

SPI Road Project

Document Structure Overview

Structure: This Draft Environmental Impact Statement (DEIS) has been prepared according to the format established by the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (40 CFR 1500-1508).

- **Chapter 1. Purpose and Need for Action:** explains the purpose and need for the proposed action, discusses how the SPI Road Project relates to the 1995 Six Rivers Land and Resource Management Plan (Forest Plan) and the 1980 Alaskan National Interest Lands Conservation Act (ANILCA), and identifies issues that drove the development of alternatives.
- **Chapter 2. Alternatives, Including the Proposed Action:** identifies the significant issues driving the analysis of environmental effects, describes and compares the no action, proposed action, temporary road, and helicopter logging alternatives. It also compares these four alternatives by summarizing their environmental consequences.
- **Chapter 3. Affected Environment and Environmental Consequences:** describes the natural and human environments potentially affected by the proposed action and alternatives, and discloses potential environmental effects.
- **Chapter 4. Consultation and Coordination:** Contains the list of preparers, followed by the draft environmental impact statement distribution list.
- **Appendices:** Provides additional information on specific aspects of the proposed project and alternatives, includes maps, references, and index.

Approach: The interdisciplinary team made up of Forest Service resource specialists used a systematic approach for analyzing the proposed project and alternatives to it, estimating the environmental effects, and preparing this draft environmental impact statement. The planning process complies with the National Environmental Policy Act (NEPA) and the CEQ regulations. Planning was coordinated with the appropriate Federal, State, local agencies and tribes.

SPI ROAD PROJECT

Draft Environmental Impact Statement

Trinity County, California

Lead Agency: USDA Forest Service

Responsible Official: Bernie Weingardt
Regional Forester
Region 5, Pacific Southwest Region
1323 Club Drive
Vallejo, CA 94592

For Information Contact: Katherine Worn
P.O. Box 68
Willow Creek, CA 95573
(530) 629-2118

Abstract: The USDA Forest Service, Six Rivers National Forest, Lower Trinity Ranger District prepared a draft environmental impact statement (DEIS) to disclose the environmental effects from construction of an access road approximately 4,800 feet long to Sierra Pacific Industries industrial lands surrounded by National Forest System lands. This DEIS documents the analysis of four alternatives:

- **Alternative 1:** No Action—under this alternative, no special use permit would be authorized; hence no road construction or reconstruction activities would occur in the SPI Road Project area.
- **Alternative 2:** Proposed Action—this alternative proposes to authorize a special use permit to SPI to construct, use, and maintain 4,811 feet of access road, across National Forest System Lands in the W ½ of Section 10, T4N, R6E, Humboldt Meridian.
- **Alternative 3:** Temporary Road—this alternative proposes the same activities as Alternative 2, but as a temporary road. The road would be obliterated and rehabilitated as stated in SRF LRMP IV-115, 13-5, Transportation and Facilities Standards and Guidelines for temporary roads.
- **Alternative 4:** Helicopter Alternative—this alternative proposes to authorize a special use permit to SPI to construct and use helicopter drop zones and a service landing to allow SPI access to their managed lands to implement timber harvest activities.

Comments: Reviewers should provide the Forest Service with their comments during the review period of the draft environmental impact statement. This will enable the Forest Service to analyze and respond to the comments at one time and to use information acquired in the preparation of the final environmental impact statement, thus avoiding undue delay in the decision making process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and alerts the agency to the reviewers' position and contentions. *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 553 (1978). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the final environmental impact statement. *City of Angoon v. Hodel* (9th Circuit, 1986) and *Wisconsin Heritages, Inc. v. Harris*, 490 F. Supp. 1334, 1338 (E.D. Wis. 1980). Comments on the draft environmental impact statement should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40 CFR 1503.3).

Send Comments to:

Bernie Weingardt
Regional Forester
Region 5, Pacific Southwest Region
1323 Club Drive
Vallejo, CA 94592

Date Comments Must Be Received: Comments must be received within 45 days of publication of the Notice of Availability in the Federal Register. Comments may be: (1) mailed; (2) hand delivered between the hours of 8:00 a.m. - 4:30 p.m. weekdays; (3) faxed to (707) 442-9242; or (4) electronically mailed to comments-pacificsouthwest-six-rivers@fs.fed.us. Please indicate the name "SPI Road Project" on the subject line of your email. Comments submitted electronically must be in either "Rich Text Format" (.rtf) or "Microsoft Document Format" (.doc).

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SUMMARY

Purpose and Need for Action

There is a need for action on a special use permit application submitted by Sierra Pacific Industries to allow construction of a road across national forest lands to provide access to their property. The purpose to provide access to Sierra Pacific Industries (SPI) is to comply with the provisions of the 1980 Alaskan National Interest Lands Conservation Act, Section 1323, and the Forest Service regulation for evaluating and granting access to private lands surrounded by National Forest System lands at 36 CFR 251.110 to 251.114.

The special use authorization term would be for a period of 10 years from issuance of the special use permit.

There is also a purpose and need to comply with Six Rivers Land and Resource Management Plan standards and guidelines with respect to riparian reserves, late successional reserves, and heritage and cultural resources.

Proposed Action

This draft environmental impact statement discloses the environmental effects from construction of an access road approximately 4,800 feet long to Sierra Pacific Industries (SPI) industrial lands surrounded by National Forest System lands. An action analyzed with this project is SPI harvesting and managing a 160 acre tract.

LAND AND RESOURCE MANAGEMENT PLAN AMENDMENT

This proposal includes a site-specific forest plan amendment. It amends the Six Rivers National Forest Land and Resource Management Plan (LRMP) (USDA Forest Service Six Rivers National Forest 1995) standard and guide 9-8 in Chapter IV on page 111, which states for key watersheds: “Inside roadless areas – No new roads will be built in remaining unroaded portions of inventoried (RARE II) roadless areas that still qualify as roadless.” This standard and guide would not apply to this project.

Project Location

The project area is located in the South Fork Watershed entirely in Trinity County, within the General Forest, and Riparian Reserves Management areas in T4N, R6E, Sections 3, 4, 9, 10, 15, and 16, HM.

The project area is in the Hog Ranch-Underwood Creek drainage within the South Fork Trinity River Watershed accessed by Forest Service Road 5N07. The project area is approximately 1,000 acres of public and private lands situated between the South Fork

Trinity River and the Shasta-Trinity Six Rivers Forest Boundaries, south of Castle Rock and north of Underwood Mountain within Trinity County (see Appendix A).

Public Involvement

An extensive public involvement process has been conducted for the SPI Road Project. The Forest Service solicited input and comments from members of the public, other public agencies, tribes, adjacent property owners, and organizations.

The initial public scoping period for this project was conducted in the fall of 2004. A Notice of Intent (NOI) to prepare an environmental impact statement (EIS) for the SPI Road Project was published in the Federal Register on December 5, 2005. Comments received during the scoping periods have been considered in this analysis.

Tribal Consultation

Formal governmental consultation was initiated with the Federally Recognized Hoopa Valley Tribe in June of 2003. There were no issues or concerns identified by the Tribe. There are no trust resources or rights associated with this project area.

In June of 2003 consultation was initiated with the Tsungwe Tribe. Concerns were raised over heritage resources within the general area and discussions were held on the ground to assist in identifying a proposed route that would not affect heritage resources and, to assure this, the area would be monitored (see Appendix C).

Alternative Development

In determining the relevant issues relating to the proposed action and the range of alternatives, the Forest Service Interdisciplinary Team (IDT) reviewed public and agency comments generated during the scoping periods. The IDT also evaluated data and information collected during the 2002 - 2005 field seasons.

To narrow the scope of the environmental analysis process, the IDT focused on issues that provide comparative measures between the proposed action and the other management scenarios considered for this project. Significant issues were addressed as alternatives, by application of applicable standards and guides, mitigation measures, or analyzed in detail in Chapter 3. Affected Environment and Environmental Consequences. Three action and one no action alternatives were developed and would be analyzed in detail.

Indicators and their measures display the most important environmental effects between the alternatives and provide a clear basis for choice among the options. Thus, the purpose and need, range of alternatives, environmental effects, and final decision will be discussed throughout this document in terms of the issues and the indicator and measures.

Summary of Environmental Consequences

A brief summary of the effects below is based on the following indicators:

- Roadless
- Water Quality
- Cultural and Heritage Resources
- Noxious Weeds
- Actions on SPI Lands

Additional, clarifying, and analysis of effects are described in Chapter 3.

Alternative 1 (No Action): Under this alternative, no special use permit would be authorized; hence no road construction or reconstruction activities would occur in the SPI Road Project area. There would be no affect to the roadless area, water quality, cultural and heritage resources, noxious weeds, botanical resources, air quality, fish or wildlife species, economics, recreation, visuals, lands, or minerals, outside of what is currently happening in and adjacent to the project area other than what is inherently there now. Ability to suppress wildfires would not change with this alternative.

Alternative 2 (Proposed Action): This alternative has a negligible impact to no impact on cultural and heritage resources, air quality. There would be 1.8 acres of Forest Service System Lands within the roadless area that would be permanently loose roadless characteristics. It has little to no chance of changing watershed conditions (including water quality). Changes to anadromous fish habitat will be undetectable; therefore, there is no potential for adverse cumulative effects on anadromous fisheries. The Region 5 Equivalent Roaded Acres (ERA) model confirms that impacts to the watershed would be low (less than 2.1% ERA) and, therefore, there would not be any detectable cumulative effects to the watershed or water quality. Non-vascular (bryophytes and lichens) and fungal species would have a may affect individual but would not lead to a trend toward listing. Due to mitigation measures and design criteria, noxious weed risk is reduced but not eliminated. Wildlife species effects range from no effect to a may affect individuals but would not lead to a trend toward listing.

Alternative 3 (Temporary Road): No cumulative effects to heritage resources are expected. There would be 1.8 acres of Forest Service System Lands within the roadless area that would have a short-term lose to current roadless characteristics. There is no potential for adverse cumulative effects on anadromous fisheries resulting from this alternative. The Region 5 ERA model confirms that impacts to the watershed would be low (less than 2.1% ERA) and, therefore, there would not be any detectable cumulative effects to the watershed or water quality. Non-vascular (bryophytes and lichens) and fungal species would have a may affect individuals but not likely to result in a trend toward

Federal listing. Due to mitigation measures and design criteria, noxious weed risk is reduced but not eliminated. Wildlife species effects range from no effect to a may affect individuals but not likely to result in a trend toward Federal listing. There would be cost increase with this alternative over Alternative 2 in outyear work (e.g. site prep, planting), since the lack of access would still exist. Also there would be an increase in cost to obliterate and rehabilitate the road bed.

Alternative 4 (Helicopter): There would be no affect to the roadless area, cultural and heritage resources, botanical resources, air quality, fish or wildlife species, recreation, visuals, lands, or minerals, outside of what is currently happening in and adjacent to the project area. There would be a short-term noise disturbance to the roadless area during helicopter operations. The Region 5 ERA model confirms that impacts to the watershed would be low (less than 2% ERA) and, therefore, there would not be any detectable cumulative effects to the watershed or water quality. There would be a moderate risk of noxious weed spread. Ability to suppress wildfires would increase slightly due to the construction of the service landing previously unavailable. The cost of this alternative to implement would be three times the cost of Alternative 2.

Decision Framework

Management activities on SPI lands are not part of the decision to be made.

Based upon the effects analysis of the alternatives, the Deciding Officer will decide whether to issue, as proposed, a special use authorization to SPI for construction, use, and maintenance of a road to access their property or a modified proposal. The Deciding Officer has identified Alternative 2 as the preferred alternative.

Timing

Since the Forest Service does not make decisions on state or private lands, the timing of this project is represented by the date when the decision would be made and the decision document would be signed (Record of Decision or ROD). The Six Rivers National Forest anticipates making a decision and signing the ROD in the late spring early summer of 2006.

SPI has a timber harvest plan (THP) granted by the State of California (THP2-02-212 TRI(4)). It is anticipated that SPI would begin project implementation of this THP sometime in the fall of 2006.

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Chapter 1. Purpose and Need for Action

1.1 Background

The Forest Service is required to work with private land owners who request access to their isolated parcels to provide reasonable access under the provisions of 1980 Alaska National Interest Lands Conservation Act (ANILCA), Sec. 1323(a). In this case, Sierra Pacific Industries has requested access to their property which is totally surrounded by National Forest System lands. Access across National Forest land is necessary.

In 1995, the Six Rivers National Forest adopted its current forestwide land and resource management plan (LRMP) (USDA Forest Service Six Rivers National Forest 1995). In it is incorporated the Northwest Forest Plan (also know as the Presidents Plan). This proposal includes an amendment to the LRMP.

1.2 Project Location

The project area is located in Trinity County, California, within the Lower Trinity Ranger District of the Six Rivers National Forest (see attached Vicinity Map in Appendix A. Maps). Comprising approximately 1,000 acres of private and public lands, it is generally situated between the South Fork Trinity River and the Shasta-Trinity and Six Rivers Forest boundaries, south of Castle Rock and north of Underwood Mountain.

The project area is within the General Forest, Adaptive, Riparian Reserve, Managed Habitat – Late-Successional Reserve, Partial Retention – Visual Quality Objectives management areas (see Appendix A for Land Allocation Area map). These areas are within portions of Sections 3, 4, 9, 10, 15, and 16, of T4N, R6E, Humboldt Base Meridian. The project area ranges in elevation from 1,200 to 4,000 feet above mean sea level.

1.3 Proposed Action

The Six Rivers National Forest is proposing to authorize a special use permit to Sierra Pacific Industries (SPI) to construct, use and maintain 4,811 feet of access road, across National Forest System lands in the W ½ Section 10, T4N, R6E, HM. The road is needed for SPI to access their property located in the SW ¼ of Section 9, T4N, R6E, HM, in the upper Underwood Creek drainage.

LAND AND RESOURCE MANAGEMENT PLAN AMENDMENT

This proposal includes a site-specific forest plan amendment. It amends the LRMP standard and guide 9-8 in Chapter IV on page 111, which states for key watersheds:

“Inside roadless areas – No new roads will be built in remaining unroaded portions of inventoried (RARE II) roadless areas that still qualify as roadless. This standard and guide would not apply to this project.

1.4 Purpose and Need

There is a need for action on a special use permit application submitted by Sierra Pacific Industries property to allow construction of a road across national forest system lands to provide access to their property. The purpose to provide access to Sierra Pacific Industries is to comply with the provisions of the 1980 Alaskan National Interest Lands Conservation Act, Section 1323, and the Forest Service regulation for evaluating and granting access to private lands within the national forest system at 36 CFR 251.110 to 251.114.

The 1980 Alaskan National Interest Lands Conservation Act, Section 1323, states:

“(a) Notwithstanding any other provision of law, and subject to such terms and provisions of law, and subject to such terms and conditions as the Secretary of Agriculture may prescribe, the Secretary shall provide such access to nonfederally owned land within the boundaries of the National Forest System as the Secretary deems adequate to secure to the owner the reasonable use and enjoyment thereof; Provided, That such owner comply with rules and regulations applicable to ingress and egress to or from the National Forest System.”

36 CFR 251.111 defines adequate access, and 36 CFR 251.114 describes the criteria, terms, and conditions of its granting:

*“(a) In issuing a special-use authorization for access to non-Federal lands, the authorized officer shall authorize only those access facilities or modes of access that are needed for the reasonable use and enjoyment of the land and minimize the impacts on the Federal resources. **The authorizing officer shall determine what constitutes reasonable use and enjoyment of the lands based on contemporaneous uses made of similarly suitable lands in the area and any other relevant criteria.**”*

“... (2) the route is so located and constructed as to minimize adverse impacts on soils, fish and wildlife, scenic, cultural, threatened and endangered species, and other values of the Federal Lands;...”

In meeting this need the project would achieve the following:

- Avoid late successional reserves.
- Avoid heritage and cultural resource sites.
- Minimize impacts to riparian reserves.

Management Direction

National Forest management is guided by a variety of laws, regulations and policies that provide the framework for all levels of planning, including Land and Resource Management Plans. Resource direction for this project is provided by the 1995 Six Rivers National Forest Land and Resource Management Plan (LRMP). The LRMP categorizes the Forest into 17 Management Areas that provide site-specific direction for National Forest projects. This project lies within five of these 17 management areas: General Forest, Adaptive, Riparian Reserve, Managed Habitat – Late-Successional Reserve, Partial Retention – Visual Quality Objectives (see Appendix A for Land Allocation Area map).

The overview for these three land management areas follow:

1. General Forest Management Area

The General Forest Management Area is designated as "matrix" lands (lands not reserved for other designations) with management emphasis on sustained yield of wood products that is consistent with Forest-wide management goals (LRMP IV-63). The goals in the General Forest Management Area, as defined in the LRMP, are to produce a sustained yield of timber, contribute younger seral stages to the overall vegetation mosaic of the forest, and conserve key components of functional habitat for mature and older growth associated species. The desired condition for the General Forest is a mosaic of forested stands comprised of a variety of vegetative species.

2. Riparian Reserve Management Area

Riparian Reserve Management Areas are linear areas as they follow stream courses through other management areas. There are four streams crossing the project area that are part of the Riparian Reserves Management Area. Direction for the protection of these stream courses is found in the Riparian Reserve Management Area section of the Forest LRMP page IV-44. Riparian Reserves are used to maintain and restore riparian structure and function.

Riparian Reserves are to be managed for the benefit of riparian and aquatic species, to conserve habitat for organisms dependent on the transition zone between upslope and riparian areas, to improve travel and dispersal for many terrestrial animals and plants, and to provide for habitat connectivity within the watershed. Riparian Reserves also serve as corridors to connect Late Successional Reserves.

The proposed road would cross four streams channels, each of which constitutes a Riparian Reserve. The project proposes to use rocked low water crossings to minimize impacts to the stream channel and streamside vegetation within the Riparian Reserve.

3. Adaptive Management Area

The project area is also within the Hayfork Adaptive Management Area. The objective of the Adaptive Management Area is to provide for opportunities to develop and test new management approaches for the integration and achievement of ecological and economic forest health, and other social objectives (LRMP IV-64). This project would not test new management concepts for economic or ecological forest health.

4. Managed Habitat – Late-Successional Reserve

The project area contains approximately 95 acres of late-successional reserve (LSR). LSRs are included under the Special Habitat Management Area. LSRs are to be managed to protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late-successional and old-growth related species including the northern spotted owl (LRMP IV-34).

5. Partial Retention – Visual Quality Objective

The project area contains approximately 40 acres of Partial Retention. These 40 acres are split in two areas one at the northwestern edge and the other at the southwestern edge of the project area. The goal of the Partial Retention is to maintain the area in near-natural appearing condition (LRMP IV- 62). No ground disturbing activities would take place on these 40 acres. The location at the northwestern edge of the project area is adjacent to the road intersection of 5N07 and 5N08.

1.5 Decision Framework

Management activities on SPI lands are not part of the decision to be made.

The Responsible Officer for this project, Regional Forester, Bernie Weingardt, will decide based upon the effects analysis of the alternatives, whether to issue, as proposed, a special use authorization to SPI for construction, use, and maintenance of a road to access their property or a modified proposal. The Deciding Officer has identified Alternative 2, the proposed action, as the preferred alternative.

1.6 Timing

Since the Forest Service does not make decisions on state or private lands, the timing of this project is represented by the date when the decision would be made and the decision document would be signed (Record of Decision or ROD). The Six Rivers National Forest anticipates making a decision and signing the ROD in the late spring early summer of 2006.

SPI has a timber harvest plan (THP) granted by the State of California (THP2-02-212 TRI(4)). It is anticipated that SPI would begin project implementation of this THP sometime in the fall of 2006.

1.7 Involvement

An extensive public involvement process has been conducted for the SPI Road Project. The Forest Service solicited input and comments from members of the public, other public agencies, tribes, adjacent property owners, and organizations.

Tribal Consultation

Formal governmental consultation was initiated with the Federally Recognized Hoopa Valley Tribe in June of 2003. There were no issues or concerns identified by the Tribe. There are no trust resources or rights associated with this project area.

In June of 2003 consultation was initiated with the Tsnungwe Tribe. Concerns were raised over heritage resources within the general area and discussions were held on the ground to assist in identifying a proposed route that would not affect heritage resources and, to assure this, the area would be monitored (see Appendix C).

Public Involvement

In the 2nd and 3rd Quarters of 2003, the 3rd Quarter of 2005, and the 1st and 2nd quarters and of 2006, the Sierra Pacific Industries (SPI) Road Project was included in the Six Rivers National Forest Schedule of Proposed Action, which was mailed to interested parties. The proposal was to build 4,811 feet of road.

On October 18, 2004, a scoping letter was mailed to interested and affected tribes, individuals, organizations, and Federal, State and local agencies with responsibilities for local resource management. The Forest Service received responses from 15 groups or individuals providing comments and concerns. After evaluating responses to the November 2004 scoping period, the Forest Service decided to prepare an environmental impact statement (EIS) for this project.

The Notice of Intent (NOI) to prepare an EIS was published in the Federal Register on December 5, 2005. The NOI asked for public comment on the proposal within 30 days of the publication of the notice in the Federal Register. Comments that were previously submitted from the October 18, 2004 scoping period will be used in the environmental analysis process. The Forest Service received additional responses from seven groups or individuals, some of whom had previously provided comments and concerns for the

November 2004 scoping. Using comments from both scoping periods, the interdisciplinary team developed a list of issues to address in the course of analysis.

1.8 Issues

Issues are points of discussion, debate, or dispute about the potential environmental impacts of a proposed action. As such, issues influence the design and evaluation of alternatives to the proposed action. Issues can be categorized as either non-significant or significant. The Council on Environmental Quality (CEQ) NEPA regulations guide Federal agencies in handling non-significant issues by directing them to "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)..." (40 CFR Part 1501.7).

Non-significant issues are those that are: (1) already addressed by law, regulation, forest plan or other higher level decision; (2) beyond the scope of the purpose and need described in the Notice of Intent; (3) not connected to the proposed action; (4) conjectural and not supported by scientific or factual evidence; or (5) irrelevant to the decision to be made.

Issues for the SPI Road Project have been identified and the issue to alternative process is summarized below. The relevant issues for the SPI Project were derived from a variety of sources including: 1) scoping comments, 2) the IDT through initial interdisciplinary processes and evaluation of data and information collected during the last field season, and 3) those developed in coordination with the Responsible Official and forest staff.

The scoping comments received through public involvement were reviewed by the SPI Road Project IDT who separated the issues into two groups: significant and non-significant as described by CEQ regulations above. Issues whether significant or not, can be, and in this project were, addressed by standards and guidelines (S&Gs), mitigation measures, or design features common to all alternatives (Chapter 2). Through this process, the IDT identified three significant issues. A list of scoping comments and the reason for their non-significance may be found in the project record at the Lower Trinity District in Willow Creek, California. They are summarized below.

The IDT through the interdisciplinary processes and in coordination with the Responsible Official and forest staff looked at internal issues, or issues not addressed by the public, and external issues (those comments from public scoping) to provide a basis for the analysis of environmental effects (Chapter 3). To narrow the focus of the environmental process, the IDT focused on internal and external issues that provided measurable elements to the proposed action and emphasized the most important environmental effects. These are elements of the ecosystem that can be measured to

indicate an increase or decrease in trends in ecosystem health. To compare these elements, indicators and appropriate measures were developed that compare the differences between the alternatives, and provide a clear basis for decision choice for a decision by the Responsible Official. Thus, the purpose and need, range of alternatives, environmental effects, and final decision will be connected using the scoping comments, internal issues and the corresponding indicator measures.

Summary of Issues

The discussion below focuses on significant and some non-significant issues determined to be relevant and within the scope of the project decision. Table 1-1 displays the public comments that were brought forward as significant issues and Table 1-2 displays non-significant issues and where each issue is addressed in Chapter 3 of this document.

Many commenters did not support the proposed road allowing SPI to access their managed land. Most suggested that an EIS was the appropriate level of documentation for the analysis. There were comments regarding archaeological sites and cultural resources. Some requested we allow only helicopter logging as an option for SPI to access the timber on their managed lands, a few suggested an alternative to a long-term road, such as a temporary road that would be removed after use. Most requested to remain on the mailing list. Numerous comments discussed Hells Half-Acre, the proposed wilderness area bill by Senator Barbara Boxer and U.S. Representative Mike Thompson in Humboldt County, and general South Fork Trinity River comments. Other comments were related to environmental impacts, which are addressed in the disclosure of effects in Chapter 3.

Table 1-1 Summary of public issues with significance

Significant Issue	Summary of Comments Supporting Significance
Reasonable Access	Road access is not necessarily needed to provide reasonable access.
Actions on SPI Lands	Actions on private lands will contribute to cumulative effects from many resources in the watershed.
Roadless Area	Road construction and logging will alter the roadless character of the Underwood IRA, including impacts to the recreation potential and visual resources.
Wild and Scenic River	Proposed activities will impact the values of the designated South Fork of the Trinity River.
Water Quality and Fisheries	Road construction may increase fine sediments, turbidity and erosion problems in Underwood Creek and hence the South Fork Trinity River, degrade Riparian Reserves, and impact fisheries.
Noxious Weeds	Proposed activities may impact the spread of noxious weeds species known to occur in the area because of project ground disturbing activities.

Table 1-1 Summary of public issues with significance (continued)

Significant Issue	Summary of Comments Supporting Significance
Botanical Concerns	Proposed activities may impact the sensitive plants known to occur in the area because of project ground disturbing activities.
Wildlife Concerns	Decrease or degradation in suitable habitat for Northern Spotted Owl and other threatened, endangered, or Forest Service sensitive species.
Cultural Heritage	Avoid disrupting archaeological sites within the project area.
Soils	Proposed activities may impact soil productivity.
Air Quality	Slash burning may affect air quality.
Fire and Fuels	Proposed activities may increase the potential for wildland fire and decrease the ability to suppress fires that occur.

Table 1-2 Summary of non-significant public issues and reason for excluding

Issue Category	Summary of Comments Addressed in Analysis	Reason for Excluding the Issue
Wilderness	The area should be maintained as roadless to preserve the wilderness potential.	Already addressed by Forest Plan allocations.
Land Exchange	Forest Service should acquire the SPI property through purchase or trade, conservation easement or any means by which building the road can be avoided.	Outside the scope of the access request under ANILCA.

Chapter 2. Alternatives, including the proposed action

2.1 Introduction

This Chapter describes and compares the alternatives considered for the SPI Road Project. It outlines the process that led to development of alternatives to the proposed action. Alternatives considered, but eliminated from detailed study, are summarized in this chapter. The Chapter concludes with mitigations, monitoring and tabular comparison of the alternatives analyzed in detail. The comparison is based on indicators and the measures developed from these indicators selected by the project interdisciplinary team (IDT) to evaluate how each alternative responds to the issues and to the purpose and need for action.

2.1.1 Indicators and Associated Measures

As discussed in Chapter 1 in Section 1.7 Issues, the development of indicators and their measures are presented. Measures were developed from specific indicators by internal and external issues, forest staff, and Responsible Official evaluations to quantitatively and qualitatively compare and analyze alternatives. The following indicators and subsequent measures were used to address the impacts of the proposed actions in Chapter 3. At the end of this chapter, Table 2-1 compares the alternatives by indicator. The following is a complete list of indicators and subsequent measures that were used in this DEIS.

Resource Indicators

- Section 3.2 *Air Quality* – impacts to air quality were addressed by attainment standards and public nuisance complaints.
- Section 3.3 *Botany* – impacts were measured qualitatively and quantitatively on Survey and Manage species (S&M), Threatened and Endangered species (T&E), Forest Service Proposed and Sensitive species associated with the project proposal.
- Section 3.4 *Fire and Fuels* – impacts to fire and fuels were addressed qualitatively and quantitatively using fire hazard and tree mortality. Fire hazard assessed changes in human caused ignition potential. Tree mortality by August modeled fire behavior.
- Section 3.5 *Fisheries* – impacts were measured qualitatively and quantitatively on Federally Listed and Region 5 Forest Service Sensitive fish species (anadromous fish species).

- Section 3.6 *Heritage Resources* – impacts on heritage resources are indicated qualitatively.
- Section 3.7 *Hydrology* – watershed condition indicators include: sediment, hydrologic flows, temperature, large woody debris (LWD), water quality, and the percent Equivalent Roaded Acres compared to the Threshold of Concern. Unstable areas are discussed in this section.
- Section 3.8 *Noxious Weeds* – impacts were measured qualitatively and quantitatively as the level of risk of spread of noxious weeds and seeds (acres disturbed).
- Section 3.9 *Recreation and Visuals* – Recreation Opportunity Spectrum (ROS) as measured by Visual Quality Objectives (VQO), this section also includes lands discussed by contemporaneous use and minerals.
- Section 3.10 *Roadless* – impacts to the roadless area solitude as discussed by impacts on noise disturbance.
- Section 3.11 *Soils* – Soil physical properties, which include soil productivity, was measured by soil cover (Erosion Hazard Rating), soil porosity (for example, soil compaction), and organic matter/nutrient loss; hydrologic function was measured through cumulative watershed effects assessment in *Hydrology*, Section 3.7.
- Section 3.12 *Wildlife* – impacts on species (Threatened, Endangered, Proposed, Sensitive species, and Management Indicator Species) associated with forest habitat where project activities would occur were used as indicators and measured in acres of suitable habitat affected.

2.2 Description of the Alternatives

The Council on Environmental Quality (CEQ) regulations that implement the procedural provisions of the National Environmental Policy Act require federal agencies to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14).

The SPI Road Project ID Team analyzed a reasonable range of alternatives given the specificity of the proposed action. Six alternatives were developed within the range of alternatives based on concerns about forest conditions, including potential hydrologic, heritage, fish and wildlife, and social impacts that could result from this road project. Four alternatives were analyzed in detail: no action, proposed action, temporary road and helicopter alternative. Two other alternatives were eliminated from detailed study. Below is a brief summary of the four alternatives analyzed in detail in chapter 3.

2.2.1 Alternative 1 – No Action

Under the No Action alternative, no special use permit would be authorized; therefore management activities in the analysis area would be deferred for an unspecified length of time. The purpose and need described in Chapter 1 would not be realized from implementing this alternative. No actions on SPI lands within the project area would occur with the implementation of this alternative.

2.2.2 Alternative 2 – Proposed Action (Preferred Alternative)

The proposed action is to issue a special use permit to SPI to construct 4,811 feet of road with conventional motorized equipment, constructed to low volume road standards and specifications. The road would cross two ephemeral streams and two intermittent/perennial streams (i.e. wet for up to 9 months of the year). The road would cross the streams with rocked low water crossings or temporary culverts. The road would be maintained by SPI as a dry weather access route and would be gated. The proposed alignment is not the shortest possible route but the alignment avoids or limits impacts to a number of resource concerns discovered during initial reconnaissance of the area (see Section 2.4 Alternatives Considered but Eliminated from Detailed Study).

The special use authorization term would be for a period of 10 years from issuance of the special use permit. This is the standard length for a special use permit.

(1) Gate - A gate would be installed at the start of the second rocked stream crossing. The terrain is such that placing a gate closer to the Forest Service system road 5N07 would result in the gate being easily bypassed. The gate would block access to unauthorized individuals. The proposed road would not be part of the Forest Service road system and would be maintained by SPI.

(2) Road Construction – There would be two levels of road construction for this project. The first section of the road would be constructed on 885 feet of temporary road through a 20-30 year old ponderosa pine plantation. Because of the existing temporary roadbed, there will be minimal construction needs for this portion of the road.

The second section of the road is 3,926 feet and would be through a previously undisturbed area. The road would be through a 90 year old Douglas-fir and ponderosa pine stand. Both sections of the road would be constructed to 14-foot width with approximately three feet of shoulder on each side of the road. Road gradient for the proposed roads are less than 15%.

(3) Right-of-Way Vegetation – vegetation in the right-of-way (ROW) would be cleared. This would include felling approximately 50 thousand board feet (about 10 log truck loads) of merchantable Douglas-fir and ponderosa pine timber. Merchantable right-

of-way logs would be decked along the road to be sold under standard Forest Service timber disposal procedures. Clearing width of the right-of-way would vary depending on slope of the terrain. The clearing would be kept to the minimum needed to build a road with a 14 foot wide running surface, a three foot shoulder on either side of the road and associated cuts and fills.

(4) Right-of-Way Slash - Unmerchantable right-of-way slash would be lopped and scattered on fill slopes to a depth not to exceed 30" inches. Deposited material would assist in stabilizing the exposed soil.

(5) Stumps – Stumps within the ROW would be removed, by use of heavy equipment, and transported to adjacent SPI lands for disposal.

(6) Rocked Stream Crossings - The proposed road alignment would traverse two ephemeral and two intermittent/perennial streams. These streams would be crossed with a permanent low water crossings called a rocked rolling dip, constructed of medium to large diameter base rock (1 to 3 foot in diameter) overlain by 5-12 inch rock (cobble) and capped with a running surface of clean rock approximately ½ - 1 ½ inch diameter rock, all base rock and cobble would not exceed a 3-foot depth. The rock would be generated from the second section of road bed proposed to be built (any imported rock would be cleaned washed rock). The rock would be placed after May 1st and before October 15th. The running surface rock would begin approximately 25 – 75 feet before the stream to protect approaches to the crossing. The low water crossings would be designed to meet Best Management Practices, would be free-draining, and would minimize short- and long-term disturbance to the existing streambed. During the dry season, if water was flowing in the channel, a temporary culvert of appropriate size to handle the flow would be installed to allow vehicle passage without becoming in direct contact with water flow. This culvert would be maintained until such time as it was no longer necessary or at that point after October 15th when it was determined road conditions were unsuitable for further road usage, whichever came first.

The road and crossings would not be used during the wet weather season by heavy equipment. During the wet season pickup trucks or quad runners could be used for slash and reforestation work in the early spring and late fall, as long as neither representative (designated Forest Service or SPI representative) encounters detrimental effects to the transportation system, water quality, or soil resources. The rocked crossings would be designed to allow water to flow during the wet season. The crossing design would eliminate the potential of sediment input associated with traditional permanent culverts, minimize impacts to stream channels and also reduce the potential for winter culvert flow failures.

(7) Wet Weather Waterbars - Following the dry season, drivable waterbars or rolling dips would be placed to minimize wet weather erosion problems and allow the road to be

free draining. Placement of water bars, or rolling dips would occur by October 15th of each operating year unless post October 15th weather is dry in which case the permittee may solicit permission by the Forest Service to continue daily use of the road up to November 15.

