habitat) of suitable fisher/marten habitat in the wildlife analysis area. When these additional stands are considered, the existing condition of the analysis area would meet the criteria for a moderate-quality subdrainage. However, field review indicates that the amount of large diameter logs may be below desired levels in many of these stands. The analysis is based on the amount of mature/sawtimber sized stands.

The above discussion applies only to the NFS administered lands in the wildlife analysis area. It should be noted that the surrounding landscape is primarily non-NFS land that does not provide much, if any mature or older forest habitat.

Impacted riparian zones are also affecting existing fisher/marten habitat. See the previous section on riparian habitat for further discussion on effects on riparian habitat.

Access/Vulnerability Risk

Trapping-vulnerability risk has been cited as one of the factors affecting forest carnivores in Idaho (Heinemeyer and Jones, 1994). Roads are correlated with trapping vulnerability and human disturbance. Areas with greater than or equal to 1 mi/mi^2 road densities have a high risk to trapping vulnerability for fisher and marten.

As the effects from roads are associated with access, roads that effectively (either physically or legally) restrict motorized use are not included in the road density. The existing open road density in the Hidden Cedar Wildlife Analysis Area is 1.8 mi/mi^2 on all lands and 2.2 mi/mi^2 on NFS lands.

Environmental Consequences

Vegetation/Habitat

Table 3-100 Acres and Percent of Forest Structure by Alternative

Forest Structure	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Mature/Older Forest	1,664 ac 14%	1,603 ac 14%	1,610 ac 14%	1,634 ac 14%	1,664 ac 14%	1,624 ac 14%
Young Forest	7,414 ac 64%	7,115 ac 61%	7,150 ac 61%	7,260 ac 63%	7,406 ac 64%	7,147 ac 62%
Pole/Sapling	1,489 ac 13%	1,505 ac 13%	1,505 ac 13%	1,488 ac 13%	1,489 ac 13%	1,504 ac 13%
Open/Seed	1,019 ac 9%	1,313 ac 11%	1,313 ac 11%	1,195 ac 10%	1,019 ac 9%	1,271 ac 11%

Access/Vulnerability Risk

Table 3-101 Effects on Road Density (miles/mile^2)

	Existing	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
NFS lands	**Direct and Indirect Effects**						
Total Road Density	3.6	3.6	2.9	2.8	2.5	2.5	2.6
Open Road Density	2.2	2.2	2.2	1.8	1.8	1.8	2.1
All ownership	**Cumulative Effects**						
Total Road Density	4.7	4.7	4.3	4.3	4.1	4.1	4.1
Open Road Density	1.8	1.8	1.8	1.8	1.8	1.8	1.8

Common to All Alternatives

Direct and Indirect Effects

Although suitable habitat would be reduced under some alternatives, all alternatives would maintain about 14% of the NFS land in the analysis area as mature/old forest structure and would maintain a minimum of 61% (96+% of existing) as young forest that would succeed to older forests.

A total of approximately 15 acres of the riparian area along Hidden Creek, Wood Creek and the West Fork of the St. Maries River would be planted to trees and/or brush. This would begin the process of restoring/moving the riparian habitat closer to conditions suitable for travel use by fisher and marten.

The relatively small changes in the amount of mature/older forest structure and young forest structure would not appreciably affect the availability of suitable habitat, and there would be no change in the quality of the "subdrainage" (i.e. less than low-quality for fisher). There would be a negligible change in the amount and distribution of future suitable habitat as succession continues to move the area towards a moderate- or high- quality subdrainage.

Cumulative Effects

The St. Maries River Basin Fuels Reduction Project (Area 3) would impact a total of approximately 27 acres of immature sawtimber size class. The treatment would not result in a change in size class but would reduce the suitability of the treated areas as potential denning habitat – the forage value

would change but would not be eliminated. When added to the direct/indirect effects from each alternative (see below) this treatment would not change the quality of the analysis area to support fisher/marten.

In all alternatives, road densities remain at levels that result in a high risk to trapping vulnerability.

Based on existing conditions on non-NFS lands (from field review and aerial photos) and management objectives on non-NFS lands in the St. Maries River Drainage, it can be assumed with a reasonable degree of confidence that the St. Maries River Drainage is and will remain an area of low integrity for forest carnivores. This condition most likely will exist independent of conditions/management on NFS lands in the St. Maries River Drainage and the Hidden Cedar Wildlife Analysis Area.

Common to All Action Alternatives

Direct, Indirect, and Cumulative Effects

All alternatives that propose some Forest Service action (B through F) would reduce road miles and change road/access management. This would maintain or reduce both total road densities and open road densities (see Table 3-86); and cause a small improvement in the risk to trapping/ vulnerability.

Alternative A

Direct and Indirect Effects

This alternative would not affect suitable mature forest habitat.

Alternative B

Direct and Indirect Effects

A total of 261 acres (254 harvest and 7 road construction) of mature forest and 1,133 acres (1,090 harvest and 43 road construction) of young forest would be impacted. This would reduce mature forest habitat by 61 acres (54 acres from harvest and 7 acres from road construction) and reduce immature sawtimber (i.e. young forest) by 299 acres (256 from harvest and 43 from road construction). The 200 acres of partial harvest in mature forest would result in a total or partial loss of suitable fisher/marten denning habitat until the habitat attributes (e.g. down wood) are restored (e.g. succession). The 834 acres of partial harvest in immature sawtimber forest would retain the future suitability of the treated stands.

Alternative C

Direct and Indirect Effects

A total of 264 acres of mature forest and 1,113 acres of young forest would be impacted by harvest and/or road construction. This would reduce mature forest habitat by 54 acres and reduce immature sawtimber (i.e. young forest) by 264 acres. The 210 acres of partial harvest in mature forest would result in a total or partial loss of suitable fisher/marten denning habitat until the habitat attributes (e.g. down wood) are restored (e.g. succession). The 849 acres of partial harvest in immature sawtimber forest would retain the future suitability of the treated stands.

Alternative D

Direct and Indirect Effects

A total of 117 acres of mature forest and 474 acres of young forest would be impacted by harvest and/or road construction. This would reduce mature forest habitat by 30 acres and reduce immature sawtimber (i.e. young forest) by 154 acres. The 87 acres of partial harvest in mature forest would result in a total or partial loss of suitable fisher/marten denning habitat until the habitat attributes (e.g. down wood) are restored (e.g. succession). The 320 acres of partial harvest in immature sawtimber forest would retain the future suitability of the treated stands.

Alternatives D, E, & F

Direct and Indirect Effects

These alternatives would remove approximately 0.7 mile of existing road that is encroaching on the riparian habitat in Wood Creek and 0.2 miles in Hidden Creek. This (along with the riparian planting) would begin the process of restoring/moving the riparian habitat closer to historic conditions thereby improving habitat for fisher and marten.

Alternative E

Direct and Indirect Effects

This alternative would reduce approximately 8 acres of immature sawtimber due to access request road construction.

Alternative F

Direct and Indirect Effects

A total of 203 acres (199 harvest and 4 road construction) of mature forest and 1,116 acres (1,081 harvest and 35 road construction) of young forest would be impacted. This would reduce mature forest habitat by 40 acres (36 acres from harvest and 4 acres from road construction) and reduce immature sawtimber (i.e. young forest) by 267 acres (232 from harvest and 35 from road construction). The 163 acres of partial harvest in mature forest would result in a total or partial loss of suitable fisher/marten denning habitat until the habitat attributes (e.g. down wood) are restored (e.g. succession). The 849 acres of partial harvest in immature sawtimber forest would retain the future suitability of the treated stands.

Wolverine

Wolverines are low-density, wide-ranging species that inhabit remote forested areas, ranging over a variety of habitats. Resident female wolverine home ranges in Montana and Idaho range from 11.6 mi^2 to over 300 mi^2. Wolverines tend to use lower elevations in winter and higher elevations in summer when they provide the greatest potential food supply (Hornocker and Hash 1981). The proximity of rocky areas such as talus slopes/boulder fields for den sites was important for wolverines in Idaho (Ruggiero et al, 1994)

The availability of large mammal (i.e. ungulate) carrion as food is important for the distribution, survival, and reproductive success of wolverines (Ruggiero et. al., 1994). Wolverine presence appears to be associated with low human occurrence/access.

Factors with the potential to threaten local population viability of the species include reduction of "wilderness refugia" (large areas of habitat with limited human access) or natural reserves and food availability (Ruggiero et. al., 1994).

Management objectives for wolverine at the drainage level primarily involve maintaining quality habitat by managing road systems to limit disturbance and reduce risk of displacement during critical wolverine denning periods.

Affected Environment

Wolverine tracks have been reported adjacent to the wildlife analysis area. This sighting most likely represents a transient individual. In a district-wide assessment, potential wolverine natal denning habitat was not identified in or adjacent to the wildlife analysis area. The territory size requirements, lack of denning habitat, and existing access in the wildlife analysis area and adjacent drainages preclude other than incidental occurrence within the wildlife analysis area. The existing open road density in the wildlife analysis area is 1.8 mi/mi^2 on all lands and 2.2 mi/mi^2 on NFS lands.

Environmental Consequences

Common to All Alternatives

Direct and Indirect Effects

Due to the lack of habitat, there would be no disturbance of potential denning habitat. Based on existing human access, changes in road density would have little to no beneficial effect on wolverine habitat.

Cumulative Effects

No proposed Forest Service action would add to existing effects on wolverine habitat. High road densities from past and present activities in the wildlife analysis area and the surrounding landscape will continue to limit the suitability of the area as wolverine habitat.

Northern Goshawk

Goshawks use a variety of forest types, structures, and successional stages, and have been primarily associated with late-successional habitat. For nesting, goshawks utilize mature to old growth stands on gentle to moderately steep slopes (Kennedy, 2003). Forest habitat that provides prey species and which is open enough to allow unimpeded flight through the understory is considered suitable for foraging.

The analysis of effects on goshawks uses direction in “Old-Growth Habitats and Associated Wildlife Species in the Northern Rocky Mountains” (USDA, 1990) and “Management Recommendations for the Northern Goshawk in the Southwestern United States” (Reynolds et. al. 1992) to determine potential effects. The analysis is tiered to the analysis done for size class (under Terrestrial Wildlife Habitat).