The proposed road location would avoid:

- Riparian Habitat Conservation Areas (RHCAs) as defined by Scientific Advisory Team guidelines,
- Spotted Owl Protected Activity Centers (PACs) and Spotted Owl Habitat Areas (SOHAs),
- northern goshawk PACs,
- late-successional reserves,
- administrative sites,
- certain native plant occurrences
- recreation sites,
- rocky outcrops,
- archeological sites.

DESIGN CRITERIA

Specific design features are those items or actions designed into the project with the intent of reducing or eliminating potential adverse environmental or social effects that may be brought by the Proposed Action follow:

(1) During winter flows natural sediment transport will be unimpeded at the rocked stream crossings. Removal of all but the large anchor rock would occur prior to winter weather. Appropriate width and grade through the crossing shall mimic the natural stream channel above and below. As part of the special use permitting process, SPI would follow approved design criteria for rocked stream crossings discussed in item 6) above (See Shallow Stream Ford and Gully Crossing Rock Structure figure in Appendix F).

(2) The one sensitive lichen species (*Sulcaria badia*) would be surveyed by Forest Service botany staff prior to the decision being made.

(3) Noxious Weeds - To reduce the potential for the spread of exotic and noxious plant species, cleaning of equipment would be required before entering and leaving the work area. Equipment would be cleaned away from the watercourses where sediment from equipment could enter the stream channel (Appendix C).

No herbicides would be used for any treatments on National Forest System Lands associated with this proposed action or connected actions for this project.

Any mulch or rice straw that would be used shall be State of California certified weed free.

Any imported rock would be clean washed rock.

To reduce the spread of yellow star thistle, prior to project implementation and before weed seed heads have developed (approximately June), weeds would be removed with a weed whacker or other non-chemical means adjacent to the road through the plantation. After removal, weed-free mulch or certified weed-free rice straw would be applied up to 3" deep or weed cloth would be applied over the area where yellow star thistle was removed. If construction starts prior to June, exposed soil adjacent to the ROW in the plantation would be strawed to a depth of 3".

(4) Fuels - Fuels located within 50 feet of the right-of-way would be lopped and scattered on the fill slopes to reduce erosion.

To the extent possible, pre-existing downed logs greater than 20 inches in diameter and 10 feet long would be retained adjacent to the right-of-way to function as key habitat components.

(5) Snags and Downed Logs - In accordance with LRMP standards and guidelines, snags and downed logs would be retained at 80 to 100 percent of the average found in mature and old growth stands on the Forest. This equates to 0.9 to 3.9 snags per acre and would be met on an average basis over areas no longer than 40 acres. The ratio of hard snags to soft snags would be equal to or greater than 2:1.

Preexisting downed logs greater than 20" in diameter and 10 feet long would be retained in accordance with LRMP standards and guidelines, requiring the retention of five downed logs per acre in contact with the soil surface.

(6) Wildlife - To ensure there is no effect to Northern Spotted Owls, (within ¼ mile of the new road construction – STA 1075.1') use of the road shall be curtailed when nesting is confirmed within ¼ mile of the road.

(7) Air Quality - Dust abatement would be required on Road 5N07 during hauling operations using water from the water hole located at the intersection of 5N40 and 5N60.

(8) Public Safety - Cautionary signs would be utilized at the intersection of 5N40 and 5N60 during periods of active logging and log haul. Closure signs would be utilized for the proposed road location.

2.2.3 Alternative 3 – Temporary Road

This alternative proposes the same activities as Alternative 2, but as a temporary road, and would be obliterated and rehabilitated as stated in SRF LRMP IV-115, 13-5, Transportation and Facilities Standards and Guidelines for temporary roads. The special

use authorization term would be for a period of 10 years from issuance of the special use permit. This alternative includes the following additional rehabilitation:

DESIGN CRITERIA

Specific design features for the temporary road alternative would be the same as for the proposed action alternative. There would be additional design criteria as follows:

(1) Obliteration of the roadbed would be by mechanical ripping. Rocked stream crossings would have removal of all but the large anchor rock. Due to the relatively flat ground there would be minimal to no recontouring required. Any culverts used on the intermittent/perennial streams would be removed and the crossing returned to a natural condition.

(2) Rehabilitation of the ripped roadbed would be by placement of certified weed-free rice straw.

2.2.4 Alternative 4 – Helicopter

This alternative proposes to authorize a special use permit to SPI to construct and use helicopter drop zones and a service landing to allow SPI access to their managed lands to implement timber harvest activities. The service landing would be two acres off of Forest Service Road 5N07. There would be two drop zones in an existing plantation along 5N07 and the 885 feet of temporary road discussed in Alternative 2 and 3 above (see Helicopter Logging Method Alternative Map in Appendix A.) The landing would not be rehabilitated, since it is a strategic location for fire fighting personnel to use as an anchor point for future fire suppression activities.

DESIGN CRITERIA

The following specific design features would be implemented for the helicopter alternative:

(1) The helicopter contractor and any subcontractors would be required to comply with all state and federal laws and rules regulating helicopter logging (including HAZMAT and OSHA requirements) and associated activities (e.g. requirements for fueling and maintenance including fuel placement, storage, spill prevention, and disposal would be followed; EPA, Resource and Recovery Act 42 U.S.C. 6901).

(2) Wildlife - To ensure there is no effect to Northern Spotted Owls, (within ¼ mile of the project area – STA 1075.1') use of helicopters shall be curtailed when nesting is confirmed within ¼ mile of the flight line. Helicopter use could continue when the yearling had fledged.

(3) Air Quality - Dust abatement would be required on Road 5N07 during hauling operations using water from the water hole located at the intersection of 5N40 and 5N60.

(4) Public Safety – Forest Service Road 5N07 would be closed when helicopters were in use. Cautionary signs would be utilized at the intersection of 5N40 and 5N60 during periods of active logging and log haul.

As well, design features would also include the following on the service landing drop zones and along Forest System Lands haul roads:

(5) Cultural Resources – All known sites would be flagged. Monitoring would occur during project implementation.

(6) The one sensitive lichen species (*Sulcaria badia*) would be surveyed by Forest Service botany staff prior to the decision being made.

(7) Noxious Weeds - To reduce the potential for the spread of exotic and noxious plant species, cleaning of equipment would be required before entering and leaving the work area. Equipment would be cleaned away from the watercourses where sediment from equipment could enter the stream channel.

No herbicides would be used for any treatments on National Forest System Lands associated with this proposed action or connected actions for this project.

To reduce the spread of yellow star thistle, prior to project implementation and before weed seed heads have developed (approximately June), weeds would be removed with a weed whacker or other non-chemical means adjacent to the road through the plantation. After removal, weed-free mulch or certified weed-free rice straw would be applied up to 3" deep or weed cloth would be applied over the area where yellow star thistle was removed. If construction starts prior to June, exposed soil adjacent to the ROW in the plantation would be strawed to a depth of 3".

The service landing would be planted with a 10 foot wide buffer strip along road 5N07 to provide a vegetation barrier to prevent potential weed seed spread onto the disturbed landing. The drop zones would be site prepped and replanted.

(8) Fuels - Fuels located within 50 feet of the service landing would be lopped and scattered on the fill slopes to reduce erosion.

To the extent possible, pre-existing downed logs greater than 20 inches in diameter and 10 feet long would be retained adjacent to the right-of-way to function as key habitat components.

(9) Snags and Downed Logs - In accordance with LRMP standards and guidelines, snags and downed logs would be retained at 80 to 100 percent of the average found in mature and old growth stands on the Forest. This equates to 0.9 to 3.9 snags per acre and would be met on an average basis over areas no longer than 40 acres. The ratio of hard snags to soft snags would be equal to or greater than 2:1.

Preexisting downed logs greater than 20" in diameter and 10 feet long would be retained in accordance with LRMP standards and guidelines, requiring the retention of five downed logs per acre in contact with the soil surface.

2.4 Alternatives Considered but Eliminated from Detailed Study

The CEQ regulations that implement the National Environmental Policy Act require federal agencies to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Two alternatives were developed based on concerns about forest conditions, forest structure, and potential wildlife and cultural or heritage impacts that could result from the road project, but following initial review, were dropped from detailed analysis.

1. Shortest Route Possible Alternative

The initial route proposed by SPI utilized existing Forest Service System Road 5N07 to a point about a quarter mile from SPI's east property line. The proposed new 1,300 foot road would have been located along a small ridge and descend at reasonable grades to just east of the SPI property line. At this point a perennial fork of Underwood Creek flowing from north to south is 4 feet wide and straddles the property line. The proposed route would cross the creek utilizing a temporary bridge. This route crosses a 100 acre Late Successional Reserve (LSR) of mature Douglas-fir and incense cedar. The LSR management area is intended to provide a core of relatively natural, undisturbed habitat for plants and animals associated with mature and old growth forests (LRMP IV-34). Road building is not recommended in LSRs unless the potential benefits exceed the cost of habitat impairment (LRMP IV-40). Because this LSR was of limited size, and an alternative route was possible, this alternative was dropped from further analysis.

2. Middle Road Alternative

A second route of 2,200 feet was investigated from Forest Service Road 5N07 to the SPI property. The route is approximately 1,500 feet north and parallel to the short route described above. This route avoided impacts to the 100 acre LSR and crossed Underwood Creek in an area where the creek channel was not as deeply incised. The first 800 feet of the route followed the proposed route through a 14 year old pine plantation. The last 1,400 feet went through an open grown 90 year old Douglas-fir, ponderosa pine stand. An analysis of affected resources indicated the route crossed an archaeological resource area

that could not be avoided or easily mitigated. The route was therefore dropped from consideration.

2.5 Comparison of Alternatives

Table 2-1 compares the proposed activities for each alternative. The information in Table 2-1 also focuses on effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively between the two alternatives.

Table 2-1 Comparison of the alternatives analyzed for the SPI Road Project

Activity	Indicator or Measure	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Temporary Road	Alternative 4 Helicopter
Proposed Activities	New Road Construction	0 feet	3,926 feet	3,926 feet	0 feet
	Road Reconstruction	0 feet	885 feet	885 feet	0 feet
	Road Obliteration and Rehabilitation	0 miles	0 miles	3,926 feet	0 miles
	Helicopter Landings	none	none	none	Service landing installed over a 2-acre area, old plantation used as drop zone for flown logs – 6 acres
Air Quality	Particulate Matter (PM ₁₀) attainment Standards	No effect	No effect	No effect	No effect
Impacts on Botanical Species	Suitable habitat affected; individual plants impacted.	No Effect	MAI ¹	MAI ¹	No Effect
Fire and Fuels	Mortality – Fire Effects	N/A	Minor localized increase in individual tree mortality. No increase in spotting distance.	Minor localized increases in individual tree mortality. No increase in spotting distance.	Minor localized increases in individual tree mortality. No change in spotting distance.

Table 2-1 Comparison of the alternatives analyzed for the SPI Road Project (continued)

Activity	Indicator or Measure	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Temporary Road	Alternative 4 Helicopter
Fire Hazard	Human Ignitions	No change	Minor increase based upon increased human presence.	Minor increase based upon increased human presence.	Minor increase based upon increased human presence.
Impacts on Heritage Resources	Acres impacted	None	None due to protective measures.	None due to protective measures.	None due to protective measures.
Impacts to Hydrologic Resources	Number of Low Water Crossings	none	4	4	none
	Equivalent Roaded Area (ERA) and Threshold of Concern	ERA = 0.76% and TOC = 11%	Undetectable change. ERA = 2.14% Percent TOC = 11%	Undetectable change. ERA = 2.14% Percent TOC = 11%	Undetectable change. ERA = 1.98% Percent TOC = 11%
	Sediment	Below 20%	Undetectable to no change.	Undetectable to no change.	Undetectable to no change.
	Hydrologic Flows	Unaltered	Unaltered	Unaltered	Unaltered
	Temperature	Unaltered	Undetectable	Undetectable	No Effect
	Large Woody Debris	Unaltered	Undetectable	Undetectable	No Effect
	Water Quality	No effect	No effect	No effect	No effect
Noxious Weeds	Weed Seed Spread	No Risk	Indirect- MOD Cumulative-MOD	Indirect- LOW Cumulative-MOD	Indirect- MOD Cumulative-MOD-HIGH
	Weed Seed Introduction	No Risk	Indirect- LOW Cumulative-MOD	Same as Alt 2	Indirect- MOD Cumulative-MOD-HIGH
Recreation Opportunity Spectrum	Visual Quality Objectives (VQOs)	N/A	VQOs would be maintained at acceptable levels.	VQOs would be maintained at acceptable levels.	VQOs would be maintained at acceptable levels.

Table 2-1 Comparison of the alternatives analyzed for the SPI Road Project (continued)

Activity	Indicator or Measure	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Temporary Road	Alternative 4 Helicopter
Roadless	Noise Disturbance	N/A	Temporary	Temporary	Temporary
	Feet of Road	No Change	4,811 Feet	0 Feet	0 Feet
Road Costs	Cost in dollars	N/A	\$ 25,000	\$ 27,000	\$ 30,000
Harvest Costs	Harvest Cost in dollars	N/A	\$ COST	\$ COST	\$ COST X 3

¹ MAI = May Affect Individuals

2.6 Implementation Monitoring

Monitoring and evaluation of actual project effects would be conducted by forest specialists. Implementation monitoring elements are listed below:

- noxious weed occurrence and prevention compliance
- implementation and effectiveness of Best Management Practices (BMPs)
- soil quality management (soil compaction, displacement, and cover) under BMPs
- smoke management and compliance with air quality standards

The action alternatives are designed to have minimal to no long-term detrimental impacts on the environment. Short-term impacts would be minimized through mitigation measures. Project design mitigation measures and Best Management Practices have been incorporated into Alternative 2, 3 and 4 with the intent of preventing or reducing adverse impacts on resources. Project design mitigation measures are listed in detail in Appendix C of this document and would be applied prior to and during activity implementation to reduce potential impacts on resources. BMPs (Appendix E) have an effectiveness monitoring aspect, so monitoring is also done after implementation. This list in Appendix C is not all inclusive because Forest Plan standards are incorporated by reference.

Chapter 3. Affected Environment and Environmental Consequences

3.1 Introduction

This chapter summarizes the physical, biological, social, and economic environments of the project area and the effects of implementing each alternative on that environment. It also presents the scientific and analytical basis for the comparison of alternatives presented in the alternatives chapter. The following information is a summation of project-specific reports, assessments, and input prepared by Forest Service specialists, which are listed in this draft environmental impact statement (DEIS). Project-specific reports including biological assessments and biological evaluation (BA/BE) are part of the project record on file at the Lower Trinity Ranger District in Willow Creek, California. Copies are available upon request.

3.1.1 Project Area

The project area map for the SPI Road is shown on the Project Area Map contained in Appendix A - Maps. Access to the general area for this project is served by Forest Service Road 5N07. This system road is open for public use in late spring, summer and early fall. It is closed in the winter because the road has a native surface and winter use would cause rutting and sedimentation. In addition normal winter snow levels preclude access. Forest Service Road 5N07 lies on the east side of the SPI property coming within 820 feet of the southeast corner of SPI's land. The SPI parcel has no existing road access. Historical access was by a steep horse/wagon trail that came up from the South Fork of the Trinity River, on the south side of the property.

The project area is contained in the Hog Ranch-Underwood watershed. The watershed is characterized by brush, live oaks, and scattered conifers. The watershed is also characterized by gentle slopes with steeper slopes as the terrain drops toward the South Fork of the Trinity River. There are rock outcrops and talus slides.

Within the 1,000 acre project area the vegetation is 95% early to mid mature seral stages composed mostly of conifers, Douglas-fir and ponderosa pine, with a small hardwood plant community of oak-woodlands. The slopes are gentler, and contain ephemeral, intermittent and perennial streams. General forest, adaptive, riparian reserve, and a small section of managed habitat – late-successional reserve (approximately 95 acres) and partial retention – visual quality objective (approximately 40 acres) make up the management areas.

3.1.2 Scope of Analysis

Each environmental resource area discusses its scope of analysis individually if it is different from this 1,000 acre project area. The Project Area Section 3.1.1 above describes the project area and general existing conditions. Environmental consequences form the scientific and analytical basis for comparison of alternatives, including the proposed action, through compliance with Forest Plan standards and a summary of monitoring required by the National Environmental Policy Act of 1969 and National Forest Management Act of 1976. The discussion centers on direct, indirect, and cumulative effects, along with applicable mitigation measures. Effects can be neutral, beneficial, or adverse. Irreversible and irremediable commitments of resources are also discussed for each resource indicator. These terms are defined as follows:

- **Direct effects** are caused by the action and occur at the same place and time as the action.
- **Indirect effects** are caused by the action and are later in time, or further removed in distance, but are still reasonably foreseeable.
- **Cumulative effects** are those that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.
- **Irreversible** commitments of resources are permanent or essentially permanent resource use or losses. They cannot be reversed, except in the extreme long term. Examples include mineral extraction or loss of soil productivity.
- **Irremediable** commitments of resources are losses of productivity or use for a period of time. One example is road construction on suitable timber lands. Timber growth on the land is irremediably lost while the land is used as a road, but the timber resource is not irreversibly lost because the land could grow trees again in the near future.

3.1.3 Description of Alternatives

Brief descriptions of the four alternative management scenarios analyzed for this proposal are provided below.

- **Alternative 1: No Action**—under this alternative, no special use permit would be authorized; hence no road construction or reconstruction activities would occur in the SPI Road Project area.
- **Alternative 2: Proposed Action (or the Action Alternative)**—this alternative proposes to authorize a special use permit to SPI to construct, use, and

maintain 4,811 feet of access road, during the dry season, across National Forest System Lands in the W ½ of Section 10, T4N, R6E, Humboldt Meridian.

- **Alternative 3:** Temporary Road—this alternative proposes the same activities as Alternative 2, but as a temporary road, and would be obliterated and rehabilitated as stated in the Six Rivers National Forest Land and Resource Management Plan (Six Rivers LRMP) Chapter IV page 115, Section 13-5, Transportation and Facilities Standards and Guidelines for temporary roads.
- **Alternative 4:** Helicopter Alternative—this alternative proposes to authorize a special use permit to SPI to use helicopter drop zones and a service landing to allow SPI access to their managed lands to implement timber harvest activities.

3.1.4 Cumulative Effects Analysis

Cumulative effects are discussed for each resource indicated in Section 2.1.1 Indicators and Associated Measures in Chapter 2, above and reiterated in Section 3.1.5 Resource Indicators of this chapter, below. The cumulative effects analysis area varies for each resource. Past activities are considered part of the existing condition and are discussed in the “Existing Condition and Environmental Effects” section under each resource. Tables 3-1 and 3-2 display recent past, current (or ongoing), reasonably foreseeable future, and future activities in or adjacent to the SPI Road Project area. For the purposes of this analysis, a distinction has been made between “reasonably foreseeable future” and “future” actions. “Reasonably foreseeable” is used to refer to projects for which a proposed action has been developed. This includes projects listed on the quarterly “Schedule of Proposed Actions” and decided projects that are awaiting implementation. “Future” refers to projects still in the initial stages of development and for which there is no proposed action at this time.

The cumulative effects analyses for this DEIS were prepared in accordance with CEQ’s Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (Connaughton, 2005).

3.1.5 Resource Indicators

- Section 3.2 *Air Quality* – impacts to air quality were addressed by attainment standards and public nuisance complaints.
- Section 3.3 *Botany* – impacts were measured qualitatively and quantitatively on Survey and Manage species (S&M), Threatened and Endangered species

(T&E), Forest Service Proposed and Sensitive species associated with the project proposal.

- Section 3.4 *Fire and Fuels* – impacts to fire and fuels were addressed qualitatively and quantitatively using fire hazard and tree mortality. Fire hazard assessed changes in human caused ignition potential. Tree mortality by August modeled fire behavior.
- Section 3.5 *Fisheries* – impacts were measured qualitatively and quantitatively on Federally Listed and Region 5 Forest Service Sensitive fish species (anadromous fish species).
- Section 3.6 *Heritage Resources* – impacts on heritage resources are indicated qualitatively.
- Section 3.7 *Hydrology* – watershed condition indicators include: sediment, hydrologic flows, temperature, large woody debris (LWD), water quality, and the percent Equivalent Roaded Acres compared to the Threshold of Concern. Unstable areas are discussed in this section.
- Section 3.8 *Noxious Weeds* – impacts were measured qualitatively and quantitatively as the level of risk of spread of noxious weeds and seeds on disturbed acres.
- Section 3.9 *Recreation and Visuals* – Recreation Opportunity Spectrum (ROS) as measured by Visual Quality Objectives (VQO), this section also includes private and Forest Service Lands discussed by contemporaneous use and minerals.
- Section 3.10 *Roadless* – impacts to the roadless area solitude as discussed by impacts on noise disturbance.
- Section 3.11 *Soils* – Soil physical properties, which include soil productivity, was measured by soil cover (Erosion Hazard Rating), soil porosity (for example, soil compaction), and organic matter/nutrient loss; hydrologic function was measured through cumulative watershed effects assessment in *Hydrology*, Section 3.7.
- Section 3.12 *Wildlife* – impacts on species (Threatened, Endangered, Proposed, Sensitive species, and Management Indicator Species) associated with forest habitat where project activities would occur were used as indicators and measured by acres of suitable habitat affected.

3.1.6 Past, Present, and Foreseeable Future Actions

Table 3-1 Past and Present Actions on Forest Service system lands

Activity	Year	Seral Stage	Silvicultural Prescription	Acres	Resources Affected
Sims Wildfire & Suppression Activities	2004	Late-Mature/ Old-Growth	ITS	133	Wildlife (suitable habitat), and Botany
Sims Wildfire & Suppression Activities	2004	Mid-Mature	ITS	103	Wildlife (suitable habitat), and Botany
Sims Wildfire & Suppression Activities	2004	Early-Mature	ITS	93	Wildlife (suitable habitat), and Botany
Sims Fire THP Garrett/Flebotte (Private)	2004	Mid-Mature	ITS	50	Wildlife (suitable habitat)
Road Closure, Decommissioning and/or Stabilization	Past and Current	N/A	N/A	Varies depending resources affected	Hydrology, Fisheries, Roadless
TOTAL				379	

Table 3-2 Past Timber Management Actions on Forest Service system lands

Sale Name Unit No.	Year Harvest	Silvicultural Prescription	Harvest Method	Year Planted	Unit Acres	Acres Clipped ²	Resources Affected
Castle unit #1	1975	ITS	Tractor/Rubber tired skidder	1978	25	21	hydro, fish, wildlife, and noxious weeds
Castle unit #2	1975	ITS	Tractor/Rubber tired skidder	1978	25	21	Inventoried roadless, noxious weeds
Castle unit #4	1973	Patch Cut	Tractor/Rubber tired skidder	1976	26	21	hydro, fish & wildlife
Castle unit #7	1973	ITS	Tractor/Rubber tired skidder	N/A ¹	85	60	hydro, fish, wildlife, and noxious weeds
Castle unit #7	1989	Overstory Removal	Tractor/Rubber tired skidder	1991 ¹	---	10	hydro, fish, wildlife, and noxious weeds

Table 3-2 Past Timber Management Actions on Forest Service system lands (continued)

Sale Name Unit No.	Year Harvest	Silvicultural Prescription	Harvest Method	Year Planted	Unit Acres	Acres Clipped ²	Resources Affected
Castle unit #5E	1975	Patch Clearcut	Highlead	1976	7	6	Inventoried roadless
Underwood unit #2	1983	ITS	Tractor/Rubber tired skidder	---	34	2	hydro, fish, wildlife, and noxious weeds
Underwood unit #10	1983	ITS	Tractor/Rubber tired skidder	---	19	11	hydro, fish, wildlife, and noxious weeds
Underwood unit #24	1977	ITS	Single span Skyline	no planting	9	2	hydro, fish, wildlife, and noxious weeds
Underwood unit #27	1983	ITS	Single span Skyline	N/A	11	11	Inventoried roadless
Hell Half Acre unit #11	1976	Patch Cut	Highlead	1978	9	1	Inventoried roadless
Hell Half Acre unit #15	1976	Clearcut	Helicopter	1978	20	11	Inventoried roadless
Gaynor 2 unit #1	1992	Clearcut	Single span Skyline	1992	15	15	Inventoried roadless, and noxious weeds
Gaynor 2 unit #2	1992	Clearcut	Single Span Skyline	1993	12	12	Inventoried roadless
Gaynor 2 unit #3	1981	Shelterwood Seed Cut	Single Span Skyline	1978	23	23	hydro, fish & wildlife
Gaynor unit #9	1979	Clearcut	Highlead	1981	43	23	hydro, fish & wildlife
Gaynor unit #10	1979	Group Selection	Highlead	1981	33	1	hydro, fish, wildlife, and noxious weeds

¹ replant was two acres to meet stocking requirements.

² clip to Hog-Ranch Underwood Watershed.

Table 3-3 Reasonably Foreseeable Actions on Sierra Pacific managed lands

Activity	Year	Seral Stage	Method	Acres or Miles	Resource Affected
SPI Harvesting	2006+	Mid-Mature	Clearcut	45 Acres	Wildlife, Hydrology, and Botany
SPI Harvesting	2006+	Mid-Mature	Thin/Selective Harvest	85 Acres	Wildlife, Hydrology
SPI Harvesting	2006+	Late-Mature	Thin/Selective Harvest	8 Acres	Wildlife, Hydrology
SPI Road Building	2006+	N/A	Tractor	1.5 Miles	Wildlife, Hydrology, Noxious Weeds, and Botany
Dozer Burn Piles	2007+	Mid-Mature	Hand Crew	Approx. 10 piles in 45 Acres	Wildlife, Hydrology, Noxious Weeds
Broadcast Burn	2007+	Mid-Mature	Hand Crew	Less than 30 Acres	Wildlife, Hydrology, Noxious Weeds
Herbicide Application	2007+	Mid-Mature	Hand Spray by Certified Application Technician	Less than 50 Acres	Wildlife, Hydrology, Botany, Noxious Weeds
TOTAL ACRES Harvesting	2006+	Mid- and Late-Mature	---	138 Acres	Wildlife, Hydrology, Noxious Weeds
TOTAL MILES Road Building	2006+	---	Tractor	2.4 Miles	Wildlife, Hydrology, Noxious Weeds

3.1.7 Affected Environment and Environmental Consequences

The discussion of affected environment and environmental consequences is organized by resource. Under each resource, the existing conditions are described for each indicator, followed by the environmental effects discussion, by indicator for each alternative.

3.2 Air Quality

3.2.1 Introduction

Scope of the Analysis

The analysis area for air quality includes the area potentially affected by smoke, dust, and other emissions from proposed actions: the project area and the air basin in which the project area is located. The name used for the air basin in this analysis is the: North Coast

Air Basin. This air basin is administered by the North Coast Unified Air Quality Management District (NCUAQMD), with oversight regulation by the California Air Resources Board. Additional information regarding the regulatory direction for the physical location follows in the next section below.

Regulatory Framework

National air quality standards were promulgated in 1963 with the Clean Air Act, and the law has been amended several times since. The Forest Service, as a federal agency, is to document that its proposed management activities, whether implemented by the agency or other entities, conform to California's State Implementation Plan (SIP). California's plan established ambient air quality standards, and developed an "attainment", or "non attainment" classification for each air basin. The results of these classifications determine the appropriate amount of regulation and constraint imposed upon entities whose activities produce particulate emissions. The NCUAQMD has regulatory and licensing authority for burning. Regarding other non-point source emission occurrences, the AQMD regulates and licenses point source emissions, and responds to emission complaints lodged by the public on a case-by-case basis to determine the appropriate regulatory response.

Analysis Methods

The Forest Service uses information provided by the NCUAQMD for maintaining consistency regarding baselines used for the District's evaluation of the air basin. All potential emissions considered for this analysis are "non-point source". Air Basin air quality is measured in "PM10 attainment" standards. These standards are based upon the daily amount of particulates generated within the air basin that are 10 microns in width, or smaller. The NCUAQMD considers naturally occurring emissions as part of the total emission load for the District.

It is also the policy of the NCUAQMD to investigate all complaints which may result from air contaminant emissions. The purpose of complaint response is to determine the source of air pollutants which are affecting citizens within the AQMD and to determine whether the quantities and types of emissions are in compliance with all NCUAQMD Rules and Regulations including: emission limitations, requirements for permits and prohibitions against creating a public nuisance.

Outside of PM10, the measurement for this analysis is limited to the number of recorded non-compliance violations occurring on the Six Rivers National Forest within the North Coast Air Basin. A positive response regarding this issue will reflect the potential for continued "non attainment" thus not meeting the goals of the NCUAQMD.

3.2.2 Existing Condition and Environmental Effects

Introduction

This section describes the current conditions that are affecting air quality and the potential actions that may affect air quality attainment standards used by NCUAQMD.

3.2.2.1 Existing Condition – Status of North Coast Air Basin Regarding Particulate Emissions (PM10) and Ambient Air Quality Standards

Currently, the entire North Coast Air Basin is in “non attainment” for state standards of PM10. Air basin air quality is generally considered good, with all Federal standards consistently achieved (including those for ozone, carbon monoxide, particulate matter, and nitrogen dioxide). The “non attainment” state classification is based upon more stringent standards established by the California Air Resources Board in the development of the state-wide implementation plan. Results of a source monitoring study by the NCUAQMD have attributed substantial amounts of PM10 to sea salt and to auto emissions, with smoke being a minor contributor (Six Rivers LRMP EIS 111-12). No other standards have been established regarding ambient air quality.

Generally, the measurement of PM10 emissions has been recognized as an important benchmark in determining air quality effects on human health. Airborne particles larger than 10 microns get trapped by the human body’s normal defense mechanisms and are expelled from the body. PM10 bypasses these defenses and remains lodged deep in the lungs. Detrimental health effects of PM10 particulates can include asthma attacks, reduced lung function, aggravated bronchitis, respiratory disease, cancer and possible premature death. Immediately affected by PM10 emissions are the elderly, children, asthmatics, and people with chronic heart or respiratory disease.

3.2.2.2 Effects of Alternative 1 on the Status of North Coast Air Basin Regarding Particulate Emissions (PM10) and Ambient Air Quality Standards

A source of PM10 emissions is smoke. Wildland fires will continue to generate smoke, directly to the project site, and more importantly, indirectly to the entire air basin and beyond, regardless of the alternative. Auto emissions will continue to be a primary non-point source of particulates within the air basin and the project site. Sources of non-point particulates (not generated by autos and point sources) within the air basin will continue to have a minor role in daily particulate load. The direct effects of dust and vehicle exhaust will continue to be occurring in low frequency, short duration, and with short-range particulate propagation from travel on existing roads. Cumulatively, the alternative would not affect the non-attainment rating of the air basin, because of the nature of wildland fire events that occur with seasonal regularity throughout the air basin.

3.2.2.3 Effects of Alternative 2 and 3 on the Status of North Coast Air Basin Regarding Particulate Emissions (PM10) and Ambient Air Quality Standards

Dust emissions and PM10 loads will be affected by the establishment of any road and would increase. The minor contribution of this increase in emissions will not change the overall status given to the air basin described by the existing conditions. Dust will continue to be occurring in low frequency, short duration, and short-range particulate propagation.

Other activities associated with these alternatives include the use of vehicles and equipment that create airborne particulates; however the state regulates limiting the amounts of particulates produced by the equipment in the design and construction at the source of manufacture and sale, and not at the location of use.

Neither alternative proposes to generate smoke. The actions described by the alternatives, that is, the construction of a road, does have the potential to reduce the size and intensity of a free-burning wildland fire occurring below the road, thus reducing the total amount of particulate emissions by limiting the spread of the fire. Ground-based fire suppression resources rely upon an efficient means to access fires. The availability of roads near fires tends to better maximize suppression effectiveness, thus creating the potential to reduce emissions. Cumulatively, the alternative would not affect the non-attainment rating of the air basin. This is due to the nature of wildland fire events that occur with seasonal regularity throughout the air basin.

3.2.2.4 Effects of Alternative 4 on the Status of North Coast Air Basin Regarding Particulate Emissions (PM10) and Ambient Air Quality Standards

Dust will play a role regarding particulate emissions in this alternative. The contribution of this increase in emissions will not change the conditions described by Alternative 1. Dust will continue to be occurring in low frequency, short duration, and short-range particulate propagation.

Vegetation removed to build the service landing and vegetation removed from logs at the drop zones would be piled and burned therefore, this alternative proposes to generate smoke. Smoke generation will contribute to the daily emission load for the air basin on a low frequency, short duration, and relatively restricted range of propagation. The sensitivity of smoke is measured to sensitivity receptors. These are especially focused on children and the elderly. The nearest sensitivity receptor is Burnt Ranch school, which is farther than 5 ½ miles away.

Although there will be no benefit from road construction regarding maximizing suppression effectiveness, the establishment of landing zones for helicopters will positively

benefit suppression efforts on fires away from existing roads. Utilizing the landing zones for these types of fires has the potential to reduce the size and intensity of a wildland fire, thus reducing total emission loads. Cumulatively, the alternative would not affect the non-attainment rating of the air basin. This is due to the nature of wildland fire events that occur with seasonal regularity throughout the air basin.

3.2.3 Summary of Cumulative Effects

In consideration of all the alternatives, air quality will continue to be of great importance regarding human health. The project alternatives will not affect the current status of PM10 daily emission loads within the North Coast Air Basin using the current and foreseeable regulatory constraints provided by the NCUAQMD.

3.3 Botany

3.3.1 Introduction

The species addressed in this section include Forest Service (FS) Sensitive species. Surveys have been conducted for vascular and non-vascular plant species where soil disturbance would occur. As a result of the surveys, no FS Sensitive vascular or lichen plant species were detected. In light of the negative finding, this project will have no direct or indirect effects on any FS Sensitive vascular or lichen plant species and therefore, will not be analyzed further in this document.

There were no threatened or endangered species habitats found during surveys; therefore they will not be addressed further for this project. The information in the botanical section below is a summary of the more detailed biological evaluation for botanical species, which is contained in the project file.