Geographic Scope

Goshawk territory sizes range from approximately 1,235 to 9,880 acres (Samson, 2005). Assessment areas of 5,000 acres at a minimum (USDA, 1990) and 5,400 acres not including nest areas, post fledging area, and natural or created openings (Reynolds, 1992) are recommended for evaluation of

potential goshawk suitability. For this analysis two assessment areas within the WL analysis were delineated based on topographic features and ownership. These assessment areas - representing hypothetical goshawk home ranges – are as close as practicable in size to recommended assessment areas and fall within the range of territory sizes. For analysis purposes the assessment areas are entirely within the Hidden Cedar Wildlife Analysis Area, actual goshawk home ranges may include areas outside of the analysis area.

Not all of the wildlife analysis area is included in the goshawk assessment areas. Based on size requirements, two additional home ranges could be delineated in the wildlife analysis area (i.e. one north of the Cedar Creek Area and another south of the Hidden Creek Area – see Figure 4). Those areas not included are comprised of predominately non-NFS lands, and the NFS lands within them are incapable on their own of providing sufficient suitable habitat to support the species. Based on a review of aerial photos it is unlikely that the area north of Cedar Creek provides sufficient suitable habitat because of past and present harvest on non-NFS land. Based on relatively recent road construction and timber harvest on non-NFS land and the likelihood of additional imminent harvest on non-NFS lands it is unlikely that the area south of the Hidden Creek Area would provide sufficient suitable habitat now or in the near future.

Because of the anticipated management of non-NFS lands in these areas it is unlikely that they would be able to support goshawks (or other species associated with mature/old forest structure) regardless of the condition of NFS lands. For this analysis, it is assumed that these areas would not contribute to populations of goshawks.

The proposed federal actions outside of the goshawk assessment areas would not affect the ability of those areas to support goshawks and they are not analyzed further.

Management recommendations for each home range include approximately three suitable nest areas and three replacement areas (in a developmental phase, Tables 3-102 and 3-103) per home range and a mosaic of vegetation structural stages in both an approximately 420-acre (not including nest areas) Post-fledging Family Area (PFA) and a 5,400-acre foraging area (Reynolds et al. 1992).

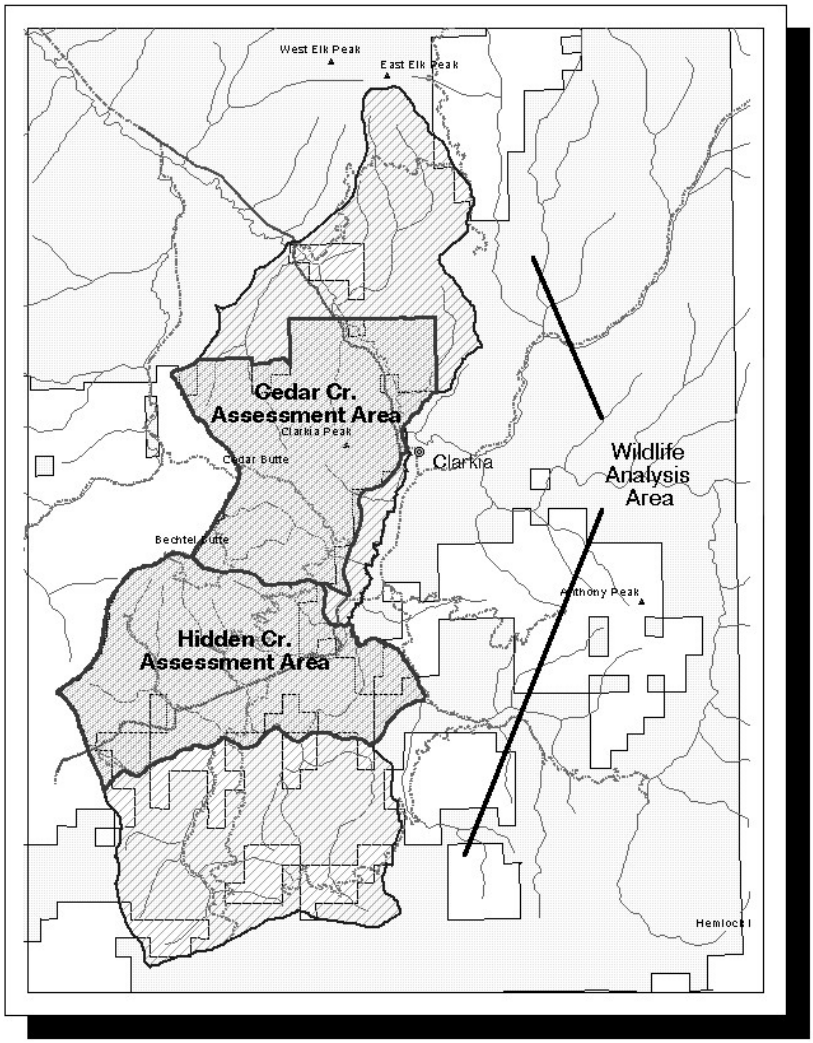

Figure 4 - Goshawk Analysis Area

Affected Environment

Table 3-102 Existing and Desired Conditions for Goshawk

			Forage Area Vegetation Structure							
			Existing acres / %				Management Recommendations			
Area	**Area acres**	**Pot. nest areas***	**Grass Shrub**	**Seed Sap**	**Pole**	**Mid Old**	**Grass Shrub**	**Seed Sap**	**Pole**	**Mid Old**
Cedar Cr.	5,132	20+	293a (6%)	481a (9%)	484a (9%)	3874a (75%)	10%	10%	20%	60%
Hidden Cr.	5,701	20+	169a (3%)	628a (11%)	349a (6%)	4554a (80%)				

***The exact number of potential nest areas depends on how patches of at least 30 acres in size are counted. These values represent a minimum number based on a conservative approach when assessing nest areas.*

Based on literature descriptions and field verification of habitat, there is capable and suitable habitat available within the Hidden Cedar Project Area, and goshawks are occasionally sighted within the wildlife analysis area. Surveys in the analysis area have confirmed the occurrence and nesting of goshawks. Two known nests in the Hidden Cedar Wildlife Analysis Area have been located within the past five years.

Potential nest areas include: mature/Sawtimber forest structure, old growth, and stands classed as immature, but have at least 20 trees per acre greater than 14 inches d.b.h., with percent slope < 40%. Based on TSMRS/FSVeg data, seedling/sapling forest in the Hidden Creek Goshawk Analysis Area exceeds the recommended 10%; however, this area has had an active nest with the existing conditions. PFAs around the known nests area were delineated based on approximate size criteria, stand boundaries, and topographic features. One PFA, as delineated, contains approximately 105 acres of non-NFS land.

Table 3-103 Existing and Desired Condition of the Goshawk PFAs

	PFA	grass/shrub	seed/sap	pole/young	mid - old
Hidden PFA acres (% of PFA)	560	0 (0%)	33 (6%)	0 (0%)	527 (94%)
Cedar PFA acres (% of PFA)	550	0 (0%)	0 (0%)	0 (0%)	550 (100%)
Desired % of PFA		10%	10%	20%	60%

Environmental Consequences

The following table summarizes the recommended habitat conditions for each goshawk analysis area and shows how each alternative compares to those conditions.

Table 3-104 Goshawk Desired Condition and the Acres/Percentage Present

Veg. Structure	Recmd	Alt. A		Alt. B		Alt. C		Alt. D		Alt. E		Alt. F	
Cedar Creek													
Nest areas	3/3♣	20+		12+*		12+*		15+*		20+		13+*	
	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Grass/shrub	10	293	6	293	6	293	6	293	6	293	6	293	6
Seed/sap	10	481	9	612	12	612	12	557	11	481	9	573	11
Pole	20	484	9	500	10	500	10	484	9	484	9	500	10
Mid/old**	60	3874	75	3711	72	3727	73	3798	74	3874	75	3753	73
Hidden Creek													
Nest areas	3/3	20+		11+*		11+*		18+*		20+		20+	
	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Grass/shrub	10	169	3	169	3	169	3	169	3	169	3	169	3
Seed/sap	10	628	11	752	13	752	13	728	13	628	11	752	13
Pole	20	349	6	349	6	349	6	349	6	349	6	349	6
Mid/old**	60	4554	80	4410	77	4430	78	4454	78	4545	80	4410	77

♣ 3/3 represents three suitable nest areas and three replacement areas
**This represents only nest areas that are not treate; additional areas that are proposed for treatment but that would not necessarily become unsuitable for nesting would also be present.*
***Reductions due to new road construction are displayed, however there is no coresponding increase in any habitat category.*

Common to All Alternatives

Direct and Indirect Effects

All alternatives would maintain middle-aged to old forest habitat in excess of 72% in each goshawk analysis area. All alternatives would maintain sufficient nesting habitat well distributed throughout each goshawk analysis area with potential PFAs (Table 3-98).

In each alternative the amount of seedling/sapling size would move above recommended levels in both goshawk analysis area (except Alt A & E in the Cedar Creek Goshawk Analysis Area). This has not (as evidenced by known nests) and is not expected to affect the suitability of the analysis area to support a breeding pair of goshawks. Older age classes of forest structure provide the most prey species at higher population levels (Reynolds, et al. 1992) and provide higher forage habitat values for goshawks (USDA, 1990). There are approximately 214 acres in the Cedar Creek Goshawk Analysis Area and approximately 123 acres in the Hidden Creek Goshawk Analysis Area typed as sapling size class that will succeed to the pole size class within a few years (five years + or -). The accomplished and planned pre-commercial thinning has/will increase the rate at which this succession to pole size class stands occurs. Based on the higher forage value of immature sawtimber vs. sapling size classes and the impending succession of existing sapling stands the increase (short term) in seedling/sapling size class would not adversely affect the suitability of either analysis area to support goshawks - now or in the future.

Cumulative Effects

It is expected that the majority of non-NFS land would be actively managed and therefore no stands would remain in the sawtimber/mature sawtimber size class for any appreciable length of time before being treated. NFS lands would provide the vast majority of mature/old forest with non-NFS lands being in younger successional stages. Because of the relatively contiguous distribution of NFS lands in each goshawk analysis area this would not appreciably affect the ability of either area to provide sufficient habitat.