Scope of the Analysis

The scope of analysis for direct and indirect effects under Alternatives 2 and 3 includes the area affected by road reconstruction and construction. Specifically, the scope coincides with the reconstruction and upgrading of approximately 855 feet of an existing low standard road, clearing of right-of-way vegetation including removal (40,000 board feet) of merchantable Douglas-fir and ponderosa pine trees, and construction of approximately 3,926 feet of new road after clearing. Total area disturbed under either alternative is 1.8 acres. For alternative 4, 2 acres of a previously disturbed site off of route 5N07 would be cleared for a helicopter landing, as well as approximately 6 acres of clearing in a 20-30 year plantation.

From a cumulative perspective, it is recognized that activities spanning the full range of FS Sensitive plant and fungi species have affected the habitats that support these species. For example, reduction in the extent and distribution of late and old-growth forest habitat across California, Oregon, Washington and Idaho, would affect population and population dynamics of mountain lady's slipper (*Cypripedium montanum*) and the encroachment of conifers into oak woodlands due to decades of fire suppression practices would affect habitat quality the Sensitive lichen species, *Sulcaria badia*. However, without specific information on distribution of plants within these habitats and the relation of the habitats to a specific activity, analyzing cumulative effects becomes rather speculative.

For this project, the spatial context for cumulative effects analysis is the known distribution of FS Sensitive species' populations across the planning unit (i.e. the Forest). This scale is appropriate because information is available for activities relative to the Forest that may have affected a particular population and thus a basis for cumulative effects and the planning unit is the context in which a determination in a biological evaluation is made.

The temporal context for cumulative effects analysis corresponds with the period of time that the species was first tracked and managed on the Forest to the period of time coinciding with foreseeable future actions on public and private lands (see Section 3.1.6 Past, Present, and Foreseeable Future Actions). The context for past activities varies by taxonomic group. The Sensitive species program on Six Rivers National Forest began in the late 1970s to early 1980s for vascular plants only. Non-vascular (bryophytes and lichens) and fungal species have only been listed as Sensitive within the past year. For these latter taxonomic groups, the temporal context for past activities would coincide with the past 2 years.

Regulatory Framework

Current policy for FS Sensitive species as stated in the Forest Service Manual includes the following:

- Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on national Forest System lands (FSM 2670.22).
- Avoid or minimize impacts to species whose viability has been identified as a concern (FSM 2670.32).
- If impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole. The line officer, with project approval authority, makes the decision to allow or disallow impact, but the decision must not result in

loss of species viability or create significant trends toward Federal listing (FSM 2670.32).

Current policy for FS Sensitive plants in the Six Rivers LRMP states that after completion of a biological evaluation for FS Sensitive plants, proposed actions will be prohibited if they are found likely to jeopardize the continued existence of species or the maintenance of viable populations throughout their existing range (LRMP S&G 6-2).

Analysis Methods

The Forest is obliged to manage for Threatened, Endangered, and FS Sensitive plant and fungi species, the latter being added in the last year. According to the U.S. Fish and Wildlife Service, Quarterly Species List (October 20, 2005, Document Number: 942397118-11046), McDonald's rock-cress (*Arabis macdonaldiana*) is the only federally listed species on the Forest. McDonald's rock-cress occupies barrens and outcrops primarily comprised of serpentinite bedrock. Habitat for this species is lacking in the project area so this species will not be further analyzed.

Species are included in the Region 5 (California) Forest Sensitive list by virtue of their rarity and degree of threat. Regional criteria used for listing species as FS Sensitive include a combination of Natural Heritage Rank, California Native Plant Society (CNPS) Ranking, California Department of Fish and Game Ranking, degree of threat, and other circumstances not expressed in the ranking. Typically, species identified as FS Sensitive have a Natural Heritage ranking of G1-G3 (species with less than 60 occurrences globally) and a CNPS ranking of 1B (rare with California and elsewhere). Exceptions to these conventions include species for which global rarity is not so much a concern as downward or tenuous population trends (e.g. mountain lady's slipper, *Cypripedium montanum*). While other rare taxa may be considered in project analysis, the Forest is only required to consider effects to FS Sensitive species.

The pre-field analysis included review of the FS Sensitive plant database and associated spatial layers of known occurrences relative to the project area, assessment of the vegetative sub-series and stand age in which the project occurs and the potential of the project area to support FS Sensitive species, elevation gradient of the project area, land-use history, and professional knowledge of FS Sensitive species habitat and distribution on the Forest. As a result of the pre-field review, there were no documented occurrences of any FS Sensitive species in the project area. However, based upon the vegetative sub-series, stand age, and knowledge of the species, potential habitat exists for a number of FS Sensitive species. Table 3-4 is a list of those FS Sensitive species for which potential habitat exists in the project area.

Table 3-4 List of Forest Sensitive Species considered for this project

Common Name	Scientific Name	Taxonomic Group	General Habitat
South Fork Mtn. lupine	Lupinus elmeri	Vascular plant	Early-seral
Howell's montia	Montia howellii ²	Vascular plant	Early-seral (with partial shade)
Trinity stonecrop	Sedum paradisum	Vascular plant	Outcrops
Not applicable	Dendrocollybia racemosa ¹	Fungus	Mature forest
Not applicable	Cudonia monticola ¹	Fungus	Mature forest
Not applicable	Phaeocollybia racemosa	Fungus	Mature forest
Not applicable	Sowerbyella rhenana ¹	Fungus	Mature forest
Not applicable	Tricholomopsis fulvescens ¹	Fungus	Mature forest (on wood)

¹Species are also Northwest Forest Plan Survey and Manage species; see section 3.3.2 under the header by that name for more information.

²Proposed for listing in 2006 revision.

Vascular plant surveys were conducted in the portion of the project considered suitable for FS Sensitive species, specifically the early-mature conifer habitat aligned with the project area slated for clearing and construction. A survey for FS Sensitive vascular plants was conducted on June 4, 2003 (T. Engstrom of Sierra Pacific Industries) at the time of the year when the vascular plants would be visible. Surveys for the one FS Sensitive non-vascular plant, *Sulcaria badia*, was conducted on May 19, 2006 (T. Carlberg Botanist, Six Rivers National Forest).

The 20-30 year old plantation and disturbed portion of the project area adjoining the portion of the project where road reconstruction is to occur is not considered suitable habitat for any FS Sensitive species and therefore was not subject to survey. Under Alternative 4, the proposed 6 acres of landing would also not constitute suitable habitat.

As a result of the surveys no FS Sensitive vascular plant species or FS Sensitive lichen species were detected. In light of the negative finding, this project will have no direct or indirect effects on any FS Sensitive vascular plant or lichen species.

Given the scope and scale of the disturbance associated with this project that may affect FS Sensitive fungi habitat (less than 1 acre) and the maintenance of potentially suitable habitat adjacent to the disturbed area, fungi surveys were not conducted. The rationale for this decision is discussed under the next section.

3.3.2 Existing Condition and Environmental Effects

Introduction

As was mentioned under the “Analysis Methods” section of this chapter, surveys were conducted for FS Sensitive vascular and lichen plant species and none were found; therefore, there will be no further discussion surrounding these suite of FS Sensitive species. Fungi (which fall into a category of species that are neither vascular or lichen species) were recently added to the FS Sensitive species list. The following provides introductory information about the habitat and ecology of the FS Sensitive fungi species considered in this project. This information along with the existing conditions provide the basis for analyzing effects of the four alternatives.

In addition to FS Sensitive species, background is provided below on species associated with the Northwest Forest Plan Survey and Manage Program. Survey and manage (S&M) species are those considered rare or uncommon, and associated with late-successional forests. Of the FS Sensitive species in Table 3-4, seven are also S&M species.

Northwest Forest Plan Survey & Manage Species

With the January 9th, 2006 court order NEA et al vs. Ray et al, Civ. No. 04-844P) ground disturbing activities need to comply or demonstrate consistency with the 2001 Record of Decision (ROD) and Standard and Guidelines for Survey and Manage Species (USDA and USDI 2001). Prior to this ruling, a number of Survey and Manage lichen, bryophyte and fungi species transitioned to the Regional Forester’s Sensitive Species list for Six Rivers National Forest (USDA and USDI 2004). Plant and fungal species that transitioned are addressed in this section.

Compliance or consistency with the 2001 ROD involves application of existing Management Recommendations to any known sites potentially affected by project activities and pre-disturbance surveys for those species listed as Category A or C (USDA and USDI 2001). The following addresses compliance or consistency by taxonomic group.

Plant and Fungal Species

Review of the 2001 data for known sites of plant or fungal species on Six Rivers National Forest indicated that none were located within the SPI Road project area.

According to the last Annual Species Review undertaken for the 2001 ROD (Implementation of 2003 Survey and Manage Annual Species Review, Table 1-1, December 19, 2003), there is only one fungus (*Bridgeoporus nobilissimus*) requiring pre-disturbance surveys and that fungus has not been documented in California nor does the project area support potential habitat for the species. Of the bryophytes requiring pre-

disturbance surveys, none have ranges or habitats that overlap the project area. Pre-disturbance surveys were conducted for two vascular plant species with potential habitat in the project area, specifically, fascicled and mountain lady's slipper (*Cypripedium fasciculatum* and *C. montanum*). None were located in the course of the survey.

Fungi

The fungi species listed in Table 3-4 can be divided into two groups: saprobic and mycorrhizal. *Cudonia monticola*, *Dendrocollybia racemosa*, and *Sowerbyella rhenana* are saprobic meaning that they are decomposers, thriving on the litter and duff of the forest floor. *Tricholomopsis fulvescens* decomposes wood. Relatively shady and moist to mesic mature stands with various sized litter (including some coarse woody debris) describe the habitat for saprobes. *Phaeocollybia olivaceae* is mycorrhizal. Mycorrhizal fungi form interdependent relationships with their host tree, exchanging nutrients, mineral and water. Similar to saprobes, shady, mature stands with conifer or hardwood hosts characterize the habitat for this mycorrhizal species. Management that retains living trees (the host) and the important underground linkages for mycorrhizal fungi via the mycelial network will maintain habitat parameters for mycorrhizal species (Amaranthus and Perry 1994). Likewise, management that retains overstory canopy and the litter and coarse woody debris of the forest floor will maintain habitat parameters for saprobes (Norden et. al. 2004). While forest clearing and road construction degrade habitat for FS Sensitive fungi, the impacts expected in the project area would be very localized, occurring over less than 1 acre of potential habitat. It is likely that mycelial networks (the underground body of mycorrhizal fungi) would not be completely disrupted by the scale of disturbance. Habitat components for saprobes and mycorrhizal fungi (litter, organic layer, coarse woody debris, host trees, shade) will remain intact beyond the road prism, thereby providing sites for spore dispersal and maintenance of the mycelial network. These species and potential project effects are analyzed further in the Biological Evaluation for this project (Hoover 2006).

3.3.2.1 Existing Condition

As stated in the "Analysis Methods" above, there is no potential habitat for any Threatened and Endangered species and no FS Sensitive vascular or lichen plant species were found as a result of field surveys. Existing condition and environmental effects in this section will focus on FS Sensitive fungi species only.

A 20-30 year old plantation aligns the portion of the road subject to reconstruction. The landing locations under Alternative 4 have also been previously disturbed. Given the previously disturbed characteristic and early seral stage condition, these portions of the project area are not considered suitable habitat for any species listed in Table 3-4.

The portion of the project subject to new construction dissects an early mature stand in the Douglas-fir-Black Oak vegetative sub-series. A small portion of the new construction will occur in an early mature stand in the Canyon live oak-Douglas-fir vegetative sub-series and the White oak-Douglas-fir sub-series. Presumably wildfire has influenced the tree age distribution and structure of the existing stand, but other than wildfire, the stand has not been previously disturbed by logging or other anthropomorphic activities. As a mature stand with a hardwood component, suitable habitat exists for five fungi species (Table 3-4).

Indicators of effects to fungi are the level and intensity of ground disturbance, and extent of canopy opening. For the fungi species (Table 3-4), the activities in the proposed action that would influence these indicators is the clearing and road construction which involves removing mature conifer trees and hardwoods, and removing all understory vegetation, coarse woody debris, litter, other forest floor organics. Since these indicators are associated with a connected action (i.e. vegetation clearing to build a road), they will be treated as one indicator and discussed by taxonomic group.

3.3.2.2 Effects of Alternative 1 and 4 on Fungi

Alternative 1 is the no action alternative and Alternative 4 relies upon helicopter logging. Under both alternatives, no vegetation would be removed within potential habitat; therefore, there would be no effects to FS Sensitive species under these alternatives.

3.3.2.3 Effects of Alternatives 2 and 3 on Fungi

Both alternatives would lead to the removal of overstory trees, understory vegetation, and forest floor vegetation and organics; therefore, effects to fungi species do not vary by alternative. Alternative 3, in its development of a temporary road with subsequent obliteration and rehabilitation, slightly improves the condition for FS Sensitive fungi species in the long-term by increasing potential for conifer establishment that provides active root tips for fungal inoculation.

Given the localized extent of the disturbance, the maintenance of intact vegetation and suitable habitat adjacent to the road right-of-way, the effects to fungi are expected to be minimal to non-existent. It is assumed that the localized alteration of habitat in association with intact habitat conditions adjacent to that area of disturbance would still allow for maintenance of the mycelial network for fungi and suitable micro-habitat conditions for spore dispersal. With this assumption, “individuals” (given that the body of the fungi is underground or nested in the substrate and consists of a mycelial network, “individual” is used here to represent the sporocarp or above-ground fruiting body) may be affected by the activity but would not affect the species in the area.

3.3.3 Summary of Cumulative Effects

Since there are no effects to fungi species as a result of implementing Alternatives 1 and 4, there are no cumulative effects relative to this project under these alternatives. Alternatives 2 and 3 would potentially affect suitable habitat, therefore, cumulative effects will be discussed relative to these alternatives and associated activities.

The activities identified for cumulative effects analysis in Tables 3-1, 3-2, 3-3 and in Section 3.1.b above coincide with the 7th field watershed. Given the geographic scale for analyzing cumulative effects for FS Sensitive species (i.e. range of species on Six Rivers), other reasonably foreseeable future actions will be considered in this cumulative effects analysis.

Fungal species have only been listed as FS Sensitive since 2004. For the fungal species identified in Table 3-4 above, the temporal context for past timber actions identified in Table 3-2 that span 1973-1992 do not apply.

Activities on Forest Service Land

The past and present actions on Forest Service lands identified in Tables 3-1 that may have cumulatively affected these species was the Sims Wildfire and associated suppression activities. Prior to the Sims Wildfire, there were no documented occurrences of the fungi species noted in Table 3-4; however, both of these activities altered the habitat conditions that support fungi (e.g. burning of the duff, litter; loss of canopy cover).

Besides the reasonable foreseeable future activities on Forest Service land listed in Tables 3-3, other activities identified on the Schedule of Proposed Actions (January 2006) within the range of the FS Sensitive species on Six Rivers National Forest that support potential habitat for FS Sensitive fungi species include: Hiouchi Community Protection Project (CPP), Knoptki Creek Restoration Project, Sunset Fuel Break, Wilder Fire Salvage, Mill Creek Fuels Reduction Project, Trinity River CPP, and Little Doe/Low Gulch Timber Sale. Any present or reasonably foreseeable future activities on Forest Service System Land within the range of the species on the Forest would be subject to analysis, possible survey, and evaluation in conjunction with development of a Biological Evaluation. Mitigations or project design features would be established to minimize direct and indirect effects on species, therefore, reducing the cumulative effects to FS Sensitive fungi species. Cumulative effects are described further in the Biological Evaluation for this project (Hoover 2006).

Activities on Private Land

Fungi species are currently not subject to management on private lands, therefore, protection is not afforded to these species relative to past, present and reasonably foreseeable future activities. Specifics on past activities on private land across the range of

FS Sensitive fungi species on the Forest are not available, and since effects on these species vary by intensity of activity, determining any level of effects is speculative.

Reasonably foreseeable future actions include logging 138 acres of mid-mature and late-mature stands and constructing 1.5 miles of road by Sierra Pacific Industries (Table 3-3). Of those acres to be logged, 45 would be clearcut which basically removes all the habitat components or otherwise degrades the habitat associated with FS Sensitive fungi species. By significantly altering habitat conditions for fungi, this private land logging contributes to the cumulative effects of these species. Since clearing of a stand so notably degrades habitat conditions, it is assumed that the effects of any associated activities (e.g. broadcast burning, herbicide application) are relatively inconsequential.

Thinning or selective harvesting is proposed for 93 acres. The cumulative effects associated with a thinning prescription while considered less compared to clearcutting, is dependent on the intensity of thinning, essentially, the degree to which the stand is open and understory habitat components are affected (e.g. drying of the forest floor, retention of litter and coarse woody debris). The intensity of broadcast burning or the extent of coarse woody debris consumed in burn piles are variables that would influence the level of effects for FS Sensitive fungi. Essentially, thinning and selection prescriptions, as well as associated burning, may or may not reduce habitat quality for FS Sensitive fungi species.

SPI proposes to use herbicides (e.g. glyphosate) on approximately 45 acres at certified rates. Non-selective herbicides are potentially detrimental to non-target species. Effects of glyphosate to fungi, specifically ectomycorrhizal fungi of which *Phaeocollybia olivaceae* is a member, have been shown to inhibit fungal growth (Carlisle and Trevors 1988); however, effects on mycorrhizal function were not studied.

The risk of cumulative effects as a result Forest Service activities occurring within the range of FS Sensitive fungi species on Six Rivers is expected to be minimal for these species as a result of past, present and reasonably foreseeable future activities. The procedure for project analysis (e.g. field survey, habitat assessment), the Forest emphasis on thinning (compared to clearcutting) and other low intensity activities, in conjunction with project design features or mitigations to alleviate effects to FS Sensitive species all reduce the risk of cumulative effects.

Since no protection is currently afforded fungi species on private timberland, it is expected that continued clearcutting and associated activities (e.g. road construction) and practices would contribute to the cumulative effects. This intensity of these activities and the resultant alteration of habitat is somewhat off-set by the presence of potentially suitable habitat for FS Sensitive fungi species on Forest Service lands adjacent to or surrounding private timber land.

The risk of direct, indirect and cumulative effects is summarized on the next page.

Table 3-5 Summary of risks to Forest Service Sensitive fungi species by effects and alternative

Resource and Effect Level	Indicator	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Temporary Road	Alternative 4 Helicopter
Direct/ Indirect	Acres of ground disturbed with removal of overstory canopy, understory vegetation, coarse woody debris, litter, other organics	No Risk	Low Risk	Low Risk	No Risk
Cumulative		Moderate Risk	Moderate Risk	Moderate Risk	Moderate Risk

3.4 Fire and Fuels

3.4.1 Introduction

Fire history information and other evidence indicate that fires have regularly occurred within the South Fork of the Trinity River drainage where this project is proposed. Data show that the mean fire free interval for the Lower Trinity Ranger District is 16.2 years in the mixed evergreen forest component (Adams and Sawyer 1980). This indicates that fire has been the dominant natural forest disturbance factor, both in frequency and scope.

Free burning wildland fires derive their existence from three broad components being available at the same place and time:

- an available source of combustible fuel
- oxygen, supplied by the atmosphere
- an ignition source

This combination initiates fire and the highly variable results of the natural phenomena on the human and natural environment. The short list of required elements for fire limits human activity to modify it to:

- Reducing the number of ignition points (or extinguishing those already there), or
- Removing (or changing the characteristics of) the source of fuel.

This analysis will present the current regulatory direction in use regarding wildland fire, and activities in the future affected by the project alternatives being considered.

Scope of the Analysis

The analysis area for fire and fuels includes the Hog Ranch-Underwood subwatershed (7th field hydrologic unit code-HUC). Cumulative effects include human activities and disturbance by wildland fire in the foreseeable future within the Hog Ranch-Underwood subwatershed, but a majority of the impacts are specific to the project area.

Regulatory Framework

Authorities and policy references, and a brief narrative of their uses, can be found in the 2005 Six Rivers National Forest Fire Management Plan, Section 1, E.

The appropriate management direction (developed with these regulations and policies in mind) is described in the Six Rivers Land and Resource Management Plan.

Analysis Methods

Data collected, and more importantly, the modeled effects of the data, used standard accepted procedures used for planning and implementing a federal wildland fire management program. The methods used include formulations to estimate fire effects on the vegetation within and adjacent to the project site.

Weather conditions dramatically affect fire behavior by wetting and drying fuels (affording their availability to burn), and creating air movement that affects the availability of fuels to be burned, enhances oxygen availability, and enhances spotting potential (new ignition sources) for additional new fires. The time of the year and the time of day a fire burns also plays a role in fire behavior. Seasonal and diurnal variations affect the amount of fuel moisture present in vegetation. Modeling for weather conditions and time of year have been developed and used in planning documents to provide a “snapshot” of weather conditions to reference potential fire effects. A good reference exists that describes the modeling process (see the Lower South Fork Trinity River Watershed Analysis, Chapter III, pg. 39). Similar to that analysis, the strategy used here reviews one scenario representing fire behavior for the middle of August. This time period represents weather conditions similar to the “average extreme” conditions found throughout any given annual season of fire. Flame lengths will be modeled, and associated with stand mortality.

3.4.2 Existing Condition and Environmental Effects

Introduction

Wildfire and timber management have shaped the vegetation composition of the project area, resulting in a varied assortment of species combinations and age classes. Other human activity associated with timber harvest has created roads that generally break up the continuity of vegetation and the debris associated with the vegetation. Natural

breaks in fuel continuity exist as rock outcrops and large expanses of rock not conducive to vegetative growth.

This section will describe the effects within the context of the tree species management as described by standards established in the Six Rivers Land and Resource Management Plan. Generally this concept is consistent with an analysis affecting specifically late-Successional and old-growth characteristics, and other areas with an economic timber value. This section will describe the effects of the various actions proposed by the alternatives, and analyze the effects of the alternative on the existing conditions.

3.4.2.1 Existing Condition – Fire Hazard and Tree Mortality from Wildland Fire

Fire hazard pertains to projected fire behavior and subsequent suppression effectiveness once a fire starts. A certain pattern of succession begins after wildland fires occur. After a stand replacement fire, Douglas-fir regenerating on the site may survive several low to moderate severity fires that thin the Douglas-fir, remove the understory and top kill the associated hardwoods such as madrone, oaks, and tanoak. Recurrences of such fires will create stands with several age classes of Douglas-fir and hardwoods representing regeneration after the last disturbance. Within the project area, very little understory exists in early-mature, mid-mature, late mature, and old growth stands. Coarse woody debris on the forest floor is present due to the singular degeneration of trees that die and their boles eventually have become horizontal on the forest floor. The project area reflects this type of disturbance and although historical records show only 17 fires in the subwatershed (1910-2005), the stands generally are of early-to-mid mature seral stage development that reflect more vigorous disturbance patterns occurring prior to record keeping.

A comparison of seral stage distribution to climatic data can define when catastrophic events of stand replacing fires were most prevalent. The present seral stage distributions for the project area shows the dominance of early mature and mid mature seral stages where soils and geology are conducive to stand growth (and where timber management actions have not occurred). This suggests disturbance patterns affecting a good portion of the subwatershed where stand replacing fires occurred. This major stand replacement disturbance was further exacerbated by the fact that the climate of the times of the potential disturbances were in cycles of drought between 1860 and 1890.

Human Intervention – Suppression

Since the 1930's, with the influx of a Civilian Conservation Corps workforce, fire suppression efforts in the Forest Service improved dramatically. Firefighting effectiveness since that time has been enhanced with an infusion of better technology, and improved access by land and air into the hinterland. The increase in fire fighting efforts and

accessibility have helped lead to the decrease in the number of acres burned. The largest recorded fires within the subwatershed occurred in two separate years, 1966 and 1922 and burned two acres each. The severity of these fires is unknown.

Since the beginning of fire recordkeeping (1910), there has been only one unintentional human caused fire within the subwatershed. The exact cause of this 1922 wildfire was undetermined, and it was coded as “miscellaneous.” These 95 years of fire records show that there has been limited potential for human-caused fires within this subwatershed, even after the construction of roads into the area in 1973 (USDA). Based upon this data, there has been little to no change regarding human-caused fire starts – even after the construction of roads into the subwatershed in 1973.

Human Intervention – Vegetation Management

Although American Indians, and later ranchers burned nearby areas to increase the health and vigor of plants, no recorded events of this nature occurred within the subwatershed. There is evidence here of human presence. A ranch was developed in the late 1880’s and there is evidence of American Indian seasonal camps used in the subwatershed prior to that. It is not unreasonable to assume that the few old fire scars observed within the subwatershed outside of known wildland fire sites were human-caused (USDA, 1996).

Between 1973 and 1983, human intervention in the subwatershed was focused on activities of road construction and timber harvest. These activities changed the composition and makeup of vegetation and flammable debris associated with the stand. Immediately after activities of road construction and timber harvest the effects are exacerbated. After mitigation measures, such as burning or removal debris, and natural decomposition of fuel occurs, road construction enhances suppression effectiveness. The act of timber harvest changes the physical characteristics of the vegetation by removing it and therefore causing a seral stage change. This means fewer and usually shorter trees are left on the landscape. The lowest scorch heights modeled are 16 feet in height, which has an outcome of moderate to extreme mortality rate (50% - 90%) in this type of vegetation (BEHAVE runs located in the project file).

Douglas-fir and tanoak series within the project area have never been managed to maintain the primeval fire influence (USDA, 1996). The stands within the subwatershed have had their natural fire regime altered by forest management practices, including aggressive fire suppression and too little natural prescribed fire. There is a higher probability of a shift to a high severity fire regime in all of these stands due to these management practices.

Since the time of road construction and timber harvest, minimal human interaction has occurred, including thin and release actions within harvest sites, road maintenance

(including road decommissioning and road upgrades), a remote automatic weather station installation, and gate construction to seasonally restrict public access.

Current Vegetative Conditions Contributing to Potential Stand Loss

The “average extreme” weather conditions, coupled with the existing vegetative characteristics, are described in the Lower South Fork Trinity Watershed Analysis. High (4-6 feet), Very High (6-8 feet), and Extreme (flames greater than 8 feet) flame length potential cover an estimated one-half of the project area, excluding private property (see Appendix A – Maps). Modeled scorch heights range from 16 feet to 70 feet. Using data derived from forest inventories, canopy scorch in modeled mature stands such as those in the project area would contribute to a range of 9-91% mortality of all trees within the stands. This range is indicative of the moderate fire regime in the project area (USDA 1998).

3.4.2.2 Effects of Alternative 1 on Fire Hazard and Tree Mortality from Wildland Fire

Direct, Indirect, and Cumulative Effects: This alternative would have no effect on the existing potential fire hazard conditions or tree mortality.

3.4.2.3 Effects of Alternatives 2 and 3 on Fire Hazard and Tree Mortality from Wildland Fire

Direct and Indirect Effects: The actions described for both alternatives have no direct effects on fire hazard potential or tree mortality from wildland fire. The action removes all trees and other flammable material from the roadbed and deposits the material adjacent to the road. Indirectly, fuels created by the activity will affect the adjacent stands near the road, due to the proposed fuel hazard abatement method of lop and scatter. This method will retain debris within the adjacent stands until such time that natural deterioration (without fire), or consumption (with fire) of the material occurs. This increase in flammable material (available fuels) will result in a localized increase in flame heights and heat intensities in the event of a wildland fire within seven to ten. It may affect localized flame length ratings, but not outside the range of modeled flame lengths of the area classified as high-to-extreme (see Appendix A – Maps). These conditions already exist on over 500 acres adjacent to the road construction site. Cumulatively, the increase in current mortality conditions is negligible. Even though there is a potential for increase localized mortality in the event of a wildland fire (from the debris abatement methods considered), the construction of a road that removes flammable material will moderate the effects of a fire’s spread and intensity (thus flame length). The actions of either alternative will not affect the fire regime classification of the area.

Regarding any effects associated with increased ignitions due to increased human activity within the project site, short term risk is associated with the construction of the

road and subsequent use of the road by the adjacent landowner. This risk is of relatively short duration, and the intended use of the road will be regulated to include assurances of fire suppression equipment availability during construction. Standard permissions for construction activities include appropriate responses to weather that affects potential fire starts, including shutting down operations during high fire danger, the posting of patrol personnel, and similar precautionary actions. The prescribed gate construction (see Section 2.2.2 item (1) above) associated with these alternatives is an appropriate response to the issue of restricting public traffic on this road during times when the road is not used for its intended purpose. Restricting traffic is an efficient means of restricting human ignitions.

The actions described by the alternatives, that is, the construction of a road, does have the potential to reduce the size and intensity of a free-burning wildland fire occurring below the road, thus reducing the total amount of particulate emissions by limiting the spread of the fire. Ground-based fire suppression resources rely upon an efficient means to access fires. The availability of roads near fires tends to better maximize suppression effectiveness, thus creating the potential to reduce emissions.

3.4.2.4 Effects of Alternative 4 on Fire Hazard and Tree Mortality from Wildland Fire

Direct and Indirect Effects: This action describes activities that affect locations within the project area where helicopters will haul material from private land and service their equipment. Direct effects of this alternative are that creation of flammable vegetation when land clearing activities are completed. This alternative prescribes the removal of the debris as part of the land clearing, and any other natural flammable debris created by its use.

The actions considered by this alternative do not have a direct effect on tree mortality from wildland fire. Indirectly, the action will provide an increased available fuel supply until it is removed by burning. Part of the service landing clearing prescription will include the assurance of control lines around the debris piles until they are burned (Appendix C - Mitigations).

The location of the cleared area is adjacent to the existing road, and will enhance the effectiveness of that road in moderating fire behavior for up to 10-15 years. By breaking up the continuity of the fuel bed, the localized indirect effects of the cleared area within the pole-stage stand of trees will enhance their chances of living through a wildland fire. The use of the cleared landing as intended after timber harvest would aid in the deployment of suppression forces. This is a slight improvement in suppression effectiveness. Cumulatively, the actions proposed have little bearing on changing the existing conditions affecting the survival of tree stands.

3.4.3 Summary of Cumulative Effects

This project as proposed would have a slight improvement in suppression effectiveness, although the actions proposed have little bearing on changing the existing conditions affecting the survival of tree stands. The increase in current mortality conditions is negligible. The action alternatives would not affect the fire regime classification of the area. The effects of any of the actions alternatives are negligible and minor.

3.5 Fisheries

3.5.1 Introduction

The elements addressed in this section include stream conditions and aquatic species found in areas potentially affected by the proposed actions along with the affects of the project on those species and their habitats. See Section 3.1.6 above for a list of projects considered under this action. Species that will be addressed in this analysis include threatened and Forest Service sensitive fish species.

Scope of the Analysis and Analysis Methods

The proposed action would allow the construction or reconstruction of a roadway to cross four Riparian Reserves with two ephemeral streams and two intermittent/perennial streams that are tributary to Underwood Creek. The anadromous habitat in Underwood Creek is located approximately 1.8 miles downstream of the project area.

A biological analysis and biological evaluation (Fisheries BA/BE) for listed fish species was completed for this project on August 18, 2005 (contained in the project file at the Lower Trinity Ranger District in Willow Creek, California, copies available upon request). This BA/BE analyzed direct, indirect and cumulative effects to threatened and sensitive anadromous fish species at the local scale (Underwood Creek watershed) through the larger Hog Ranch Underwood Creek watershed scale (7th field HUC), which includes a portion of the lower South Fork Trinity River (6th field HUC). This is a logical analysis area to assess cumulative effects to fish as the South Fork Trinity River is a key portion of the habitat and range of coho and Chinook salmon and steelhead trout; these fish are reliant on thermal refugia provided by South Fork tributaries. The BA/BE examined the short-term impacts of the project as well as any long term cumulative impacts. The analysis relies on the cumulative effects analysis for water quality impacts addressed under the 3.7 Hydrology.

Consultation in areas covered by the Northwest Forest Plan (NWFP) is conducted under the “Streamlined Consultation Procedures for Section 7 of the Endangered Species

Act” (USDA et al., 1999). A new “Analytical Process” was developed to facilitate consultation on federal actions affecting fish proposed or listed under the ESA within the Northwest Forest Plan Area (USDA et al., 2004). The analytical process (Process) components are designed to facilitate and standardize evaluations of actions and effects determinations for conferencing or consulting under the Section (§)7(a)(2) of the Endangered Species Act (ESA), focusing on salmonid fishes. The information developed through this Process generally also satisfies the information requirements for Essential Fish Habitat (EFH) consultation for Pacific salmon under Magnuson-Stevens Fishery Conservation and Management Act (MSA) and its implementing regulations (50 CFR Part 600) when the species is also listed under the ESA. The August 18, 2005 Fisheries BA/BE was created under this Process.

Regulatory Framework

See section 3.17 for applicable laws, policies, and management practices.

3.5.2 Existing Condition and Environmental Effects

Introduction

Fisheries health can be directly affected by environmental conditions such as water quality including temperature, sediment and physical habitat, which include large woody debris (LWD). Fisheries data for project analysis was derived from habitat condition inventories, presence/absence surveys, thermograph data, spawning surveys, and the Lower South Fork Trinity -WA (USDA, 1999). These factors were summarized in the August 18, 2005 Fish BA and will be used to discuss the impacts to fisheries below.

Existing conditions for water quality and watershed characterization and effects to both are described under Section 3.7 Hydrology in this document (below). The following is information regarding anadromous species potentially impacted by this project. For more detailed information, see the August 18, 2005 Fisheries BA/BE contained in the project file at the Lower Trinity Ranger District in Willow Creek, California. Copies are available upon request.

Federally Listed Species

Coho salmon and designated critical habitat

The Southern Oregon/Northern California Coasts (SONCC) coho salmon (*Oncorhynchus kisutch*) evolutionarily significant unit (ESU) was listed as threatened under the ESA (62 FR 24588). The South Fork Trinity River and its accessible tributaries are listed as SONCC coho critical habitat. Critical Habitat (CH) was designated in 1999 and includes all currently occupied habitat, therefore, approximately 1,000 feet of

Underwood Creek from its confluence with the South Fork Trinity River upstream to a natural waterfall barrier was designated.

General coho use extends upstream into Hayfork Creek, and downstream to Madden Creek near the confluence of the mainstem and South Fork Trinity Rivers. Coho salmon utilize the mouth of Underwood Creek approximately 1.8 miles below the project area, but are excluded from the direct project area by a natural barrier (waterfall) located below the proposed activity (see Fisheries BE/BA for more details). This lower section serves as a cold water refuge because of the temperature impaired South Fork Trinity River.