The St. Maries River Basin Fuels Reduction Project (Areas 3) would impact a total of approximately 27 acres of immature sawtimber size class.

The St. Maries River Basin Fuels Reduction Project (Area 3) would impact a total of approximately 27 of immature sawtimber size class acres in the Cedar Creek Goshawk Analysis Area. The treatment would not result in a change in size class and would maintain the suitability of the treated areas as foraging habitat – albeit at a lower value (USDA, 1990). When added to the direct/indirect effects from each alternative (see below) this treatment would not change the suitability of the analysis area to support goshawk.

At this time there is no known activity reasonably foreseeable on the 105 acres of non-NFS land in the PFA. However, at some time it is realistic to expect that this land would be accessed and harvested in some manner. This would change the distribution of vegetative structure but would maintain 75% in middle-aged to old structure. The amount of vegetative structure would remain consistent with management recommendations for middle-aged to old forest structure.

Based on the availability of suitable habitat there would be no effect on goshawk populations in either of the goshawk analysis area on NFS land. Activities on non-NFS lands either have or are expected to result in insufficient suitable habitat in the areas outside of the Cedar Creek or Hidden Creek areas. The ability of those areas to support goshawks is dependent on the availability of habitat on non-NFS lands. Therefore, proposed activities on NFS lands that are not in the goshawk analysis areas would not affect the ability of those areas to support goshawks.

There would be no cumulative effects associated with this project or analysis area that would jeopardize populations of northern goshawks. This is based on the limited effects from this project, the maintenance of suitable habitat and home ranges in the analysis area, habitat estimates across Region 1 and the IPNF (Samson, 2005), the frequency of goshawk presence, and their wide distribution in Region 1 (Kowalski, 2006).

Samson (2005) concluded that short-term viability of the goshawk in the Northern Region is not an issue for the following reasons:

- No scientific evidence exists that the northern goshawk is decreasing in numbers.
- Increases in the extent and connectivity of forested habitat have occurred since European settlement.
- Well-distributed and abundant northern goshawk habitat exists on today's landscape.
- The level of timber harvest (in 2004, 0.0009% of the forested landscape in the Northern Region) is insignificant.

Consequently, none of the alternatives would likely result in appreciable adverse habitat modification or a perceptible change in populations of northern goshawks.

Alternatives A & E

Direct and Indirect Effects

These alternatives would not impact forest habitat in either of the identified PFAs.

Alternatives B, C, and F

Direct and Indirect Effects

These alternatives would treat 53 acres by commercial thinning within the PFA in the Hidden Creek Analysis Area. This includes six acres of mature forest structure that is suitable nesting habitat for goshawks and 47 acres of immature sawtimber size class. This activity would not change the percentages of forest structure in the PFA. In the Cedar Creek Analysis Area PFA these alternatives would treat a total of approximately 278 acres (241 acres of commercial thinning, 15 acres of shelterwood treatment, and 22 acres of shelterwood preparation treatment). All of the treatment in the Cedar Creek PFA is in immature sawtimber size class; approximately 11 acres would be converted to seedling size class.

The timing of the harvest activity would be restricted to avoid disturbance during the nesting season (Design Feature 12G). The commercial thinning would be marked to maintain 60% or more canopy closure (Design Feature 12G). The treatments and resulting conditions (e.g. a reduction of 11 acres in the mid-old forest structure) are consistent with management recommendations in PFAs (Reynolds et.al., 1992).

Alternative D

Direct and Indirect Effects

This alternative would treat approximately 13 acres (of immature sawtimber size class) by commercial thinning in the Cedar Creek Analysis Area PFA and six acres (of mature sawtimber size class) in the Hidden Creek Analysis Area PFA – all by commercial thinning. This activity would not change the percentages of forest structure in the PFAs.

The timing of the harvest activity would be restricted to avoid disturbance during the nesting season (Design Feature 12G in Chapter 2). The prescriptions call for thinning from below. This treatment is consistent with management recommendations in PFAs (Reynolds et. al., 1992).

Black-backed Woodpecker

Black-backed woodpeckers nest in snags or in live trees with heart rot. They feed primarily on wood-boring beetles and respond to insect outbreaks in conifer forests from either wildfire or other reasons (Hutto, 1995, and Wisdom, et. al., 2000). Breeding densities of black-backed woodpeckers vary considerably in response to prey availability. They are specialists in exploiting recent forest fires, especially for the first three to five years after burning, and rapidly utilize new burns (Hutto, 1995). It has been suggested that black-backed woodpeckers may be well distributed but relatively uncommon in the more natural landscape (Dixon and Saab, 2000) where older forests and lodgepole pine forests provide source habitats (Wisdom, et. al., 2000).

There have been black-backed woodpecker surveys in the St. Maries River drainage and their presence has been confirmed. Based on literature descriptions and field verification of habitat, there is capable and suitable habitat available within the Hidden Cedar Project Area. Distribution of black-backed woodpeckers is presumed to coincide with existing stands of mature and old forest structure and lodgepole pine (pole size and larger). In the analysis area they are suspected of occurring at levels comparable with other areas on the Forest and District.