Past surveys conducted by USFS, CDF&G and their partners have found low numbers of Coho salmon in the mainstem South Fork Trinity River (Lower South Fork Trinity WA, 1999).

Region 5 Forest Service Sensitive Species

Spring-run Chinook salmon (Upper Klamath-Trinity Rivers ESU)

Spring Chinook (*Oncorhynchus tshawytscha*) utilize the South Fork Trinity River extensively to access spawning gravels within the river and its tributaries (Garrison, 2004). CDF&G data was collected by summer steelhead/spring Chinook direct observation snorkel surveys from the East Fork of the South Fork Trinity to Sandy Bar, near the confluence of the mainstem Trinity River.

A ten-year data set (Garrison, 2004) reveals a decrease in the numbers of adult and jack spring Chinook salmon. Although the data set is too brief for robust statistical analysis, these numbers are well below those escapement targets defined in the South Fork Trinity and Hayfork Creek Sediment TMDL.

Fall-run Chinook Salmon (Upper Trinity River ESU)

Fall Chinook (*Oncorhynchus tshawytscha*); the principle distribution of the fall-run Chinook runs is presently in the Klamath, Salmon, and Trinity Rivers, including the South Fork, North Fork, and New River (Moyle, 2002). Fall-run Chinook salmon escapement estimates for the South Fork Trinity River range from a high of 2,640 fish in 1985 to a low of 345 fish in 1990 (Jong and Mills, 1992). Natural populations of fall-run Chinook in this ESU have failed to meet modest escapement goals (Federal Register 63(45): 11481-11520, March 9, 1998).

Steelhead trout (Klamath Province ESU)

Steelhead (*Oncorhynchus mykiss*), which includes non-anadromous rainbow trout, is distributed from southern California north to Alaska. In California, steelhead range coast-wide, but this ESU is specific to the upper and lower Klamath River system, including the Trinity River system and its tributaries, and the Rogue River system in Oregon.

Steelhead utilize approximately the first 1,000 feet of Underwood Creek from its confluence with the South Fork Trinity, and are specifically excluded from the project area by a natural waterfall barrier. This reach is located approximately 1.8 miles below the project area.

CDF&G has conducted surveys for a number of years to address concerns with steelhead trout and Chinook salmon in the South Fork system. (La Faunce, 1964; Jong and Mills, 1992; Garrison, 2002). South Fork Trinity Spring Chinook and Summer Steelhead dives occur from the East Fork of the South Fork to the mainstem Trinity River. Results from 2004 data indicate that presence fell below the 10-year average for both Chinook adults and jacks, and steelhead adults (29) and half-pounders (73).

3.5.2.1 Existing Habitat Conditions

Underwood Creek is poor spawning habitat, however, it does provide habitat for holding and migrating salmonids during higher spring flows, rearing habitat for juveniles prior to smolting and, most critically, provides cooler flows to the South Fork Trinity, a large migrational corridor where spawning does occur. Underwood Creek provides very modest thermal refugia to anadromous fishes at the South Fork Trinity confluence. The temperature average in this creek is 57° F. Mainstem water temperatures in the South Fork Trinity River are substantially elevated seasonally. The optimal temperature range for most salmonid species is approximately 53-57° F. Lethal temperature levels generally range from 68-77° F and have been recorded several times each summer over the past ten years at Mule Bridge on the South Fork Trinity River. Underwood Creek and tributaries within the South Fork Trinity WA have low fine sediment amounts. Ocular review of Underwood Creek from within the Sierra Pacific Industry special use permit application area and downstream to its confluence with the South Fork Trinity River (2002; 1982) indicate flow with negligible turbidity and little to no fine sediments within the gravel to cobble stream channel. Pool to riffle ratio from Underwood Creek's confluence with the South Fork Trinity River through the project area was assessed at 4:1 (Lancaster and Clark, 1982). The majority of pools reported in the stream surveys were found in the middle portion of the creek and were formed by large boulders. Given the assessment of LWD, pool frequency may be the natural state of Underwood Creek's configuration, with LWD providing less pool-building than is generally expected. Downstream of the barrier, substrate is largely cobble and boulder within a high gradient channel for all but the remaining 600 feet. In summary, the potential to increase temperature in the South Fork Trinity River, and to a lesser degree, increased sedimentation, are the pathways by which anadromous fish are most likely to be impacted.

3.5.2.2 Effects of Alternative 1 on anadromous fish

Direct, Indirect and Cumulative Effects: No action leaves the project area in its present condition. Alternative 1 provides a point of reference through development of an environmental baseline based on existing data. Because there would be no effect associated with no action, there would not be any cumulative effects. Present and foreseeable future actions as listed in Section 3.1.6 above, would continue to move forward and past actions would have occurred. The watershed would continue to support anadromous fish for the first 1,000 feet of Underwood Creek. The South Fork Trinity River as a whole would continue to be listed as impaired for sediment, and the Underwood Creek watershed would continue to provide cool clean water into it.

3.5.2.3 Effects of Alternatives 2 and 3 on anadromous fish

Direct and Indirect Effects: Due to the distance of TES fish habitat 1.8 miles downstream of the project area, there are no significant direct effects to TES fish species associated with Alternatives 2 and 3 although the project involves stream crossing construction and disturbance within riparian corridors. Indirect impacts to anadromous salmonids are negligible due to minor short-term sediment influxes due to road construction (Hydrology 3.7.2.3). These sediment pulses during road construction and maintenance may occur intermittently for a period of at least ten years. Any slight increase in temperature at the project site should be attenuated by tributary flow and undetectable in fish-bearing reaches in Underwood Creek and no increase to the South Fork Trinity River (Hydrology 3.7.2.8).

The Fisheries BA/BE also addressed potential impacts to other habitat indicators. In summary, clearance of riparian vegetation from the ROW at the crossings would have no measurable effects to suspended sediment, inter-gravel dissolved oxygen and turbidity, chemical contamination/nutrients, substrate character and embeddedness, pool frequencies or quality, large pools, off-channel habitat, physical refugia, the average wetted width/maximum depth ratio in scour pools from the project area to the South Fork Trinity. The proposed clearance of riparian vegetation would not alter peak/base flows, nor would it create barriers to fish passage downstream. Even with revegetation from alternative 3 the temporary road alternative, this would not alter peak/base flows. Overall the determination for the Fisheries BA/BE was that the project may result in some small impact; however the actions would not result in any measurable impact such that anadromous fish were adversely affected. NMFS concurred with this determination and the Forest received a letter of concurrence on September 29, 2005.

Cumulative Effects: Based on the CWE-ERA analysis (Hydrology 3.7.2.16), Alternatives 2 and 3 are not expected to lead to cumulative watershed effects and therefore, it is unlikely that the small amount of sediment generated over the life of this project will cumulatively impact anadromous fish individuals or populations addressed in this analysis.

3.5.2.4 Effects of Alternative 4 on anadromous fish

Direct, Indirect and Cumulative Effects: No direct or indirect impact, would occur to anadromous fish in Underwood Creek or South Fork Trinity River as there would be no action occurring within riparian reserves and any sediment generated from creation of landings would not be delivered to a watercourse (Hydrology 3.7.2.8 and 3.7.2.9).

3.5.3 Summary of Cumulative Effects

With negligible potential for direct or indirect effects, there are limited potential for added cumulative effects and no potential for adverse cumulative effects on anadromous fisheries resulting from the any action alternative. The project is expected to have negligible effects on SONCC coho salmon and its critical habitat nor is it likely to result in a trend towards federal listing or loss of viability of Forest Service Sensitive Species Chinook salmon (*Oncorhynchus tshawytscha*) or steelhead trout (*O. mykiss*).

Although there is the potential for SPI to use the herbicide glyphosate (round-up) as a site prep tool on less the 75 acres after harvest, there would be no cumulative effects. This is in part due to the natural barrier and the distance from it to the nearest unit on SPI lands, but also due to the application methods, the way in which round-up interacts with the soil and the lack of transport mechanisms to any water source (see Hydrology 3.7. and specifically Section 3.7.2.14).

3.6 Heritage

3.6.1 Introduction

Regulatory Framework

Section 101 of the National Environmental Policy Act (NEPA) requires the Federal Government to preserve important historic, cultural, and natural aspects of our national heritage. To accomplish this, federal agencies utilize the Section 106 process associated with the National Historic Preservation Act (NHPA). Passed by Congress three years before NEPA, the NHPA sets forth a framework for identifying and evaluating historic properties, and assessing effects to these properties. This process has been codified in 36 CFR 800 Subpart B. The coordination or linkage between the Section 106 process of the NHPA and the mandate to preserve our national heritage under NEPA is well understood, and is formally established in 36 CFR 800.3b and 800.8.

NEPA includes reference to "...important historic, cultural, and natural aspects of our national heritage." This terminology includes those resources defined as "historic properties" under the NHPA (36 CFR 800.16(1)(1)). Therefore, agencies use the NHPA Section 106 process to consider, manage, and protect historic properties during the

planning and implementation stages of federal projects. Locally, the Six Rivers National Forest uses a programmatic agreement (PA) between Region 5 of the US Forest Service, the California State Historic Preservation Office, and the Advisory Council on Historic Preservation to implement the Section 106 process.

Scope of the Analysis

Three levels of analyses were completed to understand the significant themes and extent of heritage resources associated with the SPI Road Project area. First, research into the greater history of the project area was conducted to understand historic themes or events that have transpired in time and space. Second, a heritage resource survey was conducted for the project area to identify cultural properties associated with these themes. Lastly, cultural properties were assessed to determine potential effects associated with implementation of the project. The results and relevant rationale for each of these analyses are presented below.

History of the Project Area

Following is a broad historical overview to help us understand the human or cultural mechanisms that have influenced the project area. Previous to historic times, Athabaskan-speaking people who were ancestral to the Hupa and Tsnungwe Tribes, occupied the area and probably had seasonal camps there. The first documented Euro-Americans to venture up the South Fork Trinity River were trappers led by Jedediah Smith in 1828. Smith's group reached Grouse Creek in April and spent a week traveling north to the mouth of the South Fork (Nelson 1978: 36-38). Euro-Americans continued to explore the region, but it wasn't until 1850, when gold was discovered on the upper Trinity.

Analysis Methods

Heritage resource data for the SPI Road Project is based on information available in the heritage resources files at the Six Rivers National Forest Supervisor's Office. The heritage resources files include literature pertaining to prehistory and history, site records, homestead applications, and atlases that show recorded site locations, previously surveyed areas, and other heritage resource data. Approximately 725 acres in and adjacent to the project area have been surveyed for prior projects. An intensive survey of the entire project area was completed during 2003, 2004 and 2006.

3.6.2 Existing Condition and Environmental Effects

Introduction

Cultural properties identified during literature review, inventories, or surveys were assessed to determine potential effects associated with implementation of the project. Results of the analysis are discussed below.

3.6.2.1 Existing Condition

Surveys or inventories resulted in the identifying two cultural resource properties within the proposed SPI Road Project. One site is related to prehistoric use and occupation of the project area. This site contains a stone tool assemblage indicating the area was utilized as a food processing and tool production station. The other site is related to historic homesteading that took place in the 1890s. The site is located on both private and public land, and only the portion that is located on public Forest Service-administered lands was recorded by Forest Service archaeologists. The site consists of a historic fence that delineates the approximate boundary between private and public parcels.

3.6.2.2 Effects of Alternative 1

The no action alternative (Alternative 1) is neutral, as no ground disturbing activities are proposed.

3.6.2.3 Effects of Alternatives 2 and 3

Ground-disturbing activities proposed as part of Alternatives 2 and 3, such as gate installation and road construction, would have the same level of effect to heritage resources. Alternatives 2 and 3 are the same because a temporary road would result in the same amount of ground disturbance as a permanent road. Heritage sites in the project area have been identified through surveys and avoided during design of the proposed road. The sites will be flagged prior to project implementation. Therefore, there would be no impacts on heritage resources from Alternatives 2 and 3. Monitoring would be done during project implementation to assure the identified sites are not disturbed. Because there are no direct and indirect impacts, there are no cumulative impacts.

3.6.2.4 Effects of Alternative 4

Helicopter landings and service areas would be constructed on previously disturbed sites. The landings have been surveyed and no heritage sites identified. Therefore, there would be no impacts on heritage resources of Alternative 4. Monitoring would be done during project implementation to assure no unidentified sites are disturbed. Because there are no direct and indirect impacts, there are no cumulative impacts.

3.6.3 Summary of Cumulative Effects

No cumulative effects to heritage resources are expected.

3.7 Hydrology

3.7.1 Introduction

Watershed Characterization

The South Fork Trinity River is a tributary to the Trinity River, draining 932 square miles. The South Fork Trinity River is listed as impaired for sedimentation and temperature under Section 303(d) of the Federal Clean Water Act (EPA 1998). An “impaired” waterbody is one that is not meeting water quality standards, which refers to the beneficial uses and water quality objectives of the waterbody, as stated in the North Coast Region Basin Plan (NCRWQCB, 2001). A Total Maximum Daily Load (TMDL) prescription for sediment was established in 1998 (EPA 1998). The beneficial uses that have the potential to be impacted by land management activities are anadromous fish within the South Fork Trinity River (steelhead trout, Coho salmon, Chinook).

The Project area is located within the Hog Ranch-Underwood Creek watershed (7th field Hydrologic Unit Code: 180102120502YY), a tributary to the South Fork Trinity River. The South Fork Trinity River is within the California Wild and Scenic Rivers System and protected under the National Wild and Scenic Rivers Act. That section, into which Underwood Creek drains, from Mule Bridge to Todd Ranch, is classified as Wild River. The outstanding remarkable values for the South Fork Trinity River in this classification are the fish and wildlife.

Underwood Creek

Underwood Creek is a third-order stream draining Underwood Mountain (see Appendix A for the Hydrological Analysis Area map). At the 7th field Hydrologic Unit Code (HUC) scale, the Hog Ranch-Underwood Creek watershed is approximately 4,999 acres. Data indicate at least four cubic feet per second (cfs) occurs in August (Lancaster and Clark, 1982) and is capable of supporting multiple life-history stages of anadromous fish within 1,000 feet of the confluence with the South Fork Trinity River (natural waterfall barrier).

Scope of the Analysis

The hydrology section considers physical processes such as water yield and sediment yield, including effects on channel morphology and water quality. It is closely linked to Section 3.1 Soils and 3.3 Fisheries in this document.

The geographic scope of the analysis for watershed resources includes most of the Hog Ranch-Underwood HUC. This 7th field HUC (4,999 acres) includes 1,041 acres across the South Fork Trinity River which hydrologically is not affected by the action alternatives and therefore was excluded from consideration. The resulting hydrologic analysis area, 3,958 acres (see map in Appendix A - Maps), contains the entire Underwood Creek watershed.

The temporal bound for the analysis for watershed resources is 30 years. Activities that occurred prior to 1975 are considered to have recovered to the hydrologic conditions that existed before the activity occurred. This doesn't mean that the area is exactly the same (for example, late mature forest) but that the ground mimics natural runoff and erosion regimes. The following effects analysis also includes actions from the present and foreseeable future listed in Section 3.1.6 above.

The beneficial uses of Underwood Creek are limited in scope to anadromous fish habitat for approximately the first 1,000 feet of the stream channel, which ends at a waterfall barrier. The anadromous habitat is located approximately 1.8 miles downstream of the project area. The habitat of this 1,000 foot reach is utilized by anadromous fish as a cold water refuge because of the temperature impairment of the South Fork Trinity River.

Regulatory Framework

See section 3.17 for applicable laws, policies, and management practices.

Analysis Methods

Information on existing condition is described in the Lower South Fork Trinity Watershed Analysis (USDA Forest Service, 1999) and Lancaster and Clark (1982) and key points are summarized below. Additional information was obtained from a site visit in the fall of 2005 and from GIS-generated reports. This analysis compares the effects of the alternatives on seven indicators: sediment, hydrologic flows, temperature, large woody debris, water quality, unstable areas, and percent equivalent roaded acres - ERAs).

3.7.2 Existing Condition and Environmental Effects

Introduction

This section discusses the environmental effects of implementing the no action and action alternatives.

3.7.2.1 Effects of Alternative 1 on all indicators

Direct, Indirect and Cumulative Effects: There would be no direct or indirect effects to water quality under the no action alternative and, therefore, no cumulative effect. There would be no change to the current sediment or hydrologic regime, the amount of large

woody debris, or the temperature load of Underwood Creek. The lower Underwood Creek watershed would continue to support anadromous fish. The South Fork Trinity River as a whole would continue to be listed as impaired for sediment and temperature, and the Underwood Creek watershed would continue to provide cool, clean water to it.

3.7.2.2 Existing Condition – Sediment

The South Fork Trinity River watershed is listed as impaired for sedimentation under Section 303(d) of the Federal Clean Water Act and a TMDL has been created (EPA 1998). Intensive land management, greatly exacerbated by the 1964 flood, caused widespread landsliding and road failures that led to severe aggradation of the mainstem channel. Although watershed and channel conditions have improved, the effects of the 1964 flood on the South Fork Trinity River will likely be evident for several more decades. The Underwood Creek watershed however is largely unroaded and unmanaged, resulting in near pristine conditions. Nevertheless, Underwood Creek is a tributary to the South Fork Trinity River, which is listed as impaired for sediment and temperature under section 303(d) of the Clean Water Act. As such, it is critical that water quality within Underwood Creek be maintained due to its value as a cool water refuge.

3.7.2.3 Effects of Alternatives 2 and 3 on Sediment

Direct and Indirect Effects: An effect of Alternative 2 or Alternative 3 would be the minor, short-term introduction of sediment during the construction of the proposed road through riparian areas. Low water, rocked fords would be constructed on all stream crossings (low water crossings). If flows are occurring during operations, then a temporary culvert would be installed as described above in the proposed action instead of a low water crossing, both causing slight sedimentation during construction. For Alternative 3, there would also be slight sedimentation to stream channels during the removal of culverts or low water crossings. Effects would be minimized by seasonal scheduling of operations (i.e., hauling during dry weather only), construction methods (i.e., outsloped roads, rocked rolling dips), use of applicable Best Management Practices (Appendix E) and controlled access via a locked gate which would minimize unauthorized use of the road. Small amounts of surface erosion from the roadbed and delivery of this sediment to stream channels is anticipated, however, risk of sediment introduction from roads is low given that the approaches to stream crossings would be rocked for 25 to 75 feet from the stream. Due to the small amount of sediment that would be generated, there would be no detectable change in the amount of stream sedimentation or the degree and duration of turbid conditions. The amount of sediment that actually reaches a stream would be <1% of the above-background threshold, well below the 20%-above-background threshold as outlined by the North Coast Water Quality Control Plan (NCRWQCB, 2001). The proposed action complies with the Clean Water Act, Porter-Cologne Water Quality Control Act, applicable water quality control plans, and the Regional Board waiver (Order No. R1-2004-0015).

Because the past, present, and foreseeable future actions are included in this sediment effects analysis, and there was no detectable change in direct and indirect effects on sediment, there would be no detectable cumulative effects.

3.7.2.4 Effects of Alternative 4 on Sediment

Direct, Indirect, and Cumulative Effects: The use of helicopters to yard trees to upslope landings would largely eliminate the possibility of sediment production or delivery of sediment to stream channels. The only ground disturbing activities would be the creation of landings along existing roads. Some small amounts of sediment may be produced from these landings but because they are not proximate to watercourses, delivery to stream channels, particularly to the location of beneficial uses, is unlikely.

3.7.2.5 Existing Condition – Hydrologic Flows

Hydrologic flows in the Underwood Creek watershed are essentially unaltered. No dams, diversions or water intakes exist in the watershed. There are only 4.7 miles of road in the entire watershed and these are located on upper slopes.

3.7.2.6 Effects of Alternative 2, 3 and 4 on Hydrologic Flows

Direct, Indirect, and Cumulative Effects: There would be no alteration of water quantity, flow duration, or the timing and magnitude of peak flows associated with this project. The proposed timber removal from road construction, when evaluated on a watershed scale, is not large enough to affect stream discharge in or below the project area. Therefore, there would be no change to hydrologic flows under any of the proposed alternatives within the scope of analysis or within the period of time analyzed. Because of this there are no cumulative impacts from activities to hydrologic flow.

3.7.2.7 Existing Condition – Stream Temperature

The South Fork Trinity River is listed as temperature impaired under Section 303(d) of the Federal Clean Water Act (EPA 1998), although no TMDL has yet been developed. Underwood Creek itself is not impaired and in fact is known to be a cold-water refuge for fishes trying to escape heat stress in the mainstem.

3.7.2.8 Effects of Alternative 2 and 3 on Stream Temperature

Direct, Indirect, and Cumulative Effects: Water temperature, particularly where anadromous fish exist, is not expected to increase. Due to the retention of riparian buffers, few trees would be removed that could increase direct solar radiation or the flow of warm air into stream channels. The only trees removed from riparian areas would be those in the immediate right of way of the road at stream crossings. Furthermore, the intermittent nature of the streams in the project area mean that in mid to late summer, when heat stress

for fishes is greatest, channels in the project area will have little or no discharge and therefore no mechanism to transport heat to fish-bearing reaches. Any slight increase in temperature at the project site should be attenuated by tributary flow and be undetectable in fish-bearing reaches. Because the past, present, and foreseeable future actions are included in this temperature effects analysis, and there was no detectable change in direct and indirect effects to temperature, there would be no detectable cumulative effects.

3.7.2.9 Effects of Alternative 4 on Stream Temperature

Direct, Indirect, and Cumulative Effects: For Alternative 4 there would be no stream crossings, therefore full shade in the riparian corridor would be maintained and there would be no effect on stream temperature. Cold water in fish-bearing reaches would be unaltered.

3.7.2.10 Existing Condition – Large Woody Debris (LWD)

Unpublished surveys (Lancaster and Clark 1982) conducted from the mainstem South Fork Trinity River to the headwaters of the Underwood Creek indicate that LWD was moderate to high. Recruitment potential is high based on riparian hardwood densities and an average of 75% stream shading.

3.7.2.11 Effects of Alternatives 2 and 3 on LWD

Direct, Indirect, and Cumulative Effects: While Alternative 2 and 3 would remove some large wood from 0.6 acres in the 3,958 acre Underwood watershed, it would not produce a measurable effect on the total LWD available. Because LWD is basically unaffected, controls on pool morphology, size and quality would remain in place and, therefore, there would be no cumulative impacts on LWD.

3.7.2.12 Effects of Alternative 4 on LWD

Direct, Indirect, and Cumulative Effects: Alternative 4 would remove no large wood in the 3,958 acre Underwood watershed. Because LWD is unaffected, controls on pool morphology, size and quality would remain in place and, therefore, there would be no impacts to LWD.

3.7.2.13 Existing Condition – Water Quality

Because the watershed is basically undeveloped, water quality is unaltered and believed to be very high quality. There are no developed water sources of any kind within the watershed.

3.7.2.14 Effects of Alternative 2, 3 and 4 on Water Quality

Direct, Indirect, and Cumulative Effects: Though not explicitly stated in SPI's Underwood THP, after harvesting and burning activities on SPI lands are completed (see Table 3-3. Foreseeable Future Actions in Section 3.6.1 above) it is possible that herbicides, specifically glyphosate (a.k.a. roundup), could be used for site prep on less than 75 acres. No herbicides would be used for any treatments on National Forest lands. Monitoring studies show that it does not appear that glyphosate, even at levels much higher than is generally used, presents a problem to humans, fish or other wildlife (USDA 1997, Bakke 2001, Wofford et al. 2003, Ghassemi et al. 1982). Glyphosate strongly adheres to organic matter in the soil and its mobility is very limited. Because of its low mobility, the only mechanism for off site movement of glyphosate would be if it were attached to soil particles that were eroded and transported to another location. Normal hydrolysis found in a stream will not break the attachment of glyphosate to soil particles. So, even if the combination reached the water, it would not be in a form that can be taken up by plants or released through digestion by animals. Glyphosate has little to no potential to bioaccumulate and would not affect either surface or ground water quality (Ghassemi 1982, USDA 1997), therefore there are no direct, indirect, or cumulative effects.

3.7.2.15 Unstable Areas within the Watershed

Direct, Indirect, and Cumulative Effects: The Underwood watershed and the South Fork Trinity River watershed are known to contain numerous unstable features (shallow and deep-seated landslides). Due to the absence of active unstable areas on Forest Service System Lands affected by the actions, there is extremely low risk that potential unstable areas would be affected by the project and result in any significant direct, indirect or negative cumulative impacts to the watershed assessment area as a result of the project. The proposed road location, in alternative 2 and 3, does not intersect any areas of known instability or historically active surficial mass wasting. Alternative 4 has extremely low risk of affecting unstable or potentially unstable areas (see Geologic Report in the project file).

3.7.2.16 Cumulative Watershed Effects (CWEs)

The Forest Service in Region 5 has adopted the equivalent roaded acre (ERA) model to address cumulative watershed effects. This model is designed as an initial red flag for earth scientists to determine whether or not past and present land management disturbances in a given watershed approach or exceed a threshold of concern (TOC). Where ERAs approach or exceed a given watershed's TOC, further field work would be necessary to ascertain whether cumulative watershed effects are present and if proposed management activities would adversely add to those effects.

The ERA methodology has both strengths and weaknesses. The analysis is readily duplicated and easily understood. It also incorporates rates of management disturbance and recovery times associated with those disturbances, an attribute which is missing in many other CWE models. On the other hand, it is only an office exercise based on management-related hillslope disturbance. It does not address physical or biological processes in stream channels, nor does it account for the time lag associated with routing sediment delivered from a given activity. Recovery times in the ERA model apply only to onsite treatments, not to recovery of downstream impacts.

3.7.2.17 Development of Threshold of Concern (TOC) and Model Assumptions

Thresholds of Concern (TOC) for each watershed in Six Rivers National Forest were developed for the Six Rivers LRMP. In developing TOCs, several physical and biological parameters were evaluated, including inherent geologic stability, extent of inner gorges, amount of active and inactive landslides, erodibility of soils, slope steepness, status of anadromous fish, and condition of riparian areas. Assigning a TOC to a given watershed is an interdisciplinary, professional judgment that weighs various environmental indicators. TOC values typically range between 10 and 15 percent for watersheds on Six Rivers National Forest. Due to the sensitivity of the lower South Fork Trinity River, where the beneficial uses are, Underwood Creek has a threshold of concern of 11 percent.

The CWE-ERA Analysis for the SPI Road Project was conducted for both Federal and private lands within the Underwood Creek watershed. The CWE-ERA model was adapted somewhat to incorporate GIS information on hillslope position, slope steepness, and proximity to riparian reserves. The methods used to calculate percent ERAs for past and present land management activities are described in Appendix D.

Percent ERAs were calculated for the entire Underwood Creek watershed. The area is the same as the Hog Ranch – Underwood 7th field HUC, minus the portion of this HUC that is on the west side of the South Fork Trinity River. This scale of analysis is more sensitive to disturbance because of the smaller watershed area potentially affected by the project. Conducting an ERA analysis at the 6th field HUC has the effect of diluting the impacts of the proposed project given the larger area included in the analysis.

To calculate percent ERAs, a database query was made of all past projects on National Forest System Lands. For private lands, a logging history (1960-1995) was developed as part of the Grouse Creek Watershed Analysis and this was used in the ERA calculations. For more recent activity on private lands, all Timber Harvest Plans (THP) within Underwood Creek were gathered from the California Department of Forestry from 1990 to present.

Since there were no projects proposed for the foreseeable future within the Underwood Creek watershed on National Forest System Lands, no estimates of potential future cumulative effects were possible. In summary, past, currently proposed and future actions were calculated to derive total percent ERAs. The results are described below in Table 3-6.

CWE-ERA Results

Table 3-6. Existing and Proposed Percent ERA Values

Alternative	Existing Condition	Proposed Addition	Total
1	0.76%	0	0.76%
2	0.76%	1.39%	2.14%
3	0.76%	1.39%	2.14%
4	0.76%	1.22%	1.98%

Discussion

Very little activity has occurred in the Underwood Creek watershed and it is in good condition. The current %ERA is only 0.76%. Additional ERAs from the SPI Road construction project would increase the %ERA by 1.22% (Alternative 4) or 1.39% (Alternatives 2 and 3). The resulting total percent ERA would be less than 2.2% (Table 3-6). This is well under the threshold of concern and would not lead to adverse cumulative watershed effects.

The CWE-ERA analysis reveals that the Underwood Creek watershed is below the threshold of concern. The proposed actions associated with the SPI Road Construction project would not result in ERAs exceeding the TOC. Nevertheless, field evidence supports the conclusion that cumulative watershed effects are still present in the South Fork Trinity watershed. The CWE-ERA model is a hillslope disturbance model and does not account for the lag times in sediment routing or the time needed for in-stream channel conditions to adjust and recover. The Lower South Fork Trinity River Watershed Analysis clearly states that cumulative watershed effects currently exist in terms of elevated sediment loads and chronic turbidity.

These cumulative effects in the South Fork Trinity River are mostly a legacy of past land management activities and storm events. The watershed has slowly begun the process of recovery as is evident by the re-growth of riparian areas denuded in the 1964 flood, the small numbers of new or enlarged landslides, and evidence of sediment flushing (i.e. channel downcutting). To ensure that this natural recovery is not jeopardized and to meet Northcoast Basin Plan Water Quality Objectives, any project planned within the watershed must maintain or restore beneficial uses. Stringent design criteria were applied in the

development of the action alternatives to ensure that the project was hydrologically benign and would not impact water quality, either at the site or downstream, nor result in additional additive cumulative watershed effects.

3.7.3 Summary of Cumulative Effects

There has been very limited activity, including timber harvesting or road building, within the Underwood Creek watershed to date. As a result, the watershed is in excellent condition. Water quality, including temperature and turbidity is unaltered. The proposed action has little to no chance of changing watershed conditions; including the timing or magnitude of peak flows, duration of low flows, degree or duration of turbidity, amount of sediment in stream channels, temperature, or the amount, structure or function of large woody debris. Changes to anadromous fish habitat will be undetectable. The Region 5 ERA model confirms that impacts to the watershed would be low (less than 2.2% ERA) and, therefore, there would not be cumulative watershed effects anticipated.

3.8 Noxious Weeds

3.8.1 Introduction

Noxious weeds are typified by species that are not native to a particular geographic region, were introduced to a region by anthropomorphic means, and are invasive leading to displacement of native species and in abundance, alteration of ecological functions in native plant communities. Once introduced, weed seed spreads through various means, both anthropomorphic and natural (i.e. contact with native wildlife species).

Many of the weeds in California are native to the Mediterranean region. Most of the weeds of concern on the Forest are relatively intolerant to shade and occupy disturbed sites. Based upon weed inventories on the Lower Trinity Ranger District, many of the weed occurrences are associated with road edges, river bars, landings, and other settings subjected to intense and often chronic disturbance (e.g. near residences, landslides). Potential vectors for weed introduction, spread and export, include vehicles and heavy equipment that have operated in areas infested by weeds. Imported materials such as rock or straw are also potential vectors if contaminated with weed seed.

Scope of the Analysis

Effects of noxious weeds are framed in terms of indirect and cumulative effects only since issues regarding noxious weeds are an aftermath of project implementation and their sphere of influence pertains to the indirect effect of the weeds on the existing composition and structure of plant communities.

The scope of analysis for environment effects (indirect) under Alternatives 2 and 3 includes the area affected by road reconstruction and construction. Specifically the scope coincides with the reconstruction and upgrading of approximately 855 feet of an existing low standard road, clearing of right-of-way vegetation, construction of approximately 3,926 feet of new road after clearing, and installation of rocked stream crossings. Total area disturbed under either alternative is 1.8 acres. Under alternative 4, in addition to road reconstruction, clearing and construction, 2 acres of a previously disturbed site off of route 5N07 will be cleared for a helicopter service landing, as well as approximately 6 acres of clearing in a 20-30 year old plantation.

From a cumulative perspective, it is recognized that weed introductions have occurred in California over historic time in association with homesteading and ranching. Once introduced, subsequent clearing of land for various purposes (e.g. road construction, ranching, timber) creates a setting conducive to weed establishment. For the purposes of evaluating the cumulative effects of past activities on weed introductions and spread germane to this project, the temporal context coincides with the period for which we have information about past ground disturbing activities, specifically timber management and related road construction beginning in 1975 to those foreseeable future activities identified in Table 3-3 Reasonable Foreseeable Actions. While we have information on ground disturbance associated with timber sale activities dating back to 1975, there is no weed data associated with this time period. Weed inventories were first conducted on portions of the Lower Trinity Ranger District in 1999 and weed inventories have not been conducted along 5N07 or associated spur roads; therefore, discussion of cumulative effects related to these past timber sales will be assessed qualitatively and based upon professional knowledge.

Given that weed introductions and spread are commonly associated with roads and settings of relatively intense disturbance (e.g. clearings, turn-outs); the geographic context for applying cumulative effects coincides with public land timber activities occurring along the portion of Forest Service route 5N07 within 2-3 miles of the project area and private land logging associated with this project. Connectivity of past and foreseeable future activities by spur roads, 5N07, and planned roads in this project constitute the spatial extent of the analysis area for cumulative effects. Similar to the temporal context of cumulative effects, it is recognized that weed seed can be transported and introduced many miles away from the many different sources; however, actual cause and affect of weed introduction to a particular place on the ground is highly speculative.

Regulatory Framework

Current Forest Service Manual (FSM 2080) policy for noxious weeds relative to any ground disturbing activity is as follows:

2081.03 - Policy. When any ground disturbing action or activity is proposed, determine the risk of introducing or spreading noxious weeds associated with the proposed action.

- For projects having a moderate to high risk of introducing or spreading noxious weeds, the project decision must identify noxious weed control measures that must be undertaken during project implementation.
- Use contract and permit clauses to prevent the introduction or spread of noxious weeds by contractors and permittees.

In addition to FSM policy, current policy for noxious weeds (also includes invasive exotic species) in the Forest's LRMP states:

- Practices that prevent the introduction or spread of invasive exotic plant species shall be incorporated into planning and analysis for all management activities that have the potential to introduce or spread these species (LRMP 20-18).
- Off-site materials (i.e. mulch, imported soil, construction materials) shall be screened for the presence of invasive exotic plant materials (LRMP 20-19).