Affected Environment

The wildlife analysis area contains 1,664 acres of mature/sawtimber size stands and an additional 761 acres of lodgepole pine pole size or larger (SWL-7) that is considered source habitat (total of 2,425 acres).

Due to the fire history and past logging in the drainage there is a low level of mature/old forest structure in the St. Maries River Drainage; and current fire suppression policy is not conducive to the creation of areas of fire-killed trees. Both of these conditions may be affecting populations of black-backed woodpeckers. Insect and disease infestations in the project area are at or near naturally occurring endemic levels (SWL-30). The 22 acres that were prescribed burned in 1997 are past the time of providing prime habitat for black-backed woodpeckers.

Environmental Consequences

Broadcast burning would have a likelihood of improving habitat for black-backed woodpeckers by providing fire-killed trees. It is reasonable to expect mortality of some trees retained after harvest. The shelterwood units with broadcast burning would have more trees left after harvest than the clearcut units (all units have requirements for leave trees, see design features in Chapter 2), and therefore have a greater likelihood of providing higher quality habitat than the clearcut units.

Table 3-105 Acres of Size Class Proposed for Harvest Treatment

	Alt. A & E		Alt. B		Alt. C		Alt. D		Alt. F	
	acres treated	% untreated	acres treated	% untreated	acres treated	% untreated	acres treated	% untreated	acres treated	% untreated
Mature/Old	0	100	254	85	264	84	117	93	199	88
Lodgepole Pine	0	100	83	89	83	89	27	96	23	97
Broadcast burning										
SW acres / CC acres	0		60/104		60/104		21/93		60/104	

SW= shelterwood; CC = clearcut

Common to All Alternatives

Direct and Indirect Effects

Succession would continue on untreated stands and improve their suitability as black-backed woodpecker habitat.

A maximum of 14% (in Alternative C) of existing source habitat would be impacted due to the direct/indirect effects of the Hidden Cedar Project. Broadcast burning treatment would provide fire-killed trees for black-backed woodpeckers on from 114 – 164 acres. In addition, all proposed

treatment units would retain snags at levels intended to maintain viability of cavity dependent species.

Based on the limited effects from this project, the level of suitable habitat maintained and/or improved, information that indicates black-backed woodpecker can use partially harvested stands (Quesnel and Steeger, 2002), and estimates of existing habitat across Region 1 and the IPNF (Samson, 2005) no alternative would adversely impact black-backed woodpecker populations.

Cumulative Effects

The St. Maries River Basin Fuels Reduction Project (Area 3) would impact a total of 27 acres of immature sawtimber size class and <5 acres of lodgepole pine forest type. This would reduce source habitat for black-backed woodpeckers by 5 acres. A minimum of 84% of existing source habitat would be maintained in its present condition.

Historic wildfire patterns in the drainage would have created stands of fire-killed trees at periodic intervals. It is reasonable to assume that the suppression of fires in the St. Maries River Drainage and wildlife analysis area has reduced both habitat quantity and quality that would have been present. It is also reasonable to assume that suppression of nonprescription fires would continue. This would continue to affect the availability of high quality habitat for black-backed woodpeckers.

It is expected that the majority of non-NFS land would be actively managed and therefore no stands would remain in the sawtimber/mature sawtimber size class for any appreciable length of time before being treated. NFS lands would provide the vast majority of mature/old forest with non-NFS lands being in younger successional stages.

Allocated old growth would be maintained at or near existing levels and untreated stands would continue to age. Retention of snags at levels in the design features would maintain some habitat value for black-backed woodpeckers (albeit at a lower level). The proposed federal action would not contribute to adverse impacts on black-backed woodpecker populations within the project area or at a landscape level (see also direct and indirect effects section).

Samson (2005) concluded that short-term viability of the black-backed woodpecker in the Northern Region is not an issue for the following reasons:

- No scientific evidence exists that the black-backed woodpecker is decreasing in numbers.
- Increases in the extent and connectivity of forested habitat have occurred since European settlement.
- Increases in amounts of small and mid-size trees have increased since European settlement.
- Well-distributed and abundant blacked-back woodpecker habitat exists on today’s landscape.
- The level of salvage timber harvest (in 2004, 1210 ha of 2,276,588 ha or 0.0005%) or overall timber harvest (0.009% of forested landscape in the Northern Region) is insignificant.

Consequently, none of the alternatives would likely result in appreciable adverse habitat modification or a perceptible change in populations of black-backed woodpeckers.

Flammulated Owl & Pygmy Nuthatch

Flammulated owls are seasonal migrants that occupy home ranges in the northern latitudes during the spring, summer and fall. They are cavity nesters that depend upon naturally occurring or excavated cavities for nesting. Consequently, snags and other defective trees are an important component of their breeding habitat.

These owls are attracted to relatively open (i.e. 35% - 65% canopy closure [Hayward and Verner, 1994]), older forests featuring ponderosa pine and Douglas-fir that are correlated with drier habitats. Reynolds and Linkhart (1992) reported that all published North American records of nesting, except one, came from forests in which ponderosa pine was at least present, if not dominant. The flammulated owl's preference for ponderosa pine and/or Douglas-fir can also be linked to prey availability (primarily moths, beetles, crickets). Reynolds and Linkhart noted a stronger correlation between prey availability and ponderosa pine and Douglas-fir, than with other common western conifers.