Analysis Methods

The pre-field analysis included review of the Forest's noxious weed spatial layers to determine if any weeds were documented within the geographic extent described above for cumulative effects. Habitat types associated with the project area and the extent of the roading within geographic extent were also reviewed. This analysis determined that no inventories had been conducted along 5N07 or associated spur roads and vulnerable habitats existed within the analysis area.

The species list for the project area (T. Engstrom of Sierra Pacific Industries) noted the presence of yellow starthistle (*Centaurea solstitialis*), a noxious weed. Communication with foresters of Sierra Pacific Industries indicated that the yellow starthistle coincides with the portion of the project area associated with the road reconstruction (885 foot length that intersections route 5N07), and occurs along the road edge next to the 20-30 year old plantation.

Beyond review of the spatial layers and the aforementioned information, noxious weeds will be analyzed in terms of risk of introduction and spread. The Noxious Weed Risk Assessment (contained in the project file) rates the project based upon the intensity of ground disturbing activities proposed and thus the habitat vulnerability, proximity of activity to the known weed sites, proximity of activity to potential weed corridors (i.e. roads), and the extent of equipment used which can serve as a vector for weed seed import or seed export. Depending on the risk, project design features are developed to reduce the risk of noxious weed introduction and spread.

3.8.2 Existing Condition and Environmental Effects

3.8.2.1 Introduction and Existing Condition Weed Seed Spread and Introduction

The portion of the road subject to reconstruction is aligned by a 20-30 year old ponderosa pine plantation. Areas under Alternative 4 proposed for landing development include three sites totaling 8 acres. One of these sites is completely within the plantation, another is within the plantation and straddles route 5N07, and the third site is located in a disturbed setting off of route 5N07, characterized by early seral (shrubs and pole-sized trees) vegetation (Appendix A – Maps with locations of the service landing and drop zones). As noted, yellow starthistle was documented on the road edge next to the 20-30 year old plantation. It is conceivable that yellow starthistle weed seed was introduced on equipment used during logging of the Gaynor Timber Sale and subsequently became established at this site. The old road to be reconstructed is currently grown over, therefore not readily accessible to vehicles which are potential vectors for weed spread.

The portion of the project subject to new construction under Alternatives 2 and 3, dissects an early to mid-mature stand in the Douglas-fir-Black Oak vegetative sub-series. A small portion of the new construction will occur in an early mature stand in the Canyon Live Oak-Douglas-fir vegetative sub-series and the White Oak-Douglas-fir sub-series. The portion of the project slated for new construction traverses two ephemeral and two intermittent/perennial streams. As a mature stand providing shade to the forest floor and competitive vegetation, the habitat is not considered highly vulnerable to weed establishment. Yellow starthistle, specifically, is considered intolerant to shade.

The environmental effect (indirect) for noxious weeds as a result of road reconstruction under Alternatives 2 and 3 is the potential to induce spread and establishment of yellow starthistle, further exacerbating the effects of yellow starthistle on native species. Clearing existing vegetation (which serves as partial shade and competition) in a previously disturbed setting, using ground-based equipment, where yellow starthistle has been documented or where the landing is aligned with a road, creates a highly vulnerable setting for weed spread and introduction. Yellow starthistle readily occupies disturbed settings and out-competes other vegetation. In its development of a taproot early in the growing season, it is capable of exploiting the water resources early and throughout the growing season, thereby reducing available water for other species. Yellow starthistle is a prolific seeder. Depending on growing conditions, one plant can produce anywhere from 1,000 to 75,000 seeds (Boussard et. al. 2000). In addition, seeds can remain in the soil as a seed bank for up to 10 years (DiTomaso 2001) with germination stimulated by ground disturbance. Once established, the potential indirect environmental effects of this action are spread of yellow starthistle from the project area into plant communities in the area that are vulnerable to weed introductions (e.g. grasslands, oak

woodlands). Establishment of yellow starthistle will trigger a loss in species richness and diversity, and alteration of the ecological function of those communities (e.g. providing forage for wildlife species, water and nutrient cycling).

Overstory removal and clearing of all understory vegetation under Alternatives 2 and 3, would occur along 3,926 linear feet to roadbed width of approximately 14 feet in the early and mid-mature conifer stand. The clearing for the road construction would be kept to a minimum. The relatively narrow width of the road would allow for partial overstory shade from the trees in the stand aligning the road, thereby reducing the suitability of much of the disturbed areas to weed establishment, and thus the indirect effects associated with this activity. Given the use of ground-based equipment to construct the road, there is still potential to introduce weed seed which in turn could grow in the short-term at localized sites where light conditions are favorable for germination.

In the course of new construction four rock stream crossings would be built. These crossings would consist of the use of rock and cobbles generated from the road bed during construction and imported cleaned washed rock from outside of the project area. Use of local rock sources removed from uninfested areas as well as a clean rock sources eliminates the indirect effects related to weed seed import from potentially weed infested rock sources outside the project boundary. The indicators used for noxious weeds include those associated with weed spread and establishment, and those associated with weed seed introduction. An indicator of the potential spread and establishment of noxious weeds is the extent of ground disturbance and associated removal of vegetation. An indicator for the introduction or export of weed seed is the extent of equipment used in conjunction with this project and foreseeable future actions. For all action alternatives, project design features aimed to reduce the risk of weed introduction and spread are identified in the Noxious Weed Risk Assessment however, the risk is not eliminated.

The indicator for effects relative to weed spread and establishment is the extent (acres/impact) of ground disturbance and associated removal of vegetation.

The indicator for effects relative to weed seed introduction is the extent of equipment used (ground-based, number, frequency) in the course of project operations.

3.8.2.2 Effects of Alternative 1 on Weed Spread

No action will occur under this alternative; therefore, there are no indirect or cumulative effects to address.

3.8.2.3 Effects of Alternative 2 on Weed Spread

Under Alternative 2 ground disturbance and vegetation clearing would occur on 1.5 acres of previously undisturbed ground. The portion of the roadwork where reconstruction is to occur is adjacent to an occurrence of yellow starthistle and in an open setting that was

previously disturbed during the Gaynor Timber Sale. Potential indirect effects are more of an issue here than along the portion of the road slated for construction, which is surrounded by mature forest offering partial shade to the road edges. Project design features aimed to reduce the risk of spread are identified in the risk assessment.

3.8.2.4 Effects of Alternative 3 on Weed Spread

The effects of this alternative are similar to Alternative 2 but are lessened by the obliteration and rehabilitation of the temporary road constructed. Obliteration and rehabilitation will facilitate the establishment of conifer seedlings and other vegetation in the road right-of-way by decompacting the soil surface. Native vegetative cover reduces the suitability of the road to support noxious weeds by providing shade and competition, there fore reducing the risk of spread and thus reducing any indirect effects.

3.8.2.5 Effects of Alternative 4 on Weed Spread

No road reconstruction or construction would occur under this alternative; therefore, the risk of weed spread due to ground disturbance and vegetation removal associated with the road is eliminated.

Ground disturbance and vegetation clearing associated with landing construction would occur on 8 acres. Due the intensity of ground disturbance (including compaction), clearings for landings do not recover well and are well suited for the establishment of noxious weeds. Given the intensity, scale and proximity of the landings to either documented yellow starthistle sites or route 5N07 (which is considered a potential corridor for weed spread), ground disturbance and clearing associated with landings generate indirect effects that are only slightly reduced by project design features and mitigation measures.

3.8.2.6 Effects of Alternative 1 on Weed Seed Introduction

No action will occur under this alternative; therefore, there are no indirect or cumulative effects to address.

3.8.2.7 Effects of Alternatives 2 and 3 on Weed Seed Introduction

Ground-based equipment will be used to clear the existing vegetation, construct or reconstruct 1.8 acres of road, and for Alternative 3, obliterate the road. Use of equipment introduces a vector for weed seed introduction if equipment has been operating in an infested area prior to entering the project area. Weed seed can also be exported if the equipment has been operating in the portion of the project area with yellow starthistle. Project design features and mitigation measures that focus on equipment cleaning prior to entering the project area and management of the yellow starthistle in the project area prior

to using equipment elsewhere, would reduce the risk of weed seed introduction and export, and thus the indirect effects.

3.8.2.8 Effects of Alternative 4 on Weed Seed Introduction

Ground-based equipment will be used to clear existing vegetation to construct a service landing on 2 acres, and some minimal use within the plantation at the drop zones. In addition, equipment would be operating at the service landing and drop zone during implementation. The risk of weed seed introduction increases with each piece of equipment used. In addition to the equipment used to clear the area, helicopter operations typically utilize a fuel truck, mechanic's and supervisor's vehicle, and at the drop zones there will be a dozer, loaders, and skidders. Project design features that focus on equipment cleaning prior to entering the project area would reduce the risk of weed seed introduction (Appendix C and Chapter 2), but the efficacy of this design feature is slightly less than Alternatives 2 and 3 since more equipment is involved and equipment is entering the area at different times during the implementation of this alternative.

3.8.3 Summary of Cumulative Effects

Cumulatively, it can be assumed that past logging related activities on Forest Service land along and off of route 5N07 (e.g. Castle, Underwood, and Gaynor timber sales, Table 3-2) have likely contributed to the introduction and spread of noxious weeds and thus affected native plant communities beyond the boundaries of the respective projects. Noxious weed risk assessments and project design features to reduce the risk of introduction and spread were not conducted until only recently for activities on the Forest.

Ground disturbance related to the various logging systems, landings, skid and spur road construction associated with past timber sales, provide settings for weed establishment. Equipment used for logging that has been operating in weed infested areas can be a vector for weed seed introductions, as weed seed of some species (e.g. yellow starthistle) can readily attach to the undercarriage or tires of equipment. Once introduced, roads, road maintenance activities, and the vehicles that use the roads, serve as vectors for weed spread and weed export to uninfested areas. No past logging activities were identified in association with private lands in the project area.

The foreseeable future actions within the geographic scope of this analysis that contribute cumulatively to the introduction and spread of noxious weeds is the road reconstruction and construction proposed for this project under Alternatives 2 and 3, the road use during the course of logging (e.g. vehicles and equipment as vectors), and the clearing of vegetation on lands owned by SPI. As described above, the proposed access to the SPI parcel in Section 9 is along a road that was constructed for logging during the Gaynor Timber Sale. Yellow starthistle occurs along the edge of this old road. Project

design features to reduce the introduction and spread of noxious weeds are described and addressed in the Noxious Weed Risk Assessment; however, the measures do not eliminate risk. Any weed seed inadvertently intercepted could be introduced to uninfested areas on SPI land. Of the 138 acres to be logged, 45 will be clearcut which creates a particular suitable setting for weed establishment and the potential of further spread. Alternative 4 proposes to develop 3 landings covering 8 acres, with 2 of the landings located along 5N07.

For both indicators, implementation of Alternative 4 with its development of 3 landings covering 8 acres, with 2 of the landings along 5N07, contributes the highest cumulative risk of noxious weed introduction and spread compared to the other alternatives. Any weed seed that is inadvertently introduced on the landings will likely persist and spread since the degraded conditions at landings are not suitable for the growth of competing vegetation. Once established weed seed can be spread from the landing to the road edge and begin its migration beyond the landing location. Equipment used in road maintenance or vehicles that come into contact with infested sites, can then transport weed seed many miles from its site of origin.

The table below compares the risk of introduction and spread for the alternatives by indirect and cumulative effects and by indicator.

Table 3-7 Relative risk of noxious weed introduction and spread with project design features incorporated

Indicators	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Indicator 1- Weed Spread. Extent (acres/impact) of ground disturbance and associated removal of vegetation.	No Risk	Indirect- MOD Cumulative- MOD	Indirect- LOW Cumulative- MOD	Indirect- MOD Cumulative- MOD-HIGH
Indicator 2 – Weed Introduction. Extent of equipment used (ground-based, number, frequency)	No Risk	Indirect- LOW Cumulative- MOD	Same as Alt 2	Indirect- MOD Cumulative- MOD-HIGH

3.9 Recreation, Visuals, Lands, and Minerals

3.9.1 Introduction

Recreation and visuals have not historically been an important activity in or immediately adjacent to this remote project area, outside of minimal hunting in the watershed and very limited rock climbing that occurs outside of the project area near an outcrop to the east of Forest Service road 5N07. There are no trails, except a trail was used

for accessing the Hog Ranch in the early 1900s, which was located within the SPI managed properties.

There are no developed recreation sites, and no known dispersed recreation sites. Any recreational water use is several miles away over several main drainages. Hell's Half acre, a botanical viewing location, is over two air miles away and separated by at least four ridge systems. There are no known trails, no scenic trails or bypasses. There is no known OHV use. Within the project area there are no activities besides what is listed in Tables 3-1, 3-2, and 3-3 above.

Lands and minerals operations have been even less important in the vicinities of the proposed project area on National Forest System lands. No Notices of Intent, Plans of Operations, or Special Use Authorizations (SUA) have been issued for the project area in the last ten years and none are proposed for the foreseeable future (outside of the SPI Road Application for Permit discussed in this project).

This has not been the case on private lands. Most private lands, although have had little to no minerals activity, have had timber cuts and other related timber activities. There are no private lands within the project area except for the SPI 160 managed acres. Contemporaneous uses include clearcuts on most private parcels with a few thinnings (see Table 3-8 for past and present private activities adjacent to the project area on private lands).

The project area contains approximately 40 acres of Partial Retention as discussed above in Section 1.4 Purpose and Need, Management Direction. No ground disturbing activities would take place on these 40 acres.

Scope of the Analysis

The geographic scope of the lands, minerals, recreation, and visuals analysis is the project area and the lands immediately adjacent to it. The temporal scope of analysis looks back approximately 20 years and forward approximately 5 years. As described in the introduction there is limited use in this backcountry area. Since there are no lands or minerals operations in or adjacent to the project area on Forest Service System lands, they will not be discussed further.

Recreational indicators were analyzed for this section. They include visual quality as measured by the Visually Quality Objectives system and Recreation Opportunity Spectrum land classes. The Visually Quality Objectives system is based on designated viewing areas and the Recreation Opportunity Spectrum land class offers a framework in which to understand these relationships and is one tool used for recreation planning. The spectrum has been divided into six major classes and have been assessed for the project and surrounding area. All fall within the Roded Natural class.

There are many different recreational uses in the South Fork Trinity drainage area including fishing, hiking, rafting, kayaking, swimming, birding, dispersed camping, and off highway vehicle use (USDA 1998, III 11-12). Within and adjacent to the project area there is little to no recreational use outside of hunting and the very limited rock climbing.

Private land use will be discussed separately and within the geographical context of private lands adjacent to the project area and within the temporal context looking back approximately 20 years and forward approximately 5 years discussed as contemporaneous uses. Records show that private lands containing timber were either clearcut of merchantable timber or thinned as indicated in Table 3-8.

Regulatory Framework

The Six Rivers has a draft recreational strategy and tiers to the National Recreation Agenda setting national direction for recreation in National Forests as follows:

- Improve the setting for outdoor recreation
- Improve visitor satisfaction with our facilities and service
- Improve educational; opportunities for the public about the values of conservation, land stewardship, and responsible recreation
- Strengthen our relationships with private entities and volunteer-based nonprofit organizations
- Establish professionally managed partnerships and intergovernmental cooperative efforts

The Six Rivers draft recreational strategy also tiers to the Pacific Southwest Region Recreation Agenda that charts the future course for Forest Service recreation, wilderness and heritage resources throughout California and builds upon the National Recreation Agenda with the following goals:

- Provide bold, creative and visionary recreation leadership
- Improve visitor service
- Reinvest in infrastructure
- Build partnership and use resources more effectively

These strategies are comparable with Six Rivers LRMP for Recreation. The LRMP provides a wide range of quality outdoor recreation opportunities, incorporates universal design into all developed recreation settings to ensure accessibility and usability for a diversity of visitors, and emphasizes the national recreation strategy, to name a few (LRMP IV 122-124).

The Visual Management System presents a vocabulary for managing scenery and a systematic approach for determining the relative value and importance of scenery and

associated recreation in a national forest. High quality scenery, especially scenery with natural-appearing landscapes, enhances people's lives and benefits society. Ecosystems provide the environmental context for this scenery management system. The system is used in the context of ecosystem management to inventory and analyze scenery in a national forest, to assist in the establishment of overall resource goals and objectives, to monitor the scenic resource, and to ensure high quality scenery for future generations. The process involves inventory, analysis, and the determination of visual management objectives and provides for their input into an integrated resources planning and decision-making process. The synthesis of this information is used to determine Visual Quality Objectives (VQOs) for managing forest lands. VQOs describe different degrees of acceptable alteration of the natural landscape. The goals for the Partial Retention Visual Quality Objective management area are:

- Maintain the area in a near-natural appearing condition,
- Provide an attractive, forested landscape where management activities remain visually subordinate to the character of the landscape,
- Manage human activities so they are subordinate to the character of the landscape,
- Manage for a programmed, sustained harvest of forest products in areas that are timber-suited (LRMP IV-62).

The Recreation Opportunity Spectrum (ROS) classification system is a land management tool used to classify lands based on the different recreation settings they provide. A key component of the ROS is to provide high quality scenery, especially scenery with natural appearing landscapes, to enhance peoples' lives and benefit society. The 1986 ROS Book describes recreation setting and opportunities, and is used to evaluate the recreation potential of an area.

Analysis Methods

Two indicators will be analyzed in detail for this section, recreation using the Recreation Opportunity Spectrum (ROS) land classes and visual quality as measured by the Visual Quality Objectives (VQO) system.

Land use on privately owned parcels outside but adjacent to the project area will be investigated by state authorized timber activities.

3.9.2 Existing Condition and Environmental Effects

Introduction

The LRMP characterized the ecological and social conditions in the project area and provided a context for future forest management decisions in the area. Maintaining and

improving current dispersed primitive camping, hunting, fishing, and other undeveloped recreational opportunities is a low priority for the Forest.

The Forest has been inventoried and divided into five ROS classes described in the USDA Forest Service ROS User's Guide: Primitive, Semi-primitive Non-motorized, Semi-primitive Motorized, Roaded Natural, and Rural. The project area was inventoried as Roaded Natural. These lands lie along major travel ways and viewsheds. Nearly all developed sites are in this Roaded Natural class. Paved roads and hardened sites are common. User interaction is classified as moderate to high at developed sites.

As part of the forest planning process the VQOs were mapped using Agriculture Handbook 462 Visual Management System – Volume 2, Chapter 1, 1974. VQOs describe different degrees of acceptable alteration of the natural and characteristic landscape. They are considered the measurable standards for the management of the “seen” aspects of the land. The VQO applied to this project landscape within the project area is described below and the goals are described above in the Regulatory Framework section.

A VQO of Partial Retention is assigned within the project area. Partial retention areas are typically middleground and background viewing areas as seen from highly sensitive viewing areas, or are foreground areas as seen from moderately sensitive viewing locations such as county roads, streams, or trails. As discussed above 40 acres falls within the Partial Retention management area, and is located within the matrix; all standards and guidelines for matrix management apply in this area. Timber management in this area will use silvicultural strategy 5, with the objective to meet other resources needs, while allowing limited timber harvest. Activities may dominate the characteristic landscape, but must, at the same time, utilize naturally established form, line, color, and texture. Activities should appear as a natural occurrence when viewed in the middleground or background.

The project area is located in the backcountry, far from areas of developed recreation or roads that require increased scenic integrity. There is little or no recreational activity occurring. There is no gathering of material, developed recreational sites, nor are there any known dispersed recreation sites.

The conditions of land use on private lands fall outside of the project area and therefore, there will be no effects of any of the alternatives on private lands. The resource that is affected by activities on these private lands is hydrology. See Hydrology Section 3.7 above for a description of how timber and related timber activities on private lands are factored into the methodology for the calculations of water quality thresholds.

3.9.2.1 Existing Condition – Land Use on Private Parcels

Land use on private parcels has been consistent for the past few decades. The Timber Harvest Plans (THP) approved by the State of California have been requests for clearcuts, thinnings, and some sanitation logging. Current (this decade) THPs submitted to the state

are consistent with these past harvesting activities. These contemporaneous land uses on private parcels are shown in the Table 3-8 below. In Section, 3.1.6 above on Table 3-3 Reasonably Foreseeable Actions shows activities specific to the SPI managed property within the project area.

Table 3-8 Past, Present and Reasonably Foreseeable Actions on Private Parcels outside but adjacent to project area in T5N, R6E

Owner	Section (All T5N, R6E)	Year	Method	Acres or Miles	Resource Affected
Small Timber Company	North section of -23	2005	Sanitation Timber Thinnig	Approx. 50 acres - Active Industrial Logging	Hydrology & Fisheries
Small Timber Company	North section of -23	1995-1996	Sanitation Timber Thinnig	Approx. 50 Acres	Hydrology & Fisheries
Small Private Land Owner	22	Active Logging	Clearcut	Unknown Acres	Hydrology & Fisheries
Small Private Land Owner	25	Before 2005	Thinnings Patchcutting	Unknown Acres	Hydrology & Fisheries
SPI	23	2007+	Thinnings Clearcuts	19 Acres	Hydrology & Fisheries
SPI	26	2007+	Thinnings Clearcuts	102 Acres	Hydrology & Fisheries
Simpson	36	2005	Clearcut (by helicopter)	Unknown Acres	Hydrology & Fisheries

Table 3-8 Past, Present and Reasonably Foreseeable Actions on Private Parcels outside but adjacent to project area in T4N, R6E

Owner	Section (All T4N, R6E)	Year	Method	Acres or Miles	Resource Affected
SPI	East ½ East ½ Section 1	2007+	Thinnings Clearcuts	75 Acres	Hydrology & Fisheries
Small Private Land Owner	3		Thinning	Unknown Acres	Hydrology & Fisheries
SPI	11	2007+	Thinnings Clearcuts	105 Acres	Hydrology & Fisheries
Kline	13	2004	Clearcut	20 Acres	Hydrology & Fisheries
Sweet	13 & 18	2004	Clearcut	60 Acres	Hydrology & Fisheries

Table 3-8 Past, Present and Reasonably Foreseeable Actions on Private Parcels outside but adjacent to project area in T4N, R6E (continued)

Owner	Section (All T4N, R6E continued)	Year	Method	Acres or Miles	Resource Affected
Small Private Land Owner	17	1980's 1990's	Clearcut 1980's Thinned 1990's	Logged by PG&E in the early 80s then sold to current owner	Hydrology & Fisheries
Owner Unknown (devastation Slide area)	14	1985	Clearcut	Approx. 20 Acres	Hydrology & Fisheries
Garrett	20	2004	Clearcut	30 Acres	Hydrology & Fisheries
Flibott	20	2004	Clearcut	21 Acres	Hydrology & Fisheries

3.9.2.2 Private Lands Activities and Alternatives 1, 2, 3, and 4

As stated above the conditions of land use on private lands fall outside of the project area and therefore, there will be no effects of any of the alternatives on private lands and vice versa, outside of Hydrology and Fisheries discussed above (see Sections 3.7 Hydrology and 3.5 Fisheries).

The California State approved through a THP activities on SPI's 160 managed acres proposed in the project area, and are consistent with the past, present and foreseeable future activities on private parcels in the surrounding areas (Table 3-8 above).

3.9.2.3 Existing Condition – Recreation Opportunity Spectrum (ROS) and Visual Quality Objectives (VQO)

Recreation and visual environments can be affected by dust, noise, and large openings on the landscape or in the canopy. Research shows that recreation on national forests is not just deciding where to camp, hike or fish, but also includes a thorough process analyzing levels of risk, solitude, security, comfort, socializing, and self reliance.

All of the project area is classified under ROS as Roaded Natural. Although this class is usually associated with major travel ways and viewsheds, contain developed sites, commonly have paved roads, hardened sites, and user interaction is moderate to high at developed sites, this is not the case for the project area and adjacent lands. The current VQO, which in this case is the middleground viewing type, is consistent across the project area.

3.9.2.4 Effects of Alternative 1 on ROS and VQO

Except for possible wildland fire suppression efforts, the no action alternative would not initiate human-caused changes to the existing scenic conditions of the project area. The current ROS class would remain the same, Roaded Natural. The current VQO of Partial Retention would not be affected by implementation of the no action alternative. No road construction or road reconstruction would be scheduled. The natural evolution of the vegetative component of the landscape would continue to change the scenic qualities of the area. The potential for wildfire, along with the inherent changes in visual character, would continue to increase. No cumulative effects are expected.

3.9.2.5 Effects of Alternatives 2, 3, and 4 on ROS and VQO

Following implementation of Alternative 2, 3, or 4, there would be no change in ROS and little change to VQO from existing condition. Proposed actions are consistent with the Partial Retention, VQO assigned to the area as they are not expected to be evident to the casual forest visitor.

From Forest Service Road 5N07 that looks down on the project area there is potential for logging activities to be visible. After initial logging activities have ceased, and logs have been removed from the project area, there would be little visible signs that activities had taken place. Any visible signs could include clearcut areas visible for 6-12 months before new brush growth. Seedlings would be planted within the first five years, to further reduce any possible bare ground areas that might be visible from Forest Service Route 5N07. Therefore, the VQO of Partial Retention would have little change from existing condition, which is near-natural appearance. The ROS would remain the same, Roaded Natural. The VQO currently assigned to the project area would be met following vegetation and transportation management treatments. No action alternative would exclude any of the existing uses, but during harvest activities, only in the short term, could modify the amount of recreational access available.

A listing of past, present, and foreseeable future actions provided earlier in this chapter (Tables 3-1, 3-2, 3-3), indicates that past vegetation and transportation activities have influenced the current recreational opportunities and use of the project and adjacent areas, so their effects are part and parcel of the existing conditions described above. Except for a possible minor increase in dispersed recreational use, there are no expected cumulative effects for either of the alternatives for existing recreational opportunities.

3.9.3 Summary of Cumulative Effects

Any past and current vegetation management and transportation activities have had little influence on current opportunities and use for recreation, lands, and minerals in and adjacent to the project area. These activities have been or in the foreseeable future would

be over several ridges and drainages away. There are no other cumulative effects associated with any alternatives beyond what is anticipated with any SPI activities in the foreseeable future.

For visual resources, there are no expected cumulative effects other than the direct and indirect effects previously discussed under the action alternative, which are negligible.

The approved THP activities proposed for SPI lands are consistent with contemporaneous uses made on similarly situated lands in the adjacent and surrounding area.

3.10 Roadless Area

3.10.1 Introduction

The Underwood Inventoried Roadless Area (RARE II #05327) is 9,930 acres with 6,530 acres within the Six Rivers National Forest. There are two areas to this Underwood Inventoried Roadless Area and the remaining 3,400 acres are within the Shasta-Trinity National Forest located east of the project area. The project is located in Sections 9 and 10 of T4N, R6E within the Underwood Inventoried Roadless Area, in the southeast corner (see Appendix A - Maps).

The 1995 Six Rivers LRMP did not recommend keeping the Underwood Inventoried Roadless Area as a Roadless Area, since it no longer retained wilderness attributes; rather, it recommended managing the area within the project area as a General Forest or “matrix” area designation as discussed in Management Direction in Section 1.4 above.

Most of the Underwood Inventoried Roadless Area is included in bills before the Senate (S.128) and House (H.R. 233) as the “Northern California Coastal Wild Heritage Wilderness Act.” The entire project area is contained within the Senate Bill proposed to Congress and no portion is located within District 1 (Humboldt County) proposed in the House Bill before the State of California.

Scope of the Analysis and Analysis Methods

The geographical scope of analysis encompasses the Six Rivers NF portion of the Underwood Inventoried Roadless Area (Roadless Area), which is approximately 6,530 acres. The Shasta-Trinity portion is not included in this analysis because Forest Road 5N07 divides the Six Rivers and Shasta Trinity portions of the Roadless Area. For the temporal scope, the analysis looks back approximately 30 years when the first management activities occurred within the Roadless Area boundaries and looks forward approximately 5 years when the last of the planned management activities would occur on SPI land. Effects will be discussed in terms of impacts to the solitude experience within the Roadless Area.

Effects to other resource values within the area are discussed in other sections of this EIS, as described below.

Regulatory Framework – Roadless Area Characteristics

The Code of Federal Regulations (36 CFR Part 294, Subpart B – Protection of Inventoried Roadless Areas, 294.11 (2) Road Alignment; 16 U.S.C., 66FR3272, January 2001), lists *Roadless area characteristics*. The *roadless area characteristics* contain nine items. *Roadless area characteristics* are described as “resources or features that are often present in and characterize inventoried roadless areas, including” and are discussed in this section or the specific section listed after each item.

- 1) High quality or undisturbed soil, water, and air (see Soils 3.11, Hydrology 3.7 and Air Quality 3.2);
- 2) Sources of public drinking water (see Hydrology 3.7);
- 3) Diversity of plant and animal communities (see Botany 3.3 and Wildlife 3.12);
- 4) Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land (see Botany 3.2 and Wildlife 3.12);
- 5) Primitive, semi-primitive non-motorized and semi-primitive motorized classes of dispersed recreation (see Recreation 3.9);
- 6) Reference landscapes;
- 7) Natural appearing landscapes with high scenic quality (see Scenic 3.9);
- 8) Traditional cultural properties and sacred sites (see Heritage 3.6); and
- 9) Other locally identified unique characteristics.

3.10.2 Existing Condition and Environmental Effects

Introduction

Roadless areas serve as reference landscapes to compare non-managed areas with similar managed areas. This Roadless Area landscape has been impacted by previous road building, road decommissioning, and past timber harvest activities.

The Roadless Area lacks remoteness due to roads on both the east and west sides and private property in the southern portion. There is private property within a mile of the project area and roads within two miles. Within the Roadless Area there are some opportunities for solitude due to vegetative screening, lack of travel ways, and low current human use. For the same reason the Roadless Area both lacks and contains apparent naturalness.

There is a special feature within the Roadless Area, approximately two air miles from the project area - Hell's Half Acre. The Roadless Area does have primitive recreation possibilities and natural integrity; since human impacts are minor (see 3.9 Recreation above). There is remoteness, but only in the unroaded portions of the referenced landscape.

3.10.2.1 Existing Condition

The Roadless Area contains a section of the South Fork Trinity River, a designated wild river, and includes steep canyon slopes on both sides of the river. The area is characterized by numerous rock outcrops, talus slides, rocky ridges, and steep drainages. The river itself is the primary attraction of the area. Hells Half Acre Creek drains into the South Fork Trinity River. The South Fork Trinity River and Hells Half Acre Creek are outside of the project area. The Hell's Half Acre area, a special feature listed above, is a botanical viewing location, and although within the Roadless Area is over two air miles away and separated by at least four ridge systems.

Elevations of the Roadless Area range from 800 to 3,700 feet. The vegetation is characterized by brush, live oak, and scattered conifers. The higher elevations tend to contain more dense areas of conifer trees with little brush or hardwood habitat. The project area is in the higher elevations. Wildfire has had a minor influence on the tree age distribution and structure of the existing stands.

The Roadless Area contains past timber harvest activities and private lands. There are currently several roads within the National Forest system lands and access roads to most of the private parcels (excluding the SPI managed lands in T4N, R6E, Section 9 being analyzed here). These private parcels are located in Section 36, T5N,R6E, and in Sections 7, 8, 9, 17 & 18, T4N,R6E. Table 3-8 above lists the private parcels and the activities that have taken place on them.

The roads are concentrated to the west and north of the project area (Map 8 in Appendix A – Maps, Underwood Roadless Area). There is a portion of the Roadless Area that could be thought of as primitive (undeveloped and rarely accessed). The SPI managed lands and the proposed road location are to the far east and therefore would have a minor encroachment effect upon this primitive area containing roadless characteristics.

3.10.2.2 Effects of Alternative 1

Direct, Indirect, and Cumulative Effects: Under the No Action Alternative, no special use permit would be authorized. There would be no direct and indirect effects on the Roadless Area. Because there are no direct and indirect effects, and no foreseeable future activities as designated in Table 3-3 would occur, there are no cumulative effects.

3.10.2.3 Effects of Alternative 2

Direct and Indirect Effects: The Proposed Action Alternative is to construct 0.91 miles of road to access private land. Approximately 0.75 miles (or 3,926 feet) of this road would be within the Roadless Area. The proposed road location is on the eastern edge of the Roadless Area.

This alternative proposes a permanent road into an area that has few roads. There would be a minor effect on the naturalness or primitive character of the immediate area, but will have little effect on the character of the Roadless Area overall because it is already diminished by past and present private logging activities and past road building.

In addition to the direct effects of physical disturbances from the road, there would also be impacts on the potential for solitude within the Roadless Area. During road construction, visitors could hear equipment. After road construction, visitors would be able to hear log trucks using the road. There would be indirect effects of road use during implementation, but little to no future indirect effects due to increased traffic after implementation from the proposed road because it would be gated as described in Chapter 2, Section 2.2.2 Alternative 2 – Proposed Action (Preferred Alternative) item 1) Gate.

In addition to the indirect effects on solitude associated with the road, visitors to the Roadless Area may also hear equipment (chainsaws, tractors, and other vehicles) from SPI harvesting operations. After timber-harvesting operations are complete, visitors would occasionally hear vehicles and other equipment. This is in addition to very occasional use on existing roads within the Roadless Area.

Cumulative Effects: Past actions that have occurred within the Underwood Roadless Area include 80 acres of timber harvest and approximately 3.2 miles of road construction on Forest Service system lands (see Table 3-1). Of the 3.2 miles of existing roads, one-half mile has been decommissioned. While the road has been decommissioned, it hasn't been re-contoured so the cut slope is still visible.

On SPI land, which is surrounded by the Roadless Area, there would be approximately 1.5 miles of road construction. The past actions combined with the proposed actions would mean 3.7 miles of roads have the potential to cause disturbance to the solitude through noise and dust. These actions combined with reasonably foreseeable actions and the Proposed Action would result in a total of approximately 5 miles of roads within the Roadless Area boundary. This would result in a loss of natural appearing character of the landscape. There would be long-term adverse effects to the far eastern edge of the Roadless Area, since a permanent section of road would be built.

3.10.2.4 Effects of Alternative 3

Direct and Indirect Effects: Alternative 3 is similar to Alternative 2 with the exception that the road would be obliterated and rehabilitated after the timber harvest and associated management activities occur on SPI land. Vegetation would grow in on the road bed over time and because there is little to no cut slope needed to construct the road, the road would not be visible within approximately 40 to 50 years. The reduction in roadless character resulting from Alternative 3 would not be permanent.