Pygmy nuthatches show a strong and almost exclusive preference for yellow pine forests (i.e. ponderosa pine), especially mature to late-seral stands. Secondary habitats that the species may use include Douglas-fir and aspen. Species abundance is directly correlated with snag density (i.e. cavity availability). They feed on pine seeds and insects extracted from the bark of trees (Ghalambor, 2003). Risks to the species include: 1) timber harvest that results in the loss and fragmentation of late-seral, large-diameter live ponderosa pine stands, and large snags, 2) fire exclusion resulting in a shift in stand composition from shade-intolerant, mid-seral species to shade-tolerant, late-seral species, 3) human development that modifies and reduces habitat, and 4) livestock grazing that affects fuels as related to fire exclusion.

Habitat for both species is associated with dry habitat types; based on similar habitat associations and the existing condition (i.e. very low presence of dry site habitat types) the analysis for these species is combined.

Affected Environment

There are 108 acres of capable flammulated owl/pygmy nuthatch habitat in the wildlife analysis area. There is no suitable habitat at this time. Capable stands are either too young or, in one case, too sparsely stocked (due to natural stand conditions), to provide suitable habitat (especially for flammulated owls). Opportunities for improvement and expansion of sawtimber/mature sawtimber dry-site habitat (the forest type of primary interest is ponderosa pine) were explored. At this time there are no existing dry-site ponderosa pine stands that would benefit from active management.

There are no reported occurrences of flammulated owls or pygmy nuthatches in the Hidden Cedar Wildlife Analysis Area. The fire history in the drainage has resulted in a low level of mature/old forest structure in the drainage, and current fire suppression policy is not conducive to the creation and maintenance of areas of more open-grown stands of ponderosa pine. At best, the area provides only marginal habitat for these species. The species are considered “not present to very uncommon in the drainage” even when compared to other areas on the St. Joe District.

Environmental Consequences

Common to All Alternatives

Cumulative Effects

Fire suppression under existing policy is not expected to allow fire to perform its historic function of creating/maintaining dry-site open forest conditions. The area will continue to provide marginal habitat for these species.

Samson (2005) concluded that short-term viability of the flammulated owl in the Northern Region is not an issue for the following reasons:

- No scientific evidence exists that the flammulated owl is decreasing in numbers.
- Increases in the extent and connectivity of forested habitat have occurred since European settlement.
- Well-distributed and abundant flammulated owl habitat exists on today's landscape.
- The level of timber harvest ([in 2004] 0.0009% of the forested landscape in the Northern Region) is insignificant.

Consequently, none of the alternatives would likely result in appreciable adverse habitat modification or a perceptible change in populations of flammulated owls.

Alternative A, D, and E

Direct and Indirect Effects

There would be no impact on dry habitat or flammulated owl in these alternatives.

Alternative B, C and F

Direct and Indirect Effects

One dry-site stand (i.e. capable flammulated owl habitat) would be treated. This stand is not suitable flammulated owl habitat. The existing forest type of this stand is larch. The treatment prescription is a shelterwood preparatory cut that would create approximately four acres of opening and would thin 12 acres. This would create a more open stand and improve growth. This would not affect suitable habitat and be expected to, if anything, improve the suitability of this stand as habitat for flammulated owls and pygmy nuthatches.

Fringed Myotis

This bat is found in montane habitats and prefers dry, coniferous forests. They forage for insects in riparian and wetland areas. They use caves, buildings, bridges, crevices and large cavities for roosting (Keinath, 2004). Risks to the species include: 1) loss of existing and potential roost sites from mine closures, snag removal, and destruction/fumigation of buildings; 2) roost abandonment from excessive disturbance of roosting bats – e.g. recreational caving and road access as an indirect facilitator of such activities; and 3) degradation and loss of native riparian vegetation.

Affected Environment

The presence of dry, coniferous forest is very limited in the wildlife analysis area (See the Dry Habitat Section and the preceding discussion on flammulated owls and pygmy nuthatches), and there are no caves. For these reason their presence in the analysis area is doubtful.

Environmental Consequences

Common to All Alternatives

Direct, Indirect Effects and Cumulative Effects

The project would not have impacts on habitat or the species under all alternatives. This is based on: the limited presence of dry habitat, the absence of caves in the analysis area, and the resultant absence of the species.

Coeur d'Alene Salamander

Coeur d'Alene salamanders are restricted to cool damp aquatic habitats that have thermal and hydric stability. The species has been found in three major types of habitats in northern Idaho: spring seeps, waterfall spray zones and along stream edges between 1,800 to 3,500 feet elevation. Known populations occur in association with sharply fractured rock formations in conjunction with both persistent and intermittent surface water (Cassirer et al, 1994). These conditions are critical for Coeur d'Alene salamanders since they respire through the skin and lose water to the environment through evaporation (Groves 1989).

Affected Environment

There is one known salamander site in the Hidden Cedar Wildlife Analysis Area. In general, the geology of the wildlife analysis area is not conducive to habitat for Coeur d'Alene salamanders (e.g. very little fractured rock associated with springs/seeps and stream sides). Given the number of known sites in the drainage and the capability/suitability of habitat, Coeur d'Alene salamanders are considered relatively uncommon compared to other areas on the St. Joe District.