Cumulative Effects: In the short term (5 years) the cumulative effects for Alternative 3 would be similar as Alternative 2 with the exception that the proposed road would be temporary and obliterated and rehabilitated after SPI's timber management activities are complete. After the obliteration, there would only be 3.2 miles of permanent road within the Roadless Area. Vegetation would slowly grow back but the road would still be evident for decades (approximately 40 to 50 years). The road location would be on a fairly flat area so there would little cut and fill needed. However, even the limited cut and fill would be evident for decades because the slope would not be re-contoured.

The effects of noise on solitude would be similar to Alternative 3 except that the proposed road would be obliterated in approximately five years and there would be no noise after that time.

The effects to the roadless characteristics would be similar to Alternative 2 initially, but there would be no long-term effects, since these effects would be reduced over time. The change to the roadless characteristics would be temporary, since there would not be any permanent section of road built.

3.10.2.5 Effects of Alternative 4

Direct and Indirect Effects: With the helicopter alternative there would be no physical disturbance in the Roadless Area. However, there would be noise from the helicopters flying over the Roadless Area during timber harvest operations. Flights would be directly from SPI property to the drop zones and service landing; however, the noise of the helicopter could be heard for several miles (see Appendix A - Helicopter Logging Method Alternative Map).

Cumulative Effects: With this alternative, management on SPI's land would continue to occur as planned. Past actions that have occurred within the Roadless Area include 80 60 acres of timber harvest and approximately 3.2 miles of road construction (see Table 3-1). Of the 3.2 miles of existing roads, one-half mile has been decommissioned. While the road is decommissioned it wasn't re-contoured so the cut slope would still be the same. Past actions combined with reasonably foreseeable action would result in no increase in road miles within the Roadless Area boundary. There would be approximately 3.2 miles of existing roads.

Additionally, SPI would be harvesting 138 acres of timber which would result in a total of 218 managed acres within the boundaries of the Roadless Area.

In addition to the noise from helicopters, visitors to the Roadless Area may also hear equipment (chainsaws, tractors, and other vehicles) from SPI harvesting operations. After timber harvesting operations are complete, visitors would occasionally hear vehicles and other equipment. This is in addition to very occasional use on existing roads within the Roadless Area.

The effects of road impacts to the roadless characteristics would be eliminated, but would alter the natural character of the landscape due to logging. The activities associated with logging would be for a shorter duration when compared to road building.

3.10.3 Summary of Cumulative Effects

The cumulative effects analysis for inventoried roadless considers impacts of the alternatives when combined with the past, present, and foreseeable future actions as listed in Tables 3-1, 3-2, and 3-3. As discussed above, there would be no affect to the Roadless Area with Alternative 1, and temporary periods of noise, lack of solitude and a small area of alter natural character with alternative 4. Alternative 2 would have periods of noise and lack of solitude associated with the road building, use, and harvesting, and have permanent long-term effects to the roadless characteristics due to road building. Alternative 3 would have periods of noise and lack of solitude associated with the road building, use, and harvesting. The impacts of Alternative 3 would return to existing conditions after the additional disturbance associated with the obliteration and rehabilitation of the proposed road. This is in addition to very occasional use on existing roads within the Roadless Area.

3.11 Soils

3.11.1 Introduction

Scope of Analysis and Methods

Assessment of proposed actions and associated alternatives on soil productivity were assessed only on Forest Service lands. The effects of land management activities on soil productivity on SPI lands are outside the scope of analysis. Potential impacts to soil productivity are evaluated at the site scale or activity area where the actions occur (e.g. road or landing construction site). Off-site or detrimental impacts as a result of altered soil hydrologic functions are evaluated on a watershed scale. The size or extent of detrimental soil disturbance that is allowable and which affects hydrologic function is determined by the Region 5 Cumulative Watershed effects Analysis (FSH 2509.22). All activities on both private lands and Forest Service lands are assessed in the Cumulative Watershed Effects

(CWE) analysis and incorporate changes to soil hydrology (changes to peak flow). The CWE is contained in the project file.

The actions proposed in the various alternatives (e.g. road construction, helicopter landings and fueling areas) result in long-term to permanent impairment of soil productivity and are considered an irretrievable commitment of resources. Parameters evaluating impacts to soil productivity (e.g. soil cover, soil compaction etc) were therefore not assessed, as they were not applicable. Instead, comparisons of acres of long-term to permanent impairment of soil productivity between the alternatives were assessed.

A site visit to review location of road, helicopter fueling area and drop zones was made. Soil textures and rock content were corroborated with those described in the Forest 3rd order soil survey to determine suitability for weight bearing capacity.

Regulatory Framework

The Region 5 Soil Management Handbook establishes standards for soil quality and analysis. These standards provide threshold values that indicate when changes in soil properties and soil conditions would result in significant change or impairment of the productivity potential, hydrologic function, or buffering capacity of the soil. Soil quality standards that address soil productivity (e.g. soil cover, porosity, organic matter etc.), soil buffering capacity, and soil hydrologic functions are described in Appendix L of the Six Rivers LRMP and these standards tier to the Region 5 Soil Quality Standards.

The soil standards pertaining to soil productivity and soil buffer capacity do not apply to dedicated road systems or administrative sites (LRMP IV-71). Construction of roads is a long-term to permanent impairment of soil resources. Best Management Practices that minimize offsite soil damage (erosion and water quality) are discussed in the Hydrology Section 3.7 and in Appendix E.

3.11.2 Existing Condition and Environmental Effects

Introduction

The indicator used to assess and compare differences between alternatives is acres of long-term to permanent loss in soil productivity. Existing conditions for soil productivity will be discussed and the acres of permanent loss in soil productivity will be displayed by alternative.

3.11.2.1 Existing Condition – Soil Productivity

Soils within the proposed treatment area belong to the Clallam-Deadwood family association. Soils within the Clallam-Deadwood family association are inceptisols that are fairly young developmentally. Clallam soils within the treatment area are deep, and

extremely gravelly. They are loamy-skeletal soils with low water holding capacity and are generally found on slopes ranging from 35% to 85%. These Clallam soils are somewhat excessively drained, and generally speaking, are some of the least productive soils found within the Forest due to their very low water holding capacity (e.g. high gravel content). The low water holding capacity makes for a low regeneration potential for new seedlings.

Soils within the Deadwood family are also well to excessively drained and are relatively shallow (bedrock is within 10-20 inches). These soils are also some of the least productive soils on the Forest due to their low water holding capacity. Soils within the Clallam-Deadwood family association have a moderate to high erosion susceptibility. Soil surface textures within the Clallam-Deadwood families varies between extremely gravelly to very gravelly loams with moderate to weak granular structure. Both soils have adequate bearing capacity and are suitable for road construction.

3.11.2.2 Effects of Alternative 1 on Soil Productivity

Direct, Indirect and Cumulative Effects: No ground disturbing activities would occur under this alternative and there would therefore be no direct, indirect or cumulative effects to soil resources or soil productivity.

3.11.2.3 Effects of Alternative 2 on Soil Productivity

Direct and Indirect Effects: Erosion, compaction, and nutrient loss are the principal management-induced changes that may reduce soil productivity. Permanent road construction essentially removes the area of the road prism from the productive land base, although cut and fill slopes typically re-vegetate in time. Hence, road and turnout construction is generally limited to the minimum needed to economically manage an area. Under the Proposed Action 3,926 feet of the road would be built on undisturbed soils and 885 feet of the permanent road construction would be built on an existing temporary roadbed. The width of the disturbed ground associated with proposed road will be approximately 20 feet wide. For the section of the road on the temporary roadbed, the site is already compacted and there would be no additional changes to the impacts. For the section of road on the undisturbed soils, there would be 1.8 acres removed from the productive land base under the Proposed Action. The proposed new construction and reconstruction of the existing temporary road represents a total of 2.2 acres. This would represent a long-term impairment of the soil resource where the road is built.

Cumulative Effects: Cumulative effects to soils are evaluated at the site scale where the activity occurs. The potential to cumulatively impact soil productivity is limited to the building of the proposed road. There are no potential cumulative effects to soils for this project on Forest Service administered lands (e.g. multiple re-entries into a given area for timber harvesting or stand management that could reduce long-term soil productivity).

Instead, there is an irreversible and irretrievable commitment of 2.2 acres of soil resources for the purposes of building an access road to private land in-holdings.

3.11.2.4 Effects of Alternative 3 on Soil Productivity

Direct and Indirect Effects: The effects of the temporary road construction on soil productivity are the same as in alternative 2. Under this alternative 2.2 acres of soil will be lost to productivity as a result of road construction and reconstruction. Over time, the road would re-vegetate to some degree but the original soil productivity would be lost due to soil compaction and mixing of soil horizons during construction.

Cumulative Effects: The cumulative effects are the same as in alternative 2.

3.11.2.5 Effects of Alternative 4 on Soil Productivity

Direct and Indirect Effects: The direct and indirect effects of this alternative are similar to those described in Alternative 2, however the acres of irreversible loss in soil productivity are slightly larger.

Under this alternative, road construction and reconstruction will not occur. Instead, helicopter drop zones (landings) will be used within an existing plantation that has road access associated with an existing temporary road and Forest Road 5N07. These drop zones or landings equal 6 acres in size and will result in long-term to permanent loss of soil productivity within the plantation. In addition to the helicopter drop zones, there will be a new construction of a helicopter fueling/servicing landing on a knoll on the northwestern portion of the Underwood watershed. This fueling area will entail an additional 2 acres of permanent loss in soil productivity at the site of construction. In total, there will be 8 acres of permanent loss in soil productivity associated with this alternative.

3.11.3 Summary of Cumulative Effects

Cumulative effects to soils are evaluated at the site scale where the activity occurs. The potential to cumulatively impact soil productivity is limited to the construction of the helicopter fuel/service landing and the two helicopter drop zones within the plantation. There are no potential cumulative effects to soils for this project on Forest Service administered lands associated with this alternative (e.g. multiple re-entries into a given area for timber harvesting or stand management that could reduce long-term soil productivity). Instead, there is an irreversible and irretrievable commitment of soil resources for the purposes of building two helicopter logging drop zones and a helicopter service/fueling area. In total, these areas equal 8 acres of permanent loss in soil productivity.

3.12 Wildlife

3.12.1 Introduction

Scope of the Analysis

This section includes terrestrial wildlife species and their habitat found in the project area along with the effects of the project on those species and their habitats. See previous sections and chapters for a complete list of projects considered under this action. Species addressed in this analysis include federally endangered and threatened species, Region 5 Forest Service Sensitive Species, and Management Indicator Species (MIS).

Regulatory Framework

A biological assessment/evaluation was prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (19 U.S.C. 1536 (c)) and Forest Service Manual direction (FSM 2672.42). In addition, the project was developed in accordance with the standards and guidelines outlined within the Six Rivers National Forest Land and Resource Management Plan (1995) and the Six Rivers Forest-wide Reference Document for current management direction (March 2004). The following wildlife sections contain information summarized from the Underwood Road Construction/Reconstruction Project Biological Assessment (January 25, 2006), the Underwood Road Construction/Reconstruction Project Biological Evaluation (January 25, 2006), and the Management Indicator Species Review for the Underwood Road Construction/Reconstruction Project (January 26, 2006).

Northwest Forest Plan Survey & Manage Species

With the January 9th, 2006 court order NEA et al vs. Ray et al, Civ. No. 04-844P) ground disturbing activities need to comply or demonstrate consistency with the 2001 Record of Decision (ROD) and Standard and Guidelines for Survey and Manage Species (USDA and USDI 2001). No vertebrates, amphibians, and terrestrial or aquatic mollusks transitioned from Survey & Manage to Sensitive for Six Rivers National Forest. In addition, no suitable habitat for any terrestrial Survey & Manage species exists within the project area, therefore surveys are not required. Survey & Manage species will not be discussed further.

Analysis Methods

Wildlife populations can be affected by environmental conditions that affect the physical and biological habitat features essential for maintaining viable populations. The basic habitat elements include nesting/breeding, foraging and dispersal habitat. The habitat elements are determined from researching habitat and forage preferences throughout species established ranges.

A biological assessment (BA) for federally listed wildlife species and biological evaluation (BE) for Forest Service Sensitive Species were completed for this project on January 25, 2006. This BA and BE analyzed direct, indirect and cumulative effects to federally listed and sensitive wildlife species at the Hog Ranch-Underwood Creek watershed scale (7th field HUC). The 7th field watershed provides a logical analysis area to assess cumulative effects given the fact that home ranges of mobile species such as the northern spotted owl can be contained within size of the Hog Ranch-Underwood Watershed. This rationale is also applied to the species identified within the BA, BE and Management Indicator Species Review. The Hog Ranch-Underwood Watershed is approximately 5,000 acres. The BA and BE examined the short-term impacts of the project as well as any long term cumulative impacts.

Species occurrence is based on historic records, current sightings, and formal surveys documented within the Six Rivers National Forest Wildlife Sighting database. Presence of suitable habitat is based on the Six Rivers National Forest Vegetation Layer, 1998 aerial photographs, as well as field reviews conducted in 2003, 2004, and 2005 by wildlife biologists and botanists. In addition, vegetation polygons within the Forest Vegetation Layer that were mistyped were corrected within this analysis. District Vegetation Staff further validated forest stands (vegetation type and seral stage) through stand exams. Past actions, listed above in Section 3.1.6 are included in the current habitat conditions.

3.12.2 Existing Condition and Environmental Effects

Federally Listed Species

3.12.2.1 Existing Condition – Federally Listed Species

The action area occurs entirely within the matrix land allocation. There are no designated critical habitat units for the northern spotted owl or the marbled murrelet within the project area. In addition, no Late-Successional Reserves are within the project area. The project area is located in Marbled Murrelet Zone II as established in the Northwest Forest Plan. Zone II was established for survey purposes and does not affect land allocations.

The vegetation associated with the proposed alignment is 0.41 acre within an existing Douglas-fir plantation (14 years old) and 1.80 acres within an early mature Douglas-fir stand (85 to 90 years old). The vegetation associated with Alternative 4 includes development of proposed helicopter service areas and landings which entails approximately 8 acres of an existing Douglas –fir plantation (20 to 30 years old).

Northern Spotted Owl and Designated Critical Habitat

There is one known owl activity center within 0.7 miles of the proposed project. Northern spotted owl surveys were conducted for this project in 2001, 2002, 2003 and 2004. Surveys documented a resident single within an existing territory known since at least 1990. The activity center is located greater than .25 miles from the project area. The proposed project does not occur within suitable habitat for this species or within any designated Critical Habitat Unit. There is suitable habitat within .25 miles of the proposed project.

Bald Eagle

There have been no known sightings of bald eagle within the action area. Systematic surveys for bald eagle have not been conducted within the project area. The project area provides little or no opportunities for nesting or wintering bald eagles and does not contain a sufficient or accessible forage base for bald eagles. The project area is not within any designated foraging or nesting territory associated with a designated bald eagle territory. The nearest territory, the South Fork Trinity Bald Eagle Territory is over 2 miles to the south of the project area. The project area does not occur within any designated Critical Habitat Unit for the bald eagle.

Marbled Murrelet and Designated Critical Habitat

There have been no known sightings of marbled murrelets within the Hog Ranch-Underwood Watershed. In 1995 and 1996, extensive surveys were conducted within and adjacent to the analysis area during Phase I of the Marbled Murrelet Range and Distribution Study. The study did not detect marbled murrelets within the project area or the entire study area. In addition, the results of the "Status of the Marbled Murrelet in Interior Northwestern California: Final Results" indicate that it is unlikely that murrelets currently use the planning area. The entire project area occurs in Marbled Murrelet Zone 2 and is approximately 35 miles from coastal waters. The proposed project does not occur within suitable habitat for this species or within any designated Critical Habitat Unit.

3.12.2.2 Effects of Alternative 1 on Federally Listed Species

Direct, Indirect, and Cumulative Effects: No Action retains the project area within its present condition. The No Action Alternative provides a point of reference through development of an environment baseline based upon existing information and data. Because there would be no effect associated with the No Action Alternative, there would not be any cumulative effects.

3.12.2.3 Effects of Alternatives 2 and 3 on Federally Listed Species

There are no proposed activities in Alternatives 2 and 3 within suitable northern spotted owl nesting and roosting habitat and no activities will occur within 0.25 mile of

occupied suitable habitat during the breeding season. Implementation of either Alternative 2 or 3 would adhere to a seasonal restriction specific to the operation of mechanized equipment within 0.25 miles (0.5 km) of a northern spotted owl activity center from February 1 to July 31.

No proposed activities would degrade or remove suitable northern spotted owl habitat. Therefore, no direct and indirect effects to the northern spotted owl will occur as a result of project implementation. Given that there are no direct and indirect effects to the northern spotted owl or any Critical Habitat, there would be no cumulative effects to the species.

The action area is not within any known nesting territory for the bald eagle. Alternatives 2 and 3 would have no direct, indirect, or cumulative effects to bald eagles or their habitat. No suitable or designated habitat would be affected.

There are no proposed activities within suitable marbled murrelet nesting habitat. Suitable murrelet habitat would not be degraded or removed with these activities. Therefore, direct injury to a marbled murrelet would not occur as a result of project implementation. Activities that generate noise during the murrelet breeding season, March 24 through September 15, have potential to create disturbance within 0.25 mile of suitable murrelet nesting habitat. However, there are no known marbled murrelets nests or occupied behavior within 0.25 mile of the proposed project activities. Based on this information, there would be no direct effect from proposing noise-generating activities on breeding murrelets.

Alternatives 2 and 3 would have no direct and indirect effects to marbled murrelets. Given that there are no direct and indirect effects to the marbled murrelet or any Critical Habitat, there would be no cumulative effects to the species.

3.12.2.4 Effects of Alternative 4 on Federally Listed Species

Alternative 4 would not degrade or remove suitable habitat for Federally Listed Species. There are no known bald eagles or marbled murrelets within the project area. In addition, the helicopter flight paths identified with Alternative 4 would avoid potential effects for noise disturbance to the Northern Spotted Owl Activity Center. A Limited Operating Period has been established for a 0.25 mile radius surrounding the activity center.

Forest Service Sensitive Species

3.12.2.5 Existing Condition – Forest Service Sensitive Species

Peregrine Falcon

Peregrine falcons are not known to use the area within and adjacent to the action area. There are no historic records or observations for the peregrine falcon within the project

area. There are no designated nest site protection zones, primary territory disturbance zones, or suitable nesting habitat (cliffs) present within 1.0 mile of the action area. However, Peregrine falcons have been observed north, west and southwest of the project area. The watershed (Hog Ranch -Underwood) contains foraging habitat, however, limited nesting habitat for the peregrine falcon is present within the watershed. The nearest known nest location is located approximately 1.50 air miles northwest of the project area. No surveys have been conducted for the peregrine falcon within the action area.

Pacific Fisher

Numerous detections have been recorded on the Lower Trinity Ranger District and Mad River Ranger District, as part of the SRNF Fisher Study (Zielinski et al 1995) and incidental sightings. Fishers are known to occur within the Hog Ranch-Underwood Watershed based on historic sighting records. No surveys have been conducted for fisher within the project area. However, the Forest Wildlife Observation Database contains two records adjacent to the project area, which were recorded approximately 0.50 miles south and 1.2 miles southeast of the project area. No natal dens are known to occur within the proposed project area. Suitable habitat does not occur within the proposed road of Alternatives 2 and 3 or proposed landings of Alternative 4. The proposed road or proposed helicopter and service areas does not contain any suitable habitat for the Pacific fisher, however suitable habitat exists within 0.25 miles of the action area.

American Marten

The Forest Wildlife Database reports several sightings of marten on the Lower Trinity Ranger District. However, there are no recorded sightings or observations within the Forest Wildlife Sighting Database for the Hog Ranch – Underwood Watershed. No detections or natal dens are known to occur within the action area. No suitable habitat for the marten exists within and adjacent to the project area due to the absence of the true fir series. No surveys have been conducted for marten within the action area due to the lack of habitat (true fir & white fir series) within and adjacent to the action area.

Northern Goshawk

There are no known sightings or nest sites for the northern goshawk within the project area within the Forest Wildlife Observation Database. Surveys were conducted, using an intensive protocol, within and adjacent to the project area in the summer of 2003 and 2004 and no detections were recorded. However, during field reviews of the project area, audio and visual detections of goshawks occurred approximately 0.50 to 0.80 miles from the project area. Detailed stand searches by wildlife biologists found no existing or potential goshawk nests currently existing along or within 1.0 mile of the proposed road in Alternatives 2 and 3. Suitable habitat does not occur within any proposed landings associated with Alternative 4. The nearest known northern Goshawk Territory is located approximately 5 air miles west of the action area.

The proposed project does not occur within any identified nesting or foraging zone associated with any designated goshawk territories. There are no known goshawk nesting territories within the action area. The project does not occur in suitable habitat for this species; however, there is suitable habitat within 0.25 miles of the action area.

Western Pond Turtle

There are no known recorded sightings of western pond turtle in the planning area. There is no suitable habitat for the species within the action area. No surveys have been conducted for this project but based on incidental sightings and fisheries stream surveys, pond turtles appear to be more prolific in major river systems, the lower portions of major tributaries and permanent ponds.

All management activities proposed with the project do not occur within suitable habitat (pond habitat, slough, low gradients streams w/ side channels)) for this species. The western pond turtle and its habitat would not be affected; therefore, the proposed action is not anticipated to have any direct, indirect or cumulative effect on the Western pond turtle.

Foothill yellow-legged Frog

In general, on the Lower Trinity Ranger District, yellow-legged frog habitat is limited to major rivers, the lowest portions of major tributaries and permanent ponds. Detections have occurred from fisheries stream surveys, herpetofauna surveys in the North Fork Eel River (Wicktor 1996) and Pilot Creek watersheds (Zabel et al 1996), and incidental sightings. No surveys have been conducted in the project area, but it is highly unlikely that the foothill yellow-legged frog inhabits the ephemeral and intermittent/perennial channels in the planning area. Use of upslope areas and secondary tributaries is unlikely, as these areas do not provide a source of water most of the year.

No management activities are proposed within perennial streamcourses. The streamcourses within the project area do not flow year long and are subject to sub-surface flow during the summer and fall months. No habitat for this species would be affected by project implementation; therefore, Alternatives 2, 3 and 4 would not have any direct, indirect or cumulative effect on the foothill yellow-legged frog.

Townsend's Big Eared Bat

Townsend's big-eared bat has been detected on the Lower Trinity Ranger District (Siedman 1999). The big-eared bat depends on caves, abandoned mines, and buildings for breeding and roosting areas. The planning area does not contain caves, bridges, buildings, or other structures used by this species. No known caves and/or abandoned mines are present within the action area and within the Hog Ranch-Underwood Watershed. There have been no incidental detections or surveys for this species within the planning area.

The proposed action would not have any direct, indirect or cumulative effect on the Townsend's big-eared bat.

California Wolverine

California wolverine generally inhabits higher elevation, timberline sites, but is known to travel through lower elevation coniferous forests. There have been no validated sightings of wolverine on the Lower Trinity Ranger District and it is doubtful they will occur with any frequency. Surveys have not been conducted for the California wolverine within the project area. Surveys conducted as part of the SRNF Fisher Study did not detect wolverine on the Lower Trinity and Mad River Ranger Districts. Given, the lack of high elevation montane habitat as well as the lack of large areas of isolated montane habitat areas, it is doubtful that the California wolverine exists within the Hog Ranch-Underwood Watershed. The proposed action is not anticipated to have any direct, indirect or cumulative effect on the California wolverine.

Southern Torrent Salamander

The southern torrent salamander is found in headwater streams, first or second order streams, or shallow streams with abundant cobble and fine sediments. They also are found in seeps and in association with abundant moss. Southern torrent salamanders are susceptible to water loss and have a very narrow thermal tolerance range, which limits their use of upland habitat and dispersal capabilities. Surveys have not been conducted in the project area, but it is unlikely that the southern torrent salamander inhabits the intermittent and ephemeral stream channels in the planning area. All the channels in the project area are ephemerals and intermittent/perennial, the flow of the intermittent/perennial streamcourses during the summer and fall months is subsurface. Use of upslope areas and secondary tributaries is unlikely, as these areas do not provide a source a source of water most of the year.

All management activities proposed with the project do not occur within suitable habitat for this species. The Southern torrent salamander and its habitat would not be affected; therefore, the proposed action is not anticipated to have any direct, indirect or cumulative effect on the Southern torrent salamander.

Northern Red-legged Frog

This species frequents marshes, slow parts of streams, lakes, reservoirs, and usually permanent water. Northern red-legged frogs are relatively common on the Six Rivers National Forest. There are no recorded sightings of red-legged frogs in the planning area. The action area does not contain any suitable habitat.

All management activities proposed with the project do not occur within suitable habitat for this species. The northern red-legged frog and its habitat would not be affected;

therefore the proposed action is not anticipated to have any direct, indirect or cumulative effect on the northern red-legged frog.

3.12.2.6 Effects of Alternative 1 (no action) on Forest Service Sensitive Species

Direct, Indirect, and Cumulative Effects: The No Action Alternative retains the project area within its present condition. The No Action Alternative provides a point of reference through development of an environment baseline based upon existing information and data. Because there would be no effect associated with the No Action Alternative, there would not be any expected cumulative effects.

3.12.2.7 Effects of Alternatives 2 and 3 on Forest Service Sensitive Species

Implementation of Alternatives 2 or 3 would not degrade or remove suitable habitat for the American peregrine falcon, northern goshawk, American marten, western pond turtle, southern torrent salamander, Pacific fisher, northern goshawk, foothill yellow-legged frog, California wolverine, Townsend's big-eared bat, and the northern red-legged frog. There is no suitable habitat for sensitive species associated with Alternatives 2 and 3.

3.12.2.8 Effects of Alternative 4 on Forest Service Sensitive Species

Implementation of Alternative 4 would not degrade or remove suitable habitat for Forest Service Sensitive Species. There is no suitable habitat for sensitive species associated with the implementation of Alternative 4.

Management Indicator Species

Management Indicator Species (MIS) are used to assess potential effects of management activities on the various habitats and habitat assemblages with which these species are associated. There are seven habitat assemblages containing forty-one fish and wildlife species on the Forest. Table 3-9 displays MIS on the Six Rivers National Forest and whether or not their habitat is affected by this project. The proposed project does contain suitable habitat for 22 of the 41 identified MIS.

Table 3-9 Six Rivers Management Indicator Species and habitat affected

Management Indicator Species	Is Habitat Affected?
INDIVIDUAL SPECIES	
Northern spotted owl	No
Pileated woodpecker	Yes
Black bear	Yes

American marten	No
Fisher	No
Black tailed deer	Yes
BOG/SEEP/WET MEADOW ASSEMBLAGE	
Olympic/Southern Torrent Salamander	No
MARSH/LAKE/POND ASSEMBLAGE	
California red-legged frog	No
Western pond turtle	No
Wood duck	No
RIVER/STREAM/CREEK ASSEMBLAGE	
Cutthroat trout	No
Steelhead/Rainbow trout	Yes
Summer steelhead	No
Tailed frog	No
Common merganser	No
Ruffed grouse	No
Winter wren	No
American dipper	No
Yellow-breasted chat	No
TAN OAK/MADRONE ASSEMBLAGE	
Hammond's flycatcher	Yes
Western tanager	Yes
Black-headed grosbeak	Yes
SNAG ASSEMBLAGE	
Flammulated owl	Yes
Screech owl	Yes
Red-breasted sapsucker	Yes
Downy woodpecker	Yes
Hairy woodpecker	Yes
White-headed woodpecker	No
Vaux's swift	Yes
Brown creeper	Yes
Western bluebird	No
Douglas squirrel	Yes

DOWN WOODY MATERIAL ASSEMBLAGE	
Arboreal salamander	No
Clouded salamander	No
Blue grouse	Yes
Dusky-footed woodrat	Yes
Western fence lizard	Yes
BLACK OAK/WHITE OAK ASSEMBLAGE	
Acorn woodpecker	No
Scrub jay	No
Lazuli bunting	No
Western gray squirrel	Yes

Northern spotted owl, American marten, Pacific fisher, and the Olympic/Southern Torrent salamander are addressed above and Steelhead/Rainbow trout are addressed in Section 3.5 Fisheries.

3.12.2.9 Existing Condition – Management Indicator Species

Pileated Woodpecker

Suitable and optimal pileated woodpecker habitat is similar to conditions preferred by the northern spotted owl and the fisher. Pileated woodpeckers prefer multi-storied mature and late-mature successional conifer forests with moderate to dense canopy closure, and abundant snags and down logs. This species forages primarily in dead wood; therefore, both standing snag and down log densities are important indicators of habitat quality.

Surveys were not conducted for the pileated woodpecker within the project area. However, this species has been detected on the Pilot Creek Breeding Bird Survey Route, approximately 5 miles west of the project area. This species was recorded an average of 1.33 observation with a range 1 to 4 detections per survey since route initiation in 1994 .

Suitable habitat for the pileated woodpecker exists within the project area. Approximately 1.80 acres of marginal low quality habitat (early mature Douglas-fir, 85 to 90 years old) occur within the existing proposed road.

The average home range for pileated woodpeckers in northeastern Oregon was 128 to 240 hectares (320 or 600 acres). Minimum breeding density was 1 pair for 1629 acres (Bull and Meslow 1977).

Black Bear

The black bear is a widespread, common to uncommon resident occurring from sea level to high mountain regions. The black bear occurs in dense, mature stands of forest habitats, and feeds in a variety of habitats including brushy stands of forest, valley foothill riparian, and wet meadow. This species requires large trees and various cavities and hollows in trees, snags, stumps, logs, uprooted trees, talus slopes, or in the earth for denning. These habitat elements must be in mature, dense vegetation, and on sheltered slopes for adequate denning.

The black bear was selected as an MIS because of its habitat association with mid and late-successional stages of all forest vegetation types, meadow types, and large down log requirements. The California Department of Fish and Game (CDFG) monitors black bear populations within northwestern California. CDFG estimates the population in 2001 to be approximately 17,000 to 23,000 animals and reports the population to be increasing.. The northern portion of California is continually noted by CDFG as supporting the highest density of bears of any area within the western United States. There are no sightings listed within the Forest Wildlife Database recorded for this species within the project area; however, common species are not always recorded in the incidental sightings database. Extensive forest carnivore track plate and infrared camera surveys occurred approximately 5 miles south and west of the project area. Bears were detected at 10 of 39 stations.

Approximately 1.80 acres of low quality habitat (early mature Douglas-fir, Age = 85-90 yrs) occur within the existing proposed road construction alignment.

The average home range for male black bears in northwestern California is approximately 4.1 square miles (2,624 acres), with female home ranges averaging 1.39 square miles (896 acres) (Kellyhouse 1975).

Black-tailed Deer

The black-tailed deer is a widespread, common to abundant resident distributed throughout most of California, except in deserts and intensively farmed areas without cover (Longhurst et al 1952, Ingles 1965). The species occur in early to intermediate successional stages of most forest, woodland, and brush habitats. Habitat preferences include a mosaic of various-aged vegetation that provides woody cover, meadow and shrubby openings, and free water.

Black-tailed deer populations in the Mad River Deer Herd are monitored by California Department of Fish and Game (CDFG). The project does not occur in the critical wintering range areas for the Mad River Deer Herd (Mad River Deer Herd Management Plan, California CDFG/US Forest Service 1984). The project is located within North Coast Management Unit (DAU-1) as delineated by CDFG. The Department of Fish and Game has noted that the North Coast Management Unit is the most productive in terms of

deer/square mile. The deer population has been considered stable in recent years with population surveys yielding census counts from 170,000 to 250,000 individuals.

Suitable habitat for the black-tailed deer exists within the project area. Approximately 1.80 acres of moderate to low quality habitat occurs within the project area.

The average home range for small doe and fawn groups were 0.4 - 1.1 square miles, but varied from 0.2 – 1.9 square miles in Lake County. Typical home ranges are usually less than 1 square mile (640 acres) in diameter (Timmossi 1990).

Hammonds Flycatcher

The Hammonds flycatcher is a common summer resident in dense coniferous forests at about 4000-8000 ft from Cascade Range south along the western slope of the Sierra Nevada to Kern Co. Preferred nesting habitats include mixed conifer and red fir; also may nest in denser Jeffrey and ponderosa pine habitats, and in Douglas-fir habitat in the mountains of the North Coast down to about 2000 ft. Common spring (mid-April to early May) and uncommon fall (September to early October) transient in all wooded habitats from sea level to timberline throughout interior and southern coastal California.

This species frequents older forest, which provides well-shaded nesting and roosting sites, singing posts, and foraging perches. Nests are most commonly found in deeply shaded foliage underneath dense canopy of older forests.

This species has been recorded associated with the Pilot Creek Breeding Bird Survey Route (CAL – 903) with an average detection rate of 6.0 per route per annum (range 6-12/survey). This species was not detected during bird point-count surveys conducted in association with the Marbled Murrelet Range and Distribution Study.

Habitat conditions present within the project area for the Hammond's flycatcher are low to moderate quality level utilizing the habitat classification database found within the California Wildlife Habitat Relationship System. Approximately 1.80 acres of moderate to high quality habitat exists within the project area.

Manuwal (1970) recorded mean breeding territory of 2.6 acres (range 1.5 to 3.8 acres). Breeding density varied from 5.6 to 18.8 males per 100 acres (Beaver and Baldwin 1975).

Western Tanager

The western tanager is a common breeding resident of montane forests throughout most of the state, including coastal ranges. This species is common and widespread in migration in foothills and lowlands. For breeding, this species prefers moderately open, mature coniferous forests with associated hardwoods, but also frequents edges of denser stands. It is probably most common in mixed conifer and montane hardwood-conifer habitats but also nests in montane hardwood habitat, including stands dominated by live

oaks. Occurs widely in other wooded habitats in migration; in winter prefers groves of exotic trees, especially flowering eucalyptus. This species breeds in the Coast Ranges, usually avoiding fog belt (Grinnell and Miller 1944, McCaskie et al. 1988, Garrett and Dunn 1981).

This species has been recorded associated with the Pilot Creek Breeding Bird Survey Route (CAL – 903) with an average detection rate of 28.67 per route per annum (range 25-37/survey). In addition, bird point-count surveys conducted in association with the Marbled Murrelet R&D detected western tanager at 13 stations, with 51 total detections.