Environmental Consequences

Common to All Alternatives

Direct and Indirect Effects

There would be no direct or indirect effects on known salamander sites. It is unlikely that any habitat would be impacted by activities. The alternatives differ in their potential adverse impacts from road construction, road decommissioning, timber harvest, etc. However, the risk to the species and habitat is negligible because of the inherent limited presence of capable habitat.

Cumulative Effects

There would be no additional effects on Coeur d'Alene salamanders or suitable habitat from any current or reasonably foreseeable federal action. The same inherent lack of capable habitat that limits the potential for adverse impacts on salamander habitat on NFS land also applies to all lands in the analysis area. Cumulative adverse impacts that would affect populations are unlikely.

Boreal Toad aka Western Toad

Boreal toad breeding habitat includes shallow, quiet water in lakes, marshes, bogs, ponds, wet meadows, and other persistent water sources (Maxell, 2000). Young toads are restricted in distribution and movement by available moist habitat, while adults can move several miles and reside in marshes, wet meadows, or forested areas. Toads hibernate in the winter in habitats that maintain a

high humidity and above-freezing temperatures. Areas that provide shelter for hibernating toads include rodent burrows, beaver dams and slash piles (Loeffler, 1998).

Reasons for the decline of the boreal toad have not been defined with any degree of certainty. However, habitat alterations from timber harvest, grazing, recreation, and water development would likely not be beneficial to long-term enhancement of boreal toad habitats (Loeffler, 1998). One hypothesis explaining the boreal toad decline concerns mortality caused by disease or some other widespread agent. However, none of these factors have been shown as causative agents for population declines. Since this species depends on wetlands to breed, the reduction of or adverse impacts on wetlands potentially have detrimental effects on boreal toads.

It is important that toads be able to move among their seasonal habitats. The biggest potential barriers to their movement are roads. Steep road cuts can be a barrier to toads moving between seasonal habitats. Juvenile toads are vulnerable to being killed by motorized vehicles when they are dispersing from their natal ponds.

Affected Environment

Boreal toads have been recorded in and adjacent to the analysis area. Ocular evaluation of habitat conditions indicates that potentially suitable breeding habitat is present in the analysis area. This habitat is found primarily in riparian areas adjacent to a number of streams in the wildlife analysis area.

Based on habitat needs as described in the literature, the mesic nature of much of the forests of the IPNF indicate that toads have many opportunities to find persistent small water sources for breeding, and could successfully disperse through moist forests.

Vehicle traffic on existing open roads and restricted roads arguably constitute some level of risk to toads. This risk is considered to be small, based primarily on a combination of low toad densities, the relative unsuitability of roads as dispersal “habitat”, and the relative low availability of road surface verses forest habitat.

Environmental Consequences

Habitat alterations from timber harvest and recreation while likely not beneficial - have not been shown as causative agents for population declines (Loeffler, 1998). The primary area of concern for potential impacts to toads would be impacts on breeding habitat. Of secondary concern is the potential for direct mortality of dispersing toads.

Common to All Alternatives

Direct and Indirect Effects

The riparian buffer zones established on creeks in the project area would limit the potential for any substantive adverse impacts to potential breeding habitat. There would be no changes in water yield that would result in any measurable adverse impact on potential breeding habitat (see Watershed, Chapter 3). These buffers would also protect the majority of timbered stands near water that would be most likely to be used by toads.

This species can breed along roadside ditches and can be found in upland habitat that would not have any special protection. Some mortality may occur to adults and metamorphs in these situations.

Increases in vehicle traffic and project-related activity (e.g. harvest and road storage) may increase the risk of mortality. The existing risk is low, and any changes would remain low and inconsequential based on the same rationale as described in the Affected Environment section (e.g. low densities of toads and roads relative to forested habitat). The road obliteration in some alternatives may tend to decrease the risk of mortality over a long term; however, this effect is difficult to measure in any meaningful way and is not expected to be consequential.

Cumulative Effects

The impacts from proposed federal actions under all alternatives would not contribute appreciably to existing impacts and would not affect population viability. Activities on non-NFS lands are expected to have similar consequences for the same reasons described for federal actions (e.g. low toad and road densities). Any cumulative mortality from any alternative is unlikely; and potential adverse effects would not significantly exceed exiting levels of risks to the species.

Summary of Effects

The preceding Sensitive Wildlife Species section documents the analysis of potential impacts and provides the rationale for the effects determinations. See Appendix F for the determination of effects for each species by alternative.

Consistency with Forest Plan and Laws

All alternatives are consistent with applicable goals, direction, standards, and guidelines from the Forest Plan for the management of wildlife habitat and species populations. All alternatives, to varying degrees, comply with other direction and recommendations regarding management of the various components of wildlife habitat including the percent old growth allocated and size of old growth units/patches. All alternatives comply with applicable conservation strategies for wildlife species. All alternatives are consistent with the Endangered Species Act (ESA), the National Forest Management Act (NFMA), and other direction and requirements for the management of wildlife species and habitat.

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