Habitat conditions present within the planning area for the western tanager are classified at the low to moderate quality level utilizing the habitat classification database found within the California Wildlife Habitat Relationship System. Approximately 1.8 acres of habitat exists within the road construction alignment. There was no information found on home range size for this species, although breeding densities in Oregon coniferous forests have been reported from 21 to 46 males per 100 acres (Wiens and Nussbaum 1975). For the purposes of this analysis, it is assumed that the home range size for this species is 2.2 acres at a minimum.

Black-headed Grosbeak

The black-headed grosbeak is a common summer resident and transient. This species is a common breeder throughout most of California, excluding higher mountains, Great Basin, and southern deserts. This species frequents valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, and montane riparian habitats. It is less common in other wooded habitats of lower montane elevations, often near water and areas where deciduous oaks are numerous. It is a rare and irregular in California from October to late March (Grinnell and Miller 1944, McCaskie et al. 1988, Garrett and Dunn 1981). This species builds nest in a shrub or tree, often beside stream or other water, but may be located away from water in open woodland, orchard, or near edge of denser woodland. The black-headed grosbeak occurs in open woodlands and near edges of denser stands and favors habitats with deciduous trees, especially oaks, and a diversity of plant life.

This species has been recorded associated with the Pilot Creek Breeding Bird Survey Route (CAL – 903) with an average detection rate of 5.0 per route per annum (range 3-9/survey). In addition, bird point-count surveys conducted in association with the Marbled Murrelet R&D detected black-headed grosbeak at 14 stations, with 28 total detections.

Habitat conditions present within the planning area for the black-headed grosbeak are classified at the low to moderate quality level utilizing the habitat classification database found within the California Wildlife Habitat Relationship System. Approximately 1.80 acres of moderate to low quality habitat exists within the road construction alignment. There was no information found on home range size for this species, although breeding densities have been reported from 31 to 66 males per 100 acres (Gaines 1974). For the

purposes of this analysis, it is assumed that the home range size for this species is 1.5 acres at a minimum.

Flammulated owl

Flammulated owls are an uncommon summer resident locally in a variety of coniferous habitats from ponderosa pine to red fir forests. The species breeds within the North Coast and Klamath Ranges, Sierra Nevada, and within suitable habitat in mountains in southern California. This species is found within montane regions from 6,000 to 10,000 feet in elevation. Flammulated owls roost close to the trunks of fir or pine trees, and may occasionally use cavities in trees or snags for cover (Zeiner et al. 1990). Males utilize territorial “song posts”, which are mostly associated with mature, open stands of mixed ponderosa pine and Douglas fir (Reynolds and Linkart 1987). They prefer habitat types with low to intermediate canopy closure. Flammulated owls are secondary cavity-nesters in snags or live trees, and use cavities created by primary cavity-nesters such as woodpeckers. The standards and guidelines for snags for woodpeckers and other primary cavity-nesting species would provide for retaining habitat characteristics favorable for the flammulated owl.

This species was not detected during the Pilot Creek BBS route or the point count surveys associated with the Marbled Murrelet R&D. There are no observations or sightings records within the Forest Wildlife Database for the flammulated owl within the Hog Ranch – Underwood Watershed.

Habitat conditions within the planning area for the flammulated owl are classified at the low level utilizing the habitat classification database found within the California Wildlife Habitat Relationship System. Approximately 1.8 acres of low quality habitat exists within the project area. High quality habitat is associated with old growth ponderosa pine forests, mixed with California black oak and Douglas fir combined with fairly open canopies.

The average home range for 2 males in the Sierra Nevada was 40 hectares (100 acres) (Winter 1974). Breeding densities have varied from 3.2 to 5.2 males per 100 hectares (247 acres) (Marshall 1939, Winter 1974).

Screech owl

The western screech owl is an uncommon to common, yearlong resident of open, pinyon juniper, riparian, redwood, and mixed conifer habitats. The species occurs within the length of the state of California to 8,000 feet in elevation with the exception of the central and western portions of the Mojave Desert (Garret and Dunn 1981). Western screech owls are secondary cavity nesters and typically utilize abandoned woodpecker cavities for nesting as well as hollow trees, logs, and stumps. The species utilizes a variety

of habitats from coniferous to oak-woodland forest communities in combination with openings, meadows and riparian areas.

Approximately 1.80 acres of low quality habitat exists within the project area. There were no detections of western screech owls during the Pilot Creek BBS route, the point count surveys associated with the Marbled Murrelet R&D, or during spotted owl surveys of the project. The average home range identified by Craighead and Craighead (1956) reported 1 to 1.3 square kilometers (0.4 to 0.5 per square mile, 256 acres to 320 acres) in winter and 1.8 to 5 per square kilometers (0.7 to 1.9 per square mile; 914 acres to 1216 acres) in summer. Mean territory size in Kansas woodlands was 0.3 hectares (0.7 acres; Fitch 1947).

Red-breasted sapsucker

An uncommon to fairly common, yearlong or summer resident in open wooded mountainous regions of California. This species occurs from the Oregon border south in Coast Ranges and along coast to Marin County, and along both the eastern and western slopes of the Cascade Range and Sierra Nevada south to Kern County (Grinnell and Miller 1944, Zeiner et al. 1990). Like other sapsuckers and woodpeckers, the red-breasted sapsucker requires tree cavities for nesting and roosting. The species is an important cavity excavator, providing nest and roost cavities for a community of secondary cavity nesters. Snags and hardwood availability are habitat variables of special consideration for these sapsuckers (Airola 1980). The species prefers nesting habitat within montane riparian habitats (aspen), montane hardwood-conifer, mixed conifer and red fir, especially near meadows, clearings, lakes, and slow moving streams.

The species has been recorded associated with the Pilot Creek Breeding Bird Survey Route (CAL – 903) with an average detection rate of 5.00 per route per annum (range 2-10). In addition, bird point-count surveys conducted in association with the Marbled Murrelet R&D detected red-breasted sapsuckers at 8 stations, with 15 total detections.

Approximately 1.8 acres of moderate quality habitat exists within the project area.

The average territory size as identified by Howell (1952) in Modoc County, California was a minimum of 45 meters (150 ft) around the nest, and up to 6.1 hectares (15 acres).

Downy woodpecker

This species is a common, yearlong resident of riparian deciduous and associated hardwood and conifer habitats. The downy woodpecker occurs throughout the state of California with the exception of the southern California desert regions and is typically found below 5900 feet in elevation. The species is closely associated with riparian softwoods and is also utilizes hardwood and conifer in close proximity to riparian habitats. The downy woodpecker exhibits a preference for aspen communities adjacent to riparian conifer/deciduous habitats.

The species has not been recorded on the Pilot Creek Breeding Bird Survey Route (CAL – 903) since route initiation in 1994, nor was it detected during the bird point-count surveys conducted in association with the Marbled Murrelet R&D.

Approximately 1.8 acres of low quality habitat exists within the project area.

The average territory size reported by Lawrence (1967) in Ontario reported breeding territories of 2.0 and 3.2 hectares (5 and 9 acres).

Hairy woodpecker

A fairly common, permanent resident of mixed conifer and riparian deciduous habitats from sea level to 9,000 feet in elevation. The species occurs throughout the state of California, but scarce to absent in portion of coastal central California, Central Valley, Salinas Valley, Mojave, and the Great Basin. Specific habitat includes relatively open or patchy stands of conifers with adjacent riparian habitats and abundant snags. The hairy woodpecker is a primary cavity excavator and develops cavities within the interior of snags and or dead branches.

The species has been recorded associated with the Pilot Creek Breeding Bird Survey Route (CAL – 903) with an average detection of 4.33 per route per annum (range 1-9 per survey). In addition, bird point-count surveys conducted in association with the Marbled Murrelet R&D detected hairy woodpecker at 6 stations, with 10 total detections.

Approximately 1.8 acres of low quality habitat exist within the project area. The average territory size reported by Lawrence (1967) is 2.8 hectares (7 acres) and ranged from 2.4 to 3.2 hectares (6-8 acres) for the hairy woodpecker.

Vaux's swift

Vaux's swifts are summer breeding residents of northern California. They breed fairly common in the Coast Ranges from Sonoma County in the North and very locally south to Santa Cruz County. The species prefers redwood and Douglas-fir habitats with nest sites in hollow trees and snags (Baldwin and Hunter 1963). They are fairly common migrants throughout most of the state in April and May, and August and September. Vaux's swift occur in spring and summer, although not necessarily as breeders, on the (Timossi 1990). Timossi (1990) indicates a wide variety of tree sizes and cover classes are used for reproduction, feeding, and cover, however, Baldwin and Zaczkowski (1963) found nests in stubs in areas with continuous canopy. Because forest edges, meadows, burned areas and special features like streams, rivers, ponds, and lakes are used for foraging, habitat fragmentation would appear to have little effect on these swifts.

Vaux's swifts are likely to be sensitive to activities that limit the availability of snags and stubs for nesting and roosting. Habitat characteristics that can be maintained through

management include the retention and enhancement of stream and meadow habitat for foraging areas as well as large snags.

The species has not been recorded associated with the Pilot Creek Breeding Bird Survey Route (CAL – 903) since route initiation in 1994, nor was it detected during bird point-count surveys conducted in association with the Marbled Murrelet R&D.

Approximately 1.8 acres of moderate quality habitat exists within the project area. The average home range reported by Bull and Beckwith (1993) is identified a maximum of 5.4 kilometers from nests, however during the majority of the study radio-tagged swifts were recorded within 1.0 square kilometer (247 acres) of the nest.

Brown creeper

A common to uncommon resident in montane habitats throughout the state of California, and in coastal conifer habitats south to San Luis Obispo County. A rare transient in southern deserts on Channel Islands in fall and winter. The species prefers habitats containing dense, mature stands of conifers, but is also found in hardwood and hardwood –conifer habitats, especially in winter (Grinnell and Miller 1944, Garrett and Dunn 1981). Hardwoods and riparian deciduous trees are also used as a source of cover primarily during winter. Nests are typically constructed behind loose bark and rarely within cavities and are found usually within old-growth incense cedar, coastal redwood, pine, fir, or snags.

The species has been recorded associated with the Pilot Creek Breeding Bird Survey Route (CAL – 903) with an average detection rate of 5.33 per route per annum (range 2-17/survey). In addition, bird point-count surveys conducted in association with the Marbled Murrelet R&D detected the brown creeper at 20 stations, with 119 total detections.

The average home range for the brown creeper identified by Bock and Lynch (1970) within the Sierra Nevada was 11 hectares (27 acres). Approximately 1.80 acres of low quality habitat for this species exists within the project area.

Douglas squirrel

Common, yearlong resident of conifer, hardwood conifer, and riparian habitats of the Sierra Nevada, Cascade, Klamath, North Coast, and Warner Ranges. The Douglas squirrel occurs in California from sea level to 11,000 feet in elevation. Douglas squirrels are omnivorous and eat primarily conifer seeds and fungi as well as occasionally arthropods, bird eggs and nestlings. Mature trees with substantial crown closure provide cover. The species generally avoids forested habitats with considerable shrub understory. Reproductive activity occurs within mature conifer stands and nests are usually located within vacant cavities within live green trees and snags. However, the Douglas squirrel is known to utilize rock cavities and nests of vegetative material located in the upper canopy.

Bird point-count surveys conducted in association with the Marbled Murrelet R&D detected Douglas squirrel at 20 stations, with 48 total detections. In addition, extensive forest carnivore track plate and infrared camera surveys have occurred throughout the project area. Douglas squirrel were detected at 31 of 39 stations.

The average home range for the Douglas squirrel reported by Smith (1968) identified 0.5 hectare (1.25 acre).

Blue grouse

Uncommon to common permanent resident at middle to high elevations. Occurs in open, medium to mature stands of fir, Douglas fir, and other conifer habitats, interspersed with medium to large openings and available water. Inhabits North Coast Ranges in northwestern California, and the Klamath, Sierra Nevada, and portions of the Warner, White, and Tehachapi Mountains. The blue grouse utilizes firs and other conifers with dense canopy closure for cover. The primary food items include conifer needles (especially fir and Douglas fir), fruits, flowers, seeds, insects, land snails, and spiders. The species primarily nests on the ground, usually associated with brushy areas adjacent to downed logs or under low tree branches or shrub cover.

As noted by CDFG, blue grouse populations within northern California remain consistently stable which is reflected in the stability of the hunter harvest bag limit regulations over the last 5-8 years. No systematic surveys for this species have been conducted within the project area; however, the species has been recorded associated with the Pilot Creek Breeding Bird Survey Route (CAL – 903), an average detection rate associated of 1.33 per route per annum (range 1-2/survey). In addition, bird point-count surveys conducted in association with the Marbled Murrelet R&D detected blue grouse at 3 stations, with 3 total detections.

Habitat conditions present within the planning area for the blue grouse are classified at the moderate quality level utilizing the habitat classification database found within the California Wildlife Habitat Relationship System. Approximately 1.8 acres of moderate quality habitat exists within the project area.

The average home range size for the blue grouse reported by Mussehl (1960) averaged 51 hectares (126 acres), and varied from 12.5 to 115 hectares (31 – 283 acres).

Dusky-footed woodrat

The dusky-footed woodrat is common in California. It is found throughout the Coast Ranges, and in the northern interior (central Siskiyou County, Modoc County, Lassen County, and Shasta County). The species is also widespread along the entire western slope of the Sierra Nevada, mostly below 7,000 feet. The dusky-footed woodrat is abundant in forest habitats of moderate canopy closure and moderate to dense understory. Food items include a variety of woody plants and fungi, flowers, grasses, and acorns. Nest sites are

constructed of sticks, grasses and leaves at the base of trees, shrubs, or often at the base of hills.

Extensive forest carnivore track plate and infrared camera surveys have occurred throughout the adjacent watershed (Grouse Creek) and dusky-footed woodrats were detected at 3 of 39 stations.

Habitat conditions present within the planning area for the dusky-footed woodrat are classified at the moderate quality level utilizing the habitat classification database found within the California Wildlife Habitat Relationship System. Approximately 1.80 acres of moderate quality habitat exists within the project area.

The average home range size for the dusky-footed woodrat as reported by Cranford (1977) identified 0.23 hectares (0.58 acres) for males and 0.19 hectares (0.43 acres) for females.

Western fence lizard

The western fence lizard is probably California's most common reptile. This adaptable lizard is found throughout California except in true desert, where it is restricted to riparian and high mountain locations. The species ranges in elevation from sea level to 10,000 feet. Western fence lizards utilize a variety of habitats from valley-hardwood, grasslands, coniferous, hardwood, and alpine communities. Cover includes tree trunks, woodpiles, wooden fences, rock piles, crevices, burrows, and accumulations of coarse woody debris. Eggs are usually laid within damp, friable, well-aerated soil, in pits dug by females.

There are no sighting records for this species within the Forest Wildlife Observation Database for the Hog Ranch-Underwood Watershed, however, this common species was observed with relative abundance within the project area during field reviews.

Habitat conditions present within the planning area for the western fence lizard are classified at the moderate quality level utilizing the habitat classification database found within the California Wildlife Habitat Relationship System. Approximately 1.8 acres of moderate quality habitat exists within the project area.

Habitat conditions present within the planning area for the western fence lizard are classified at the moderate quality level utilizing the habitat classification database found within the California Wildlife Habitat Relationship System. Approximately 1.80 acres of moderate quality habitat exists within the project area.

Home range sizes vary geographically and in response to resource abundance. Tanner and Hopkins (1972) calculated home ranges for fence lizards in open shrub habitat in Nevada at 0.1 to 0.5 acres for males and 0.04 to 0.2 acres for females.

Western gray squirrel

Fairly common locally in mature stands of most conifer, hardwood, and mixed hardwood-conifer habitats in the Klamath, Cascade, Transverse, Peninsular, and Sierra Nevada Ranges (Ingles 1965). The species uses mature trees for cover and requires cavities in trees and snags for nests. Typically, the western gray squirrel utilizes abandoned woodpecker cavities or constructs nests on tree branches composed of shredded bark, grass, mosses, or lichens. The squirrel is highly associated with conifer and oak habitats. Oak mast and hypogenous fungi are vital components of the diet, however, pine nuts, forbs, grasses, and leaves are also consumed.

This species has not been detected during the Pilot Creek BBS route, bird counts associated with the Marbled Murrelet R&D, or the forest carnivore study. The Six Rivers NF Wildlife Sighting Record Database contains no sighting records for the project area; however, numerous incidental sightings of the species have occurred during field reviews of the project area.

Habitat conditions present within the planning area for the western gray squirrel are classified at the low quality level utilizing the habitat classification database found within the California Wildlife Habitat Relationship System. Approximately 1.8 acres of low quality habitat exists within the project area.

The average home range size as depicted by Ingles (1947) reported 0.5 –1.8 acres for females and 1.2 to 2.5 acres for males for the western gray squirrel.

3.12.2.10 Effects of Alternative 1 on Management Indicator Species

Direct, Indirect, and Cumulative Effects: The No Action Alternative retains the project area within its present condition. The No Action Alternative provides a point of reference through development of an environment baseline based upon existing information and data. Because there would be no effect associated with no action, there would not be any cumulative effects.

3.12.2.11 Effects of Action Alternatives 2 and 3 on Management Indicator Species

Implementation of the Alternative 2 would result in the decrease of approximately 1.80 acres of habitat in the project area due to road construction, whereas, implementation of Alternative 3 would result in a temporal removal of approximately 1.80 acres of habitat given that the road would be decommissioned and the process of forest succession would be initiated. Other potential impacts to MIS species have been mitigated primarily through the design of road, which avoids mature forest habitats (old-growth, late-mature & mid-mature) as well as a Late Successional Reserves. The effects of MIS would be minimal; based on species-specific requirements approximately 0.04% to 2.0% of suitable

habitat within the watershed would be affected by Alternatives 2 and 3. The loss of canopy closure due to road construction will be minimal. Canopy closure within the road will be retained at approximately 40% after the project is completed.

Alternatives 2 and 3 would retain habitat conditions favorable for the species. Specifically, the retention of all snags within the adjacent forested stands would be retained. Field reviews of the project area specific to downed log and snag retention levels validate that 3.9 snags per acre and 5 downed logs per acre would be maintained.

Given the past effects to habitat, as well as the reasonable and foreseeable future actions (private and USFS, the project will remove approximately 0.04 to 2.0% of the total early mature habitat available in the Hog Ranch-Underwood Watershed for Management Indicator Species. The effect to Management Indicator Species, which utilize early mature habitats, is minimal.

3.12.2.12 Effects of Alternative 4 on Management Indicator Species

Alternative 4 involves the development of helicopter drop zones and a service landing on approximately 8 acres within Douglas-fir plantations (30-40 years of age). Implementation of Alternative 4 would not result in degradation or removal of suitable habitat for Management Indicator Species. The development of service landings and helicopter landings would not involve the removal or degradation of suitable habitat for Management Indicator Species.

3.12.2.13 Fragmentation

Currently there is approximately 2,247 acres of potentially suitable habitat for mid and late successional habitat species in the Hog Ranch – Underwood Watershed. This project specific to Forest Service lands would remove 1.8 acres of early seral habitat through road construction, whereas, the proposed SPI timber harvest on private land is anticipated to remove approximately 45 acres of mid-mature acres through even age management. The temporal reduction of 45 acres of mid-mature habitat reflects a reduction of approximately 2% of the available mid mature habitat within the watershed, while the 1.8 acres of early mature habitat removed for road construction reflects a reduction of 0.06% of the available early –mature habitat within the watershed. In review of the percentages outlined above, the effects to impact habitats through fragmentation are minimal.

It is also important to note that the thinning prescriptions associated with the SPI Timber Harvest Plan will affect approximately 93 acres, however, forested habitats will remain suitable for mid and late-mature habitat dependent species post timber harvest.

There has been very limited timber harvesting or road building within the Underwood watershed. Results of the Region 5 ERA Cumulative Watershed Effects analysis reveals that existing disturbances within the Underwood watershed are very small and that the

proposed road building on Forest Service administered lands and associated timber harvesting on SPI lands will not result in significant added cumulative effects such that adverse cumulative watershed effects will occur. The effects of the road construction and timber harvesting activities proposed by SPI when added to the limited past management activities within the watershed are still well below the Threshold of Concern. ERAs developed for the Project of less than two percent indicates that this project poses very low risk of creating adverse cumulative watershed effects within the Underwood Creek watershed.

3.12.2.14 Cumulative Effects on Management Indicator Species

The current suitable habitat in the Hog Ranch-Underwood Watershed for each MIS is displayed below. The current habitat include past natural disturbances as well as past management activities. Approximately 78 acres have been harvested within the Hog-Ranch Underwood Watershed (approximately 1.6%). In addition, in 2004, the high severity effects of the Sims fire inclusive of fire suppression activities removed approximately 133 acres of late-mature and old-growth habitat as well as 99 acres of early and mid-mature habitat within the Hog Ranch-Underwood Watershed. Most of the past timber harvesting has occurred within 1983, predominantly by tractor logging.

Habitat changes from each alternative and reasonably foreseeable future actions associated with timber management on SPI lands and the percent change in habitat within the watershed are also displayed by species. The cumulative effects associated with Alternatives 2 and 3 for Management Indicator Species would be minimal; approximately 0.04% to 2.00% of the acres of suitable habitat, depending on species-specific requirements will be removed within the Hog Ranch-Underwood Watershed.

Cumulative effects associated with Alternative 4 are inclusive of only the 45 acres of even age management proposed within Sierra-Pacific Industry lands. This project in concert with the reasonably foreseeable future actions associated with SPI THP, is anticipated to remove approximately 45 acres of habitat which represents approximately 2.0% of the suitable habitat available for late mature/old-growth obligate Management Indicator Species in the watershed. The Underwood Project will have a negligible effect on Management Indicator Species.

Table 3-10 Impact to suitable habitat for Six Rivers Management Indicator Species

Management Indicator Species	Current Suitable Habitat (Acres)	Habitat Changes (Acres)	Cumulative Impact on Suitable Habitat Within Watershed
Pileated woodpecker	2,247	46.8	2 %
Black bear	4,473	46.8	1 %
Black tailed deer	2,254	46.8	2 %

Hammond's flycatcher	2,247	46.8	2 %
Western tanager	2,225	46.8	2 %
Black-headed grosbeak	2,247	46.8	2 %
Flammulated owl	2,247	46.8	2 %
Screech owl	4,473	46.8	1 %
Red-breasted sapsucker	4,473	46.8	1 %
Downy woodpecker	2,666	46.8	1.8 %
Hairy woodpecker	4,473	46.8	1 %
Vaux's swift	4,892	46.8	1 %
Brown creeper	2,226	46.8	2 %
Douglas squirrel	4,473	46.8	1 %
Blue grouse	4,892	46.8	<1 %
Dusky-footed woodrat	4,999	46.8	<1 %
Western fence lizard	4,999	46.8	< 1 %
Western gray squirrel	4,473	46.8	1 %

3.12.3 Summary of Cumulative Effects

Cumulative effects include the effects of past, present and future, state, local or private actions that have or are reasonably certain to occur in the planning area (refer to Table 3-1, in Section 3.1.6 Past, Present and Foreseeable Future Actions above). The Hog Ranch-Underwood Watershed was selected for the analysis area primarily due to the size of the watershed, which encompasses the average home range size for the northern spotted owl. The Hog Ranch-Underwood Watershed is approximately 5,000 acres in size. Past management activities in the Hog Ranch-Underwood Watershed have been primarily timber harvest activities. In assessing cumulative watershed effects for the SPI Road Project, all past, current and reasonably foreseeable actions on both private and public lands were assessed within the Hog Ranch-Underwood Watershed as well as the effects of past wildfires associated with habitat removal and degradation.

Approximately 78 acres have been harvested within the Hog-Ranch Underwood Watershed (approximately 1.6%). In addition, in 2004, the high severity effects of the Sims fire inclusive of fire suppression activities removed approximately 133 acres of late-mature and old-growth habitat as well as 99 acres of early and mid-mature habitat within the Hog Ranch-Underwood Watershed. Most of the past timber harvesting has occurred within 1983, predominantly by tractor logging.

Direct and Indirect Effects

Removal of approximately 1.8 acres of the early mature conifer stand (Age = 85-90 yrs) and 0.40 acres Douglas-fir plantation (Age = 20-30 yrs.) associated with the construction alignment segment would not effect threatened, endangered and Forest Service Sensitive species (TES) or their habitat. The proposed alignment does not contain suitable habitat for any federally listed threatened or endangered species or within any designated Critical Habitat Unit. In addition, the project was designed to avoid habitat for federally listed species as well as the Late-Seral Reserve Land Allocations designated under the Northwest Forest Plan. No cumulative effects are anticipated associated with project implementation given project implementation would have no effect for federally listed species and their habitat.

The proposed alignment does not contain suitable habitat for any Forest Service Sensitive Species. In addition, the project was designed to avoid habitat for Forest Sensitive Species as well as the Late-Seral Reserve Land Allocations designated under the Northwest Forest Plan. No cumulative effects are anticipated associated with project implementation given project implementation would have no effect for Forest Service Sensitive Species and their habitat.

The proposed alignment does contain suitable habitat for 18 of 41 Management Indicator Species. Although road construction will remove approximately 1.80 acres of an early-mature conifer stand along a 3,926 linear corridor, canopy closure would be retained at approximately 40% post project implementation along the 14-foot roadbed. The effects to Management Indicator Species would be negligible; approximately 0.04% to 0.61% of the acres of suitable habitat, depending on species-specific requirements will be removed within the Hog Ranch-Underwood Watershed.

Reasonably Foreseeable Actions

Reasonably foreseeable future actions include private, county, state, and federal actions that are in any stage of project planning and those for which decisions have been made and are awaiting implementation (refer to Table 3-3, in Section 3.1.6 Past, Present and Foreseeable Future Actions above). There are no Forest Service projects in any stage of planning within the Hog Ranch-Underwood Watershed. Future projects within private land included within an approved Timber Harvest Plan (Sierra Pacific Industries) for approximately 138 acres with associated site preparation and restocking on their 150-acre parcel within the watershed.

The proposed alignment does contain suitable habitat for 18 of 41 Management Indicator Species. Although road construction will remove approximately 1.80 acres of an early-mature conifer stand along a 3,926 linear corridor, canopy closure would be retained at approximately 40% post project implementation along the 14-foot roadbed. The effects

to Management Indicator Species would be negligible; approximately 0.04% to 2.00% of the acres of suitable habitat, depending on species-specific requirements will be removed within the Hog Ranch-Underwood Watershed

Given the past effects to habitat, as well as the reasonable and foreseeable future actions (private and USFS, the project will remove approximately 0.08% of the total early mature habitat available in the Hog Ranch-Underwood Watershed for Management Indicator Species. The effect to Management Indicator Species, which utilize early mature habitats, is insignificant.

There would be no irreversible or irretrievable commitments of wildlife resources.

3.13 Short-term Uses and Long-term Productivity _____

NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

Alternatives 2 and 3 are expected to implement ground disturbing activities through road construction and reconstruction, and alternative 4 through the use of a service landing and drop zones. These activities would produce a short-term effect on wildlife and plant species as described in the environmental effects sections of this chapter.

3.14 Unavoidable Adverse Effects _____

Alternative design criteria and prescribed resource protection measures (see Chapter 2) are intended to minimize potential adverse impacts on resources in the project area. However, in implementation of actions, some unavoidable adverse effects may result. Risks associated with the potential of noxious weed spread were described earlier in the Section 3.8, Noxious Weeds previously in this chapter.

Since various elements in the ecosystem are linked to each other, activities proposed in this project may affect individual fungi, bacteria, and a variety of other ecosystem processes, but these effects are expected to be minor and of short duration.

Mitigation measures are discussed in chapter 2 and appendix C; however, there may be some unavoidable adverse effects on native flora that could be displaced as weeds spread. The effectiveness of the mitigation measures for noxious weed spread would be monitored.

Implementation of Best Management Practices (Appendix E) would help reduce the amount of compaction resulting from activities, thus would not lead to increased surface runoff and sedimentation.

Smoke may affect air quality to some degree while prescribed fire activities occur. Prescribed fire activities would be accomplished with an approved smoke management plan.

3.15 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore or the destruction of an archeological site. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas associated with road construction or administrative use areas (e.g. landing and fueling areas, or areas kept clear for use as power line rights-of-way).

Based upon the effects analysis above, there are no irreversible or irretrievable effects to Sensitive lichen or fungi species.

There are no irreversible or irretrievable effects regarding air quality within the project area or the North Coast Air Basin nor are there effects to fire or fuels regarding any of the actions of any of the alternatives.

There are no irreversible or irretrievable effects on fish populations or habitat in Underwood Creek or the South Fork Trinity River from this project, nor are effects on heritage resources anticipated.

There are no irreversible or irretrievable effects associated with hydrology from this project.

With the exception of Alternative 1, noxious weed introductions and spread can be viewed, in the long-term, as an irreversible commitment of resources if not managed when populations are small in extent. The commitment of resources includes the loss of native species diversity and abundance, as well as the ecological function of native plant communities most affected by weed establishment (e.g. oak woodlands and grasslands). Given the forces influencing their spread and the rate of spread once established, management of populations (and their seed bank) becomes more and more difficult if not infeasible to accomplish.

There are no known irreversible or irretrievable effects for recreation, lands, or minerals.

There are no irreversible or irretrievable effects to Roadless Area characteristics with Alternatives 1, 3, or 4. With Alternative 2 there would be permanent long-term effects to the roadless characteristics due to road building specifically to solitude and the naturalness and/or primitive character.

Irreversible loss in soil productivity is assessed only on Forest Service lands where the activity occurs. Under alternative 1, there will be no irreversible acres of loss in soil productivity. Alternatives 2 and 3 have 2.2 acres of irreversible loss in soil productivity associated with road construction. Alternative 4 has 8 acres of irreversible loss in soil productivity associated with helicopter landings and fuel servicing areas. These effects are discussed in the direct, indirect, and cumulative effects analysis for soils.

There are no irreversible or irretrievable effects on Management Indicator Species or their habitat or other wildlife resources in the Hog Ranch-Underwood Watershed from this project.

3.16 Cumulative Effects

Cumulative effects are based on the past activities and disturbances plus the effects of the proposed actions and other foreseeable future actions. The activities identified for cumulative effects analysis in Section 3.1.6 Past, Present, and Foreseeable Future Actions, Tables 3-1, 3-2, 3-3 and in Section 3.1 above coincide with the 7th field watershed. As also discussed, there has been previous disturbance in the Roadless Area.

The following is a summary of the cumulative effects addressed in detail at the end of each resource in Chapter 3. The combined cumulative impacts of all resource areas for the action alternatives combined with any interrelationships with current policy and direction would not have a significant impact to the environment. As stated above, the reason that an EIS was written was to address the following, building a road in a key watershed in an inventoried roadless area.

AIR

In consideration of all the alternatives, air quality will continue to be of great importance regarding human health. The project alternatives will not affect the current status of PM10 daily emission loads within the North Coast Air Basin using the current and foreseeable regulatory constraints provided by the NCUAQMD.

BOTANY

Since there are no effects to lichen and fungi species as a result of implementing Alternatives 1 and 4, there are no cumulative effects relative to this project under these alternatives. Alternatives 2 and 3 would potentially affect suitable habitat.

The activities identified for cumulative effects analysis in Tables 3-1, 3-2, 3-3 and in Section 3.1.b above coincide with the 7th field watershed. Given the geographic scale for analyzing cumulative effects for FS Sensitive species (i.e. range of species on Six Rivers), other reasonably foreseeable future actions will be considered in this cumulative effects analysis.

Non-vascular (bryophytes and lichens) and fungal species have only been listed as FS Sensitive since 2004. For the lichen and fungal species identified above in the Botany Section 3.3, the temporal context for past timber actions identified in Table 3-2 that span 1973-1992 do not apply.

Cumulative effects for Forest Service activities occurring within the range of *Sulcaria badia* and FS Sensitive fungi species on Six Rivers is expected to be minimal for these species as a result of past, present and reasonably foreseeable future activities. The procedure for project analysis (e.g. field survey, habitat assessment), the Forest emphasis on thinning (compared to clearcutting) and other low intensity activities, in conjunction with project design features or mitigations to alleviate effects to FS Sensitive species all reduce the risk of cumulative effects.

Since no protection is currently afforded lichen or fungi species on private timberland, it is expected that continued clearcutting and associated activities (e.g. road construction) and practices would contribute to the cumulative effects. This intensity of these activities and the resultant degradation of habitat is somewhat off-set by the presence of potentially suitable habitat for both *Sulcaria badia* and Forest Service Sensitive fungi species on Forest Service lands adjacent to or surrounding private timber land.

FIRE

This project as proposed would have a slight improvement in suppression effectiveness, although the actions proposed have little bearing on changing the existing conditions affecting the survival of tree stands. The increase in current mortality conditions is negligible. The action alternatives would not affect the fire regime classification of the area. The effects of any of the actions alternatives are negligible and minor.

FISH

With negligible potential for direct or indirect effects, there are limited potential for added cumulative effects and no potential for adverse cumulative effects on anadromous fisheries resulting from the any action alternative. The project is expected to have negligible effects on SONCC coho salmon and its critical habitat nor is it likely to result in a trend towards federal listing or loss of viability of Forest Service Sensitive Species Chinook salmon (*Oncorhynchus tshawytscha*) or steelhead trout (*O. mykiss*).

Although there is the potential for SPI to use the herbicide glyphosate (round-up) as a site prep tool on less than 50 acres after harvest, there would be no cumulative effects. This is in part due to the natural barrier and the distance from it to the nearest unit on SPI lands, but also due to the application methods, the way in which round-up interacts with the soil and the lack of transport mechanisms to any water source (see Hydrology 3.7. and specifically Section 3.7.2.14).

HERITAGE

No cumulative effects to heritage resources are expected.

HYDROLOGY

There has been very limited activity, including timber harvesting or road building, within the Underwood Creek watershed to date. As a result, the watershed is in excellent condition. Water quality, including temperature and turbidity is unaltered. The proposed action has little to no chance of changing watershed conditions; including the timing or magnitude of peak flows, duration of low flows, degree or duration of turbidity, amount of sediment in stream channels, temperature, or the amount, structure or function of large woody debris. Changes to anadromous fish habitat will be undetectable. The Region 5 ERA model confirms that impacts to the watershed would be low (less than 2.2% ERA) and, therefore, there would not be cumulative watershed effects anticipated.

NOXIOUS WEEDS

Project design features to reduce the introduction and spread of noxious weeds are described and addressed in the Noxious Weed Risk Assessment (contained in the project file); however, the measures do not eliminate risk. Any weed seed inadvertently intercepted could be introduced to uninfested areas on SPI land. Of the 138 acres to be logged, 45 will be clearcut which creates a particular suitable setting for weed establishment and the potential of further spread.

For both indicators, implementation of Alternative 4 with its development of 3 landings covering 8 acres, with 2 of the landings along 5N07, contributes the highest cumulative risk of noxious weed introduction and spread compared to the other alternatives.

RECREATION

Any past and current vegetation management and transportation activities have had little influence on current opportunities and use for recreation, lands, and minerals in and adjacent to the project area. These activities are over several ridges and drainages away. There are no other cumulative effects associated with any alternatives beyond what is anticipated with any SPI activities in the foreseeable future.

There are no expected cumulative effects on visual resources under Alternatives 1, or Alternative 4.

The VQO currently assigned to the project area would be met following vegetation and transportation management treatments. No alternative would exclude any of the existing uses, but Alternative 2 and Alternative 3, in the short term, could modify the amount of recreational access available.

ROADLESS

There would be no affect to the Roadless Area with Alternative 1, and temporary periods of noise, lack of solitude and a small area of alter natural character with alternative 4. Alternative 2 would have periods of noise and lack of solitude associated with the road building, use, and harvesting, and have permanent long-term effects to the roadless characteristics due to road building. Alternative 3 would have periods of noise and lack of solitude associated with the road building, use, and harvesting. The impacts of Alternative 3 would return to existing conditions after the additional disturbance associated with the obliteration and rehabilitation of the proposed road. This is in addition to very occasional use on existing roads within the Roadless Area.

SOILS

Cumulative effects to soils are evaluated at the site scale where the activity occurs. The potential to cumulatively impact soil productivity is limited to the construction of the helicopter fuel/service landing and the two helicopter drop zones within the plantation. There are no potential cumulative effects to soils for this project on Forest Service administered lands associated with these alternatives. Instead, there is an irreversible and irretrievable commitment of soil resources for the purposes of building of a permanent roadbed, drop zones or service landing.

WILDLIFE

Removal of approximately 1.8 acres of the early mature conifer stand and 0.40 acres Douglas-fir plantation associated with the construction alignment segment would not effect threatened, endangered and Forest Service Sensitive species (TES) or their habitat.

The proposed alignment does not contain suitable habitat for any federally listed threatened or endangered species or within any designated Critical Habitat Unit. In addition, the project was designed to avoid habitat for federally listed species as well as the Late-Seral Reserve Land Allocations designated under the Northwest Forest Plan. No cumulative effects are anticipated associated with project implementation given project implementation would have no effect for federally listed species and their habitat.

The proposed alignment does not contain suitable habitat for any Forest Service Sensitive Species. In addition, the project was designed to avoid habitat for Forest Sensitive Species as well as the Late-Seral Reserve Land Allocations designated under the Northwest Forest Plan. No cumulative effects are anticipated associated with project implementation given project implementation would have no effect for Forest Service Sensitive Species and their habitat.

The proposed alignment does contain suitable habitat for 18 of 41 Management Indicator Species. Although road construction will remove approximately 1.8 acres of an early-mature conifer stand along a 3,926 linear corridor, canopy closure would be retained at approximately 40% post project implementation along the 14-foot roadbed. The effects to Management Indicator Species would be negligible; approximately 0.04% to 2.00% of the acres of suitable habitat, depending on species-specific requirements will be removed within the Hog Ranch-Underwood Watershed

Given the past effects to habitat, as well as the reasonable and foreseeable future actions (private and USFS), the project will remove approximately 0.08% of the total early mature habitat available in the Hog Ranch-Underwood Watershed for Management Indicator Species. The effect to Management Indicator Species, which utilize early mature habitats, is insignificant.

3.17 Other Applicable Laws, Rules, Regulations, and Disclosures

NEPA at 40 CFR 1502.25(a) directs “to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with ...other environmental review laws and executive orders.”

A number of laws provide direction on public lands, including the Multiple-Use Sustained Yield Act (1960), Wilderness Act (1964), Forest and Rangeland Renewable Resources Planning Act (1974), National Forest Management Act (1976), Federal Land Policy and Management Act (1976), and the California State Wilderness Act (1984).

While not specific to road construction or special use permit authorizations, other laws relevant to the proposed action include the National Historic Preservation Act (1966), Wild and Scenic River Act (1968), Endangered Species Act (1973), Clean Water Act (1977), and the Magnuson-Stevens Fishery Conservation and Management Act (1996). In addition to these laws, there are a number of laws that require consultation and coordination with Indian Tribal Governments. Of the relevant laws, the following are particularly significant to the proposed action and are discussed below.

Clean Water Act

The Federal Clean Water Act (Section 303) (CWA) requires states to adopt water quality standards (water quality objectives and beneficial uses). Under the oversight of the Environmental Protection Agency (EPA), the North Coast Regional Water Quality Control Board is the local entity responsible for implementing CWA in northwest California. Pursuant to the Clean Water Act, the EPA and North Coast Water Quality Control Board have been involved in the assessment of water quality effects associated with the this project.

Endangered Species Act

Section 7(a) of the Endangered Species Act requires Federal agencies to consult with National Marine Fisheries Service and U.S. Fish and Wildlife Service (FWS), as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their critical habitats. The purpose of the Endangered Species Act (16 U.S.C. 1531-1544) is to conserve “the ecosystems upon which endangered and threatened species depend” and to conserve and recover listed species

Magnuson-Stevens Fishery Conservation and Management Act (MSA)

In addition to the ESA, the 1996 Amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), (16 U.S.C. 1801 et seq.) require the identification of Essential Fish Habitat (EFH) for federally managed fishery species. Essential fish habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

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Chapter 4. Consultation and Coordination

4.1 Preparers and Contributions

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental impact statement:

4.1.1 Interdisciplinary Team Members

Name	Title	Education / Responsibility / Experience
Jerry Boberg	Forest Fisheries Biologist	BS Fisheries Management, MS Watershed Management, Humboldt State University, 25 years of experience in fisheries management, last 21 years with the Forest Service.
Carolyn Cook	Forest Hydrologist	BS Environmental Studies, University of Waterloo, Canada, MS Environmental Science, Washington State University, 18 years experience soils/hydrology with the Forest Service.
Ana Dittmar	Forest Archaeologist	BA Anthropology and Sociology, Stockton State College, MA and PhD Cultural Anthropology, Rutgers University. 25 years of experience in anthropology/archaeology, last 2 with the Forest Service.
Adam Dresser	Hydrologist	BA Geography, Bucknell University, Pennsylvania, MS Watershed Management, and MS Forestry, Humboldt State University. 14 years experience in hydrology, last 11 with the Forest Service.
Lisa Hoover	Forest Botanist	BA Botany, University of North Carolina, Chapel Hill, MS Natural Resources, Humboldt State University, 18 years of experience in botany/ecology, last 15 years with the Forest Service.
William Metz	Acting Forest Supervisor – Line Officer	BS Forestry, Humboldt State University. 22 years of experience in natural resource management, last 18 years experience with the Forest Service.
Robert McClelland	District Fire Management Officer	30 years of experience in fire and fuels with Forest Service.
Joyce Thompson	Forest Planner	BS Forest Management, MS Geography, Oregon State University. 20 years of experience in planning/modeling.
Kurt Werner	Civil Engineering Technician	BS Resource Planning, Humboldt State University, years of experience engineering with the Forest Service.

Name	Title	Education / Responsibility / Experience
Katherine Worn	District Resource Officer – Team Leader	BS Forestry, MS Interdisciplinary Natural Resources Humboldt State University. 20 years of experience in natural resource management, last 14 years experience with the Forest Service.
Quentin Youngblood	Forest Wildlife Biologist	BS Forest Management, Stephen F. Austin State University, MS Forestry 19 years of experience with the Forest Service.

4.1.2 Federal, State, and Local Agencies

The Forest Service consulted with the following Federal and State agencies during the development of this environmental impact statement.

The project area is not within designated; any designated Critical Habitat Unit, or within suitable habitat for any terrestrial threatened and endangered species. Implementation of the proposed project will have no effect on terrestrial threatened and endangered species. Therefore, consultation with the U.S. Fish and Wildlife Service is not required.

The U.S. Fish and Wildlife Service (USFWS) Technical Assistance Letter (Case #1-14-1997-61.2) on the document entitled “Status of the Marbled Murrelet in Interior Northwestern California: Final Results”, concurs that marbled murrelets are unlikely to use this portion of Marbled Murrelet Zone II (Appendix B). Implementation of existing and future projects in this area will not result in harassment of nesting marbled murrelets; therefore, Section 7 consultations relative to disturbance of marbled murrelets will not be necessary.

The Six Rivers National Forest received a quarterly list of threatened, endangered, and proposed species, which may occur on the Forest on January 23, 2006 (Case #627243400-105942). This list is intended for use on all projects on the Forest.

The biological assessment/evaluation for wildlife was prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (19 U.S.C. 1536 (c)), and follows the standards established in Forest Service Manual direction (FSM 2672.42). In addition the project was prepared in accordance with the standards and guidelines outlined within the Six Rivers National Forest Land and Resource Management Plan (1995) and the Six Rivers Forest-wide Reference Document for current management direction (March 2004).

No consultation was required for botanical resources.

4.1.3 Tribes

Formal governmental consultation was initiated with the Federally Recognized Hoopa Valley Tribe in June of 2003. There were no issues or concerns identified by the Tribe. There are no trust resources or rights associated with this project area.

In June of 2003 consultation was initiated with the Tsnungwe Tribe. Concerns were raised over heritage resources within the general area and discussions were held on the ground to assist in identifying a proposed route that would not affect heritage resources and, to assure this, the area would be monitored (see Appendix C).

4.2 Distribution of the Draft Environmental Impact Statement

This draft environmental impact statement has been distributed to agencies, organizations, and individuals as required by the National Environmental Policy Act regulations (40 CFR 1502.19). In addition, copies have been sent to the following Federal agencies, federally recognized tribes, State and local governments, and organizations. The complete mailing list is on file at the Lower Trinity Ranger District Office.

4.2.1 Federal, State, and Local Agencies

Council on Historic Preservation

Director for Planning & Review Advisory, Washington DC

Environmental Protection Agency

Region 9 Federal Activities Office, Laura Fujii, San Francisco, CA
EIS Filing Section, Washington DC

Federal Aviation Administration, Western-Pacific Region, Lawndale, CA

Federal Highway Administration

California HDA-CA, Sacramento, CA

National Marine Fisheries Service, Longbeach, CA

US Department of Homeland Security

U.S. Coast Guard, Washington DC

US Department of Agriculture

Natural Resources Conservation Service, Washington DC
APHIS PPD/EAD, Riverdale, MD

National Agricultural Library, Beltsville, Maryland
Forest Service, Ecosystem Management Coordination, Washington DC

US Department of Defense

Army Engineer Division, CESPDCMP, San Francisco, CA

US Department of Energy

Office of NEPA Policy & Compliance, Washington DC

US Department of the Interior

Fish and Wildlife Service, Wayne S. White, Sacramento, CA
Director, Office of Environmental Policy & Compliance, Washington DC

4.2.2 Tribes, Organizations, and Individuals

The Summary of the Draft Environmental Impact Statement for the SPI Road Project was sent to the following Tribes, organizations, and individuals:

Tsnungwe Tribe, Hoopa Valley Tribe

A copy of the Draft Environmental Impact Statement for the SPI Road Project was sent to the following organizations, and individuals:

Fred Blatt, North Coast Water Quality Control Board

Tim McKay, Northcoast Environmental Center

Pete Harrison, Californians for Alternatives to Toxics

Christine Ambrose, American Lands Alliance

Jennifer Kalt, North Coast Chapter California Native Plant Society and California Indian Basket Weavers Association

Dave Lancaster, California Department of Fish and Game

Camille Edwards

Mary Kay, Humboldt State Library

Birgit Semsrott

Kerry Camallalo, Defenders of Wildlife

Dan Close

Jason Purburko, Sierra Pacific Industries

Rose Patenaude

George Sexton, Klamath Siskiyou

David T. Loya

Scott Greacen, EPIC

Emelia Berol

Dena Ammon Magdaleno

Joseph Kacobs

Kate Tiedeman, California Wilderness Coalition

Susan Nolan

Nickki Nedeff, Wilderness Land Trust

Joseph Bower

Chapter 5 Appendices

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APPENDIX A – ACRONYMS

BA – biological assessment
BE – biological evaluation
CEQ – Council on Environmental Quality
CFR – Code of Federal Regulations
dbh – diameter at breast height
DEIS – Draft Environmental Impact Statement
EA – Early Mature with Predominants
EH – Early Harvest
EIS – environmental impact statement
EM – Early Mature
ERA – Equivalent Roaded Acres
FEIS – final environmental impact statement
FRCC – fire regime condition class
FS – USDA Forest Service
IDT – Interdisciplinary Team
LH – Early Harvest
LSR – Late Successional Reserve
LRMP – land and resource management plan
LWD – Large Woody Debris
MA – Mid Mature with Predominants
MIS – Management Indicator Species
MM – Mid Mature
mmbf – million board feet
NEPA – National Environmental Policy Act
NOI – Notice of Intent
PAC – Protected Activity Center
PN – Pole Natural
ROD – record of decision
ROS – Recreational Opportunity Spectrum
ROW – Right-of-way
RHCA – Riparian Habitat Conservation Area
S&G – Standard and Guide
S&M – Survey and Manage Species
SN – Shrub/Forb Natural

SH – Shrub/Forb Harvest

SPI – Sierra Pacific Industries

SRF – Six Rivers National Forest

VQO – Visual Quality Objectives

T&E – Threatened and Endangered

THP – Timber Harvest Plan

USDA – United States Department of Agriculture

USDI – United States Department of the Interior

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APPENDIX C - MITIGATIONS

Table C-1. Project design mitigation measures for the SPI Road Project.

(Design mitigation measures would apply to the action alternatives (alternatives 2 & 3). Forest Plan standards and other agency direction, along with information derived from monitoring past projects, were used to identify design mitigation measures applicable to alternatives 2 & 3. Mitigation measures are practices used during implementation of project activities.)

	Project Design and Mitigation Measure	Implementation Method	Effectiveness
Areas Excluded from Timber Harvest or Fuel Reduction Activities			
1	No timber harvest activities would occur in "Off Base and Deferred Lands" or California spotted owl Protected Activity Centers (PACs). In late-successional old-growth rank 4 and 5 stands, no individual tree selection or group selection would be allowed.	NEPA project design, silviculture prescription, and field prep	High, based on past experience
Fire and Fuels			
2	Falling would be done to minimize breakage and damage to residual trees.	Field preparation, contract and contract administration/ inspection	High, based on past experience
3	Activity generated fuels piled on Forest Service lands for the service landing would have control lines built where the flammable vegetation would be removed to mineral soil, prior to burning of the piles.	Field preparation, contract and contract administration/ inspection	High, based on past experience
Riparian Reserves Areas			
4	No cutting of trees would be allowed except in proposed road bed.	Field preparation, contract and contract administration/ inspection	High, based on past experience

	Project Design and Mitigation Measure	Implementation Method	Effectiveness
Soils, Water Quality, and Fish Habitat			
5	If yarding tops and limbs is needed to meet fuel reduction objectives, the preference would be for removal of excess slash larger than 3 inches for burning at landings and retaining finer slash on the unit.	NEPA project design, silviculture prescription, Brush Disposal plan, and contract.	High to the degree implemented, based on research.
6	Wet weather operating periods would be limited when soils are wet so that resource damage would not occur and to reduce rutting, displacement, and erosion.	Contract and contract administration/inspection	High, based on research
7	Drop zones, landings, and helicopter servicing areas would be located and designated to minimize the area of detrimental soil effects.	Contract and contract administration/inspection	High, based on research
8	Non-excavated landings compacted or entrenched 3 inches or more would be decompact with an excavator or subsoiled to a depth of 4 to 10 inches, or as directed by the contract administrator or District Hydrologist, to restore soil permeability.	Contract and contract administration/inspection	Moderate to high, based on research
9	Sediment and erosion control measures such as dewatering culverts, sediment barriers, rocking road surfaces and/or ditches, etc., would be used as needed when constructing, reconstructing, and decommissioning roads to protect fish habitat and water quality.	Contract and contract administration	High, based on literature, San Dimas, Road/Water Interaction
10	Stream crossing structures would provide for channel width, flow velocities, substrate condition, and stream gradients that approximate the natural channel and accommodate passage of streamflow, debris, fish, and other aquatic organisms. When designing new structures, design to accommodate the 100-year flood, and consider and give preference to open-bottom arches, bridges, and oversized culverts.	NEPA project design, contract and contract administration/inspection	High, based on literature, San Dimas, Road/Water Interaction
11	A Spill Prevention Control and Countermeasures Plan (40 CFR 112) would be prepared and implemented to incorporate the rules and requirements of EPA, Resource and Recovery Act 42 U.S.C. 6901, to include use of chemicals and petroleum products; and US Department of Transportation rules for fuels haul and temporary storage; and additional direction as applicable.	Contract and contract administration/inspection	High, based on past experience

	Project Design and Mitigation Measure	Implementation Method	Effectiveness
12	The USDA Water Quality Management for National Forest System lands in California Best Management Practices (BMPs) and Forest Service Soil and Water Conservation Practices would be applied. These are described in Appendix E.	Contract and contract administration/inspection	High, based on past experience
Trails/Recreation			
13	There are no system trails and there would be no winter hauling; therefore there would not be any conflict with recreation activities within the project area.		
Access/Public Safety			
14	During implementation of the project, SPI and any subcontractors would be required to set up warning signs advising of equipment operations or hazards for public safety.	Contract and contract administration/inspection	High, based on past experience
Air Quality			
15	Procedures outlined in the California Smoke Management Policy would be followed, including restrictions imposed by the smoke management-monitoring unit.	FS fuels management	High, based on past experience
Wildlife			
16	Should any of the following be sighted in the project area during project implementation, the Unit biologist would be notified: Threatened, Endangered, Proposed, Sensitive, and Candidate species; appropriate protection measures would be implemented.	NEPA project design, field prep, and contract administration/inspection	High; based on past experience
Heritage Resources			
17	Known historic properties or sites would be avoided or protected.	NEPA project design, field prep, contract, and administration/inspection	High, objective to achieve a "no adverse effect" on these resources

	Project Design and Mitigation Measure	Implementation Method	Effectiveness
18	If any historic properties are discovered during implementation of activities, all work must stop in compliance with 36 CFR 800.11.	Field prep, contract and contract administration/ inspection	Moderate based on COR/SA recognition of resource and contact with Heritage Personnel
19	If additional cultural resources are discovered during project operations, all ground-disturbing activities would be halted until such cultural materials can be properly documented and evaluated by the Forest Archaeologist in compliance with 36 CFR 800.	Field prep, contract and contract administration/ inspection	Moderate based on COR/SA recognition of resource and contact with Heritage Personnel
Noxious Weeds			
20	All mud, soil, and plant parts would be removed from all off-road equipment before moving into the project area to limit the spread of weeds. Cleaning must occur off National Forest lands. This does not apply to service or hauling vehicles that would stay on the roadway, traveling frequently in and out of the project area.	Contract and contract administration and inspection	Moderate; based on past experience
21	All rock used for surfacing and mulch used for erosion control would be county-certified as free of noxious weed seed.	Contract and contract administration/ inspection	Moderate; based on past experience
Threatened, Endangered, and Sensitive (TES) Plants and Fungi Species			
22	During implementation, if activities would impact previously unknown sensitive plant occurrences, appropriate protection measures would be implemented. Appropriate measures may vary depending on the ecology of the species involved and nature of the proposed action. The measures would be directed by a botanist.	Silvicultural prescription, field preparation, contract, and contract administration/inspection	High based on monitoring, experience, and logic

APPENDIX D - ERA METHODOLOGY & CALCULATIONS

The coefficients used in the ERA calculations are listed in Tables D-1 through D-4. The logic for assigning coefficients is also explained.

Calculations for Past Land Management Activities

ERAs for past land management activities were developed by adding ERAs for acres of timber harvested and miles of existing road.

Equations & Coefficients

Timber Harvest

Total ERAs = [acres harvested] x [logging system and method ERAs/Ac] x [harvest recovery coefficient] x [slope steepness coefficient] x [hillslope position coefficient] x [RR proximity coefficient]

Table D-1 Disturbance activity and associated ERA coefficients and recovery times

Activity	Method	ERAs/Acre	Recovery Years
Wildfire (small lightning fires)*	Wildfire	0.05	5
Harvest - Clearcut	Unknown**	0.3	30
Harvest - Clearcut	Helicopter	0.1	15
Harvest - Clearcut	Highlead	0.2	25
Harvest - Clearcut	Skyline	0.2	25
Harvest - Clearcut	Tractor	0.3	30
Harvest - Individual tree selection	Unknown	0.2	25
Harvest - Individual tree selection	Tractor	0.2	25
Harvest - Overstory	Unknown	0.3	30
Harvest - Salvage	Unknown	0.15	20
Harvest - Salvage	Helicopter	0.05	5
Harvest - Salvage	Tractor	0.15	20
Harvest - Shelterwood	Tractor	0.25	20
Harvest - Stand clearcut with reserve trees	Highlead	0.2	20
Harvest - Stand clearcut with reserve trees	Skyline	0.2	20
Harvest - Stand clearcut with reserve trees	Tractor	0.28	25
Harvest - thinning	Unknown	0.2	25
Harvest - thinning	Skyline	0.15	15
Harvest - thinning	Tractor	0.2	20
Site Prep - burning	Jackpot	0.05	5

Site Prep - Mechanical	Tractor pile	0.15	15
Timber Stand Improvement (TSI)	Chemical	0.01	2
Timber Stand Improvement (TSI)	Cut & burn	0.01	2
Timber Stand Improvement (TSI)	Manual cut	0.01	2
Private Harvest Clearcut pre 1982	Highlead	0.3	30
Private Harvest Clearcut pre 1982	Tractor	0.3	30
Private seed tree post 1982	Tractor	0.3	30
Private seed tree pre 1982	Highlead	0.3	35
Private seed tree pre 1982	Tractor	0.4	40

* Wildfire: no large fires within the last 40 years have occurred in Underwood Creek, only small lightning strikes

** Unknown: when no data exist, more conservative disturbance coefficients are used (i.e., greater disturbance assumed)

Table D-1 lists the coefficients assigned to various logging systems for different land ownerships. In addition, it lists the coefficients associated with other management activities that create temporary ground disturbances. Coefficients for National Forest and private lands were adjusted based on the relative hillslope impacts evident on aerial photos, as well as observations in the field by Forest Service specialists that a given timber harvest practice on private lands has had more impact than the same practice on National Forest lands, particularly in the 1970's and 1980's. Table D-1 also lists the estimated years of recovery for different harvest prescriptions or disturbances depending on land ownership. The harvest recovery coefficient is calculated as: $1 - ([\text{years since harvest}] / [\text{years to recovery}])$.

In Table D-1, recovery times associated with management activities vary depending on land ownership and type of activity. Aerial photo interpretation suggests that clear cuts and selective cuts on private lands have taken more time to recover than similar treatments on National Forest lands. Field review in Six Rivers National Forest indicates that ground disturbance associated with tractor thinning projects is very light and recovers rapidly (easily within 5 to 10 years). Nevertheless, given the extent and severity of past disturbances within the South Fork Trinity River watershed, recovery periods on National Forest lands were inflated somewhat in Table 1 in order to be extremely conservative in estimating existing and potential cumulative watershed effects.

Tables D-2, D-3 and D-4 list the coefficients used to adjust ERAs based on slope steepness, hillslope position, and proximity to riparian reserves. If a disturbance was within a riparian reserve on the lower third of a steep hillslope, those ERAs were weighted higher than a similar disturbance on the upper third of a hillslope with gentle gradient and away from riparian areas. These adjustments reflect that effects from a given management activity vary depending upon its location.

Table D-2 Slope Steepness Coefficients

Slope Steepness	Coefficient
<35%	0.8
35% to 65%	1.4
>65%	1.8

Table D-3 Hillslope Position Coefficients

Slope Position	Coefficient
Lower	1.2
Middle	1
Upper	0.8

Table D-4 Proximity to Riparian Reserve Coefficients

Proximity to RRs	Coefficient
Outside RRs	1
Within RRs	1.4

Roads

Total ERAs = [road miles] x [road surface type ERA/mi] x [slope steepness coefficient] x [slope position coefficient] x [RR proximity coefficient]

Road miles were converted to acres (ERAs) based on estimated road widths. A coefficient of 3.7 was used to estimate ERAs for all road types and landings within the watershed. Road ERAs were also adjusted according to their proximity to riparian reserves, hillslope position and slope steepness (Tables 2, 3 and 4).

Combining Past, Current and Future Land Management Activities

Percent ERAs for all past, current and future actions on all lands regardless of ownership were calculated using the following equation:

$$\%ERA = ([\text{Past Timber Harvest ERAs}] + [\text{Proposed Timber Harvest ERAs}] + [\text{Future Timber Harvest ERAs}] + [\text{Road ERAs}]) / [\text{watershed acres}] \times 100.$$

APPENDIX E – BEST MANAGEMENT PRACTICES

Best Management Practices or BMPs are used for water quality management on National Forest System lands within the State of California. Below is a summary statement for each of the BMPs applicable to this project.

Practice 1.8– Streamside Management Zone Designation

This practice would be best described as a tool with which to evaluate Interim Riparian Reserve designations associated with the project. The ID team would designate the appropriate protection areas within the Interim Riparian Reserves where project activities could occur and would be included in the Construction Stipulations of the Special use permit issued for the road. Criteria with which to evaluate effectiveness would include: ground cover disturbance, canopy closure, disturbance to channel banks and sediment delivery (BMPEP T01 – Streamside Management Zones).

Practice 1.12– Log Landing Location

The Permittee and Special Use Permit Administrator must mutually agree upon landing locations. Designated locations must comply with the requirements for location as stated in the BMP. Monitoring would include an on-site evaluation (BMPEP AE-1) of Project area, which includes any temp roads and landings.

Practice 2.3 – Timing of Construction Activities

The intent of this BMP is to minimize erosion by conducting road construction activities during minimal runoff periods. The Permittee will be required to schedule and conduct operations during the dry season or when rain and runoff are unlikely. Erosion control work will be kept as current as practicable on active road construction projects.

Practice 2.5 – Road Slope Stabilization Construction Practices

Stabilization methods will be designed to minimize erosion from road slopes and slope failure along roads. Methods will be identified during the environmental analysis and included in the project plan. The measures should be completed prior to the first winter rains.

Practice 2.6 – Dispersion of Subsurface Drainage from Cut and Fill Slopes

Subsurface drainage from cut and fill slopes will be provided where it is identified that subsurface moisture saturation is expected. Collected water will be dispersed in an area capable of withstanding increased flows.

Practice 2.7 – Control of Road Drainage

If there is a need identified in the project planning process, measures will be developed to minimize the erosive effects of water concentrated by road drainage features. Measures

include such controls as construction properly spaced cross drains, water bars or rolling dips, energy dissipaters and aprons.

Practice 2.11 – Control of Sidecast Material During Construction and Maintenance

The Special Use Permit will address temporary road maintenance specifications. This includes slide and slump repair, surface blading, and side casting during road maintenance. Generally, sidecasting of material will be avoided in areas where it can adversely impact water quality.

Practice 2.12 – Servicing and Refueling of Equipment

A Spill Prevention, Containment and Counter Measures Plan is required if the volume of fuel exceeds 660 gallons in a single container. There will be no storage of fuel on National Forest lands. This BMP will be included in the Construction stipulation and road maintenance plan of the special use permit.

Practice 2.13 – Control of Construction and Maintenance Activities Adjacent to SMZs

This BMP is designed to protect water quality by controlling construction and maintenance actions within and adjacent to streamside management zone so that its functions are not impaired. Protected streamcourses will be identified in the planning process and identified in the special use permit. Incorporation of BMPs into Timber Sale Contract Provisions are as follows: B6.5 and C6.5.

Practice 2.21 – Water Source Development Consistent with Water Quality Protection

Water source development is normally needed to supply water for road construction and maintenance, dust control, and fire control. At no time will downstream water flow be reduced to a level that will be detrimental to aquatic resources, fish passage, or other established uses. Incorporation of BMPs into the construction stipulations of the special use permit.

Practice 2.22 – Maintenance of Roads

Roads will be maintained in a manner that provides for water quality protection by minimizing rutting, failures, sidecasting, and blockage of drainage facilities. The Permittee and the Forest Service will agree to an Annual Road Maintenance Plan that outlines responsibilities and timing of maintenance. This will be done before the beginning of the operating season. Incorporation of BMPs into the Special Use Permit Construction Stipulations.

Practice 2.23 – Road Surface Treatment to Prevent Loss of Material

Measures will be taken to minimize loss of road material when the need for such action is identified. Incorporation of BMPs into the Special Use Permit Construction Stipulations.

Practice 2.24 – Traffic Control During Wet Periods

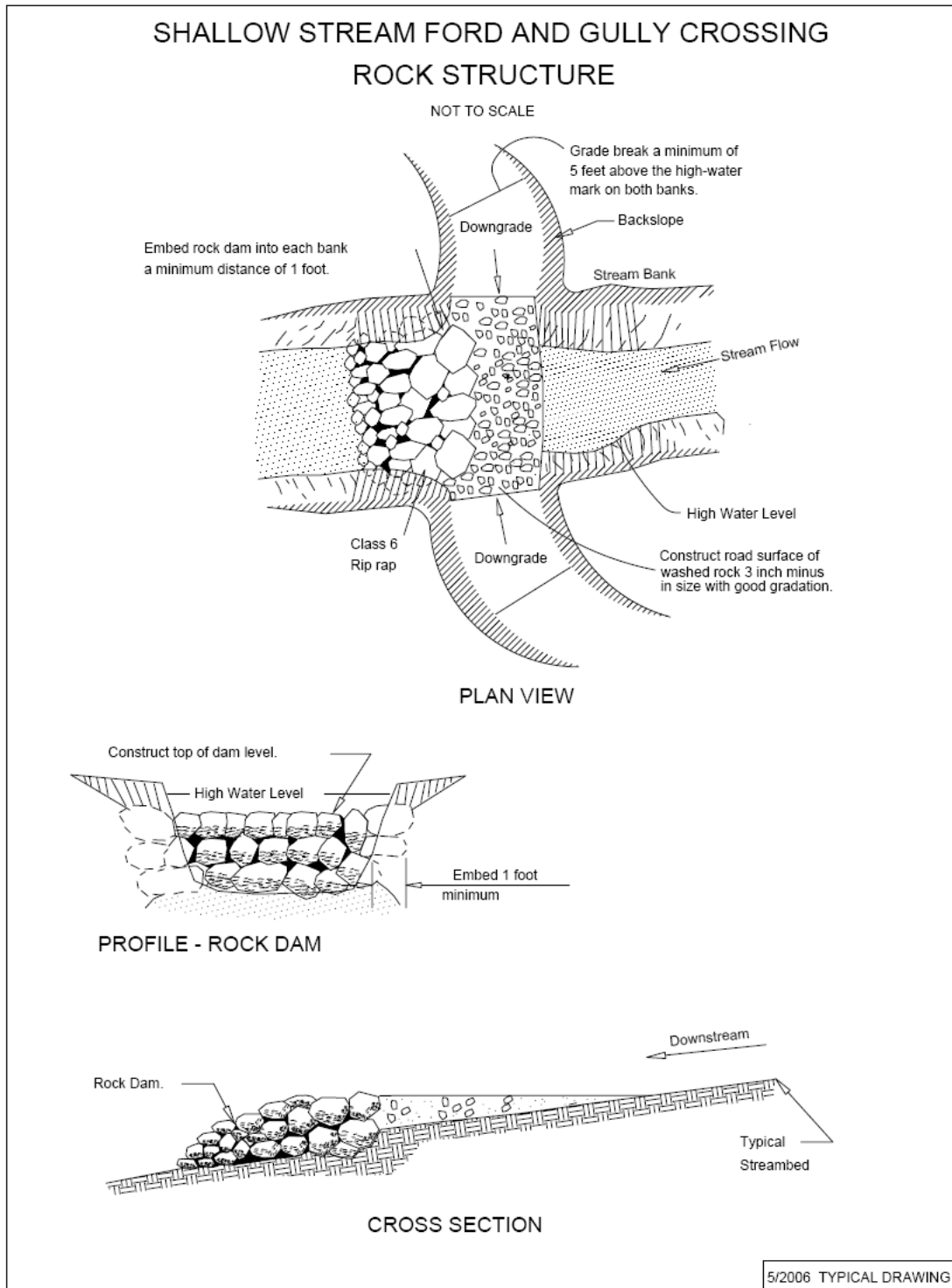
Roads that must be used during wet periods should have a stable surface and sufficient drainage provided to allow such use while at the same time maintaining water quality. Where wet season field operations are planned, roads may need to be upgraded or use restricted. The Six Rivers National Forest Wet Weather/Winter Operations Standards will be a part of the Special Use Permit for the SPI access road.

Practice 5.6 –Soil Moisture Limitations for Mechanical Equipment Operations

The Special Use Permit shall require winter shutdown whenever the Forest Service determines that the soil moisture or physical conditions have become unsuitable for equipment operation on any area. The Six Rivers National Forest Wet Weather/Winter Operations Standards will be a part of the Special Use Permit. The Special Use Permit Administrator would be responsible for determining when the soil surface is unstable and susceptible to damage, and will be responsible for terminating operations.

APPENDIX F – FIGURES

Rock Structure Figure



APPENDIX G – PROJECT MAPS

Map 1. Vicinity Map

Map 2. Project Area Map with Alternatives 2 and 3

Map 3. Helicopter Logging Alternative Map

Map 4. Project Area Map with Seral Stages

Map 5. Project Area Map with August Modeled Flame Length

Map 6. Wildlife and Fisheries Analysis Area

Map 7. Hydrological Analysis Area Map

Map 8. Underwood Roadless Area Map