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Draft Environmental Impact Statement

Lower Trinity and Mad River Motorized Travel Management

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Lower Trinity and Mad River Motorized Travel Management EIS

Draft Environmental Impact Statement

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Abstract: This Draft Environmental Impact Statement (DEIS) describes the environmental effects of a proposal by the Six Rivers National Forest (Six Rivers NF) to: (1) Prohibit cross-country motor vehicle travel off designated National Forest Transportation System (NFTS) roads and motorized trails by the public except as allowed by permit or other authorization (excluding snowmobile use); (2) Add 57 miles of unauthorized routes to the current National Forest Transportation System (NFTS) as motorized trails and co-locate 7 miles of motorized trails on NFTS closed roads; and (3) Reclassify 42 miles of existing NFTS roads and motorized trails by vehicle type or season of use and remove 6 miles of motorized use from NFTS trails.

These actions are needed in order to implement the 2005 Travel Management Rule (36 CFR Part 212, Subpart B) while providing for a diversity of motor vehicle recreation opportunities, and providing motorized access to dispersed recreation opportunities on the Six Rivers NF. The DEIS discloses environmental impacts associated with the proposed action, a no action alternative, and two additional action alternatives developed in response to issues raised by the public. Of the alternatives under consideration at this stage, Alternative 2, the Proposed Action, is preferred by the responsible official.

It is important that reviewers provide their comments at such times and in such a way that they are useful to the Agency's preparation of the EIS. Therefore, comments should be provided prior to the close of the comment period and should clearly articulate the reviewer's concerns. The submission of timely and specific comments can affect a reviewer's ability to participate in subsequent administrative review or judicial review.

Comments received in response to this solicitation, including names and addresses of those who comment, will be part of the project record. Comments submitted anonymously will be accepted and considered; however, anonymous comments will not provide the respondent with standing to participate in subsequent administrative review or judicial review.

Summary of the Draft Environmental Impact Statement (DEIS)

PROPOSED ACTION

The Six Rivers National Forest (Six Rivers NF) proposes the following actions: (1) Prohibit cross-country motor vehicle travel off designated National Forest Transportation System (NFTS) roads and motorized trails by the public except as allowed by permit or other authorization (excluding snowmobile use); (2) Add 57 miles of unauthorized routes to the current NFTS as motorized trails and co-locate 7 miles of motorized trail on existing NFTS closed roads; and (3) Reclassify 42 miles of existing NFTS roads and motorized trails by vehicle type or season of use and remove 6 miles of motorized use from NFTS trails.

SIGNIFICANT ISSUES

Internal and external scoping identified the following significant issues and these issues were used to assist in development of the action alternatives. The significant issues are the following:

Table S-1. List of Significant Issues

Issue Topic	Cause and Effect
1. Access and Recreation Opportunity	The proposed action unreasonably restricts motorized recreation use. The prohibition on cross-country travel will severely limit recreation opportunities and access, and the addition of only 64 miles of motorized trails to the NFTS provides insufficient public access to Six Rivers NF lands and unfairly limits motorized recreation.
2. Non-motorized Opportunity	Public motorized use of roads and trails as described in the Proposed Action will negatively affect non-motorized recreation opportunity and Inventoried Roadless Area character (engine noise, dust, conflicts, and aesthetic values).
3. Resource Impacts	Public motorized use of roads and trails as described in the Proposed Action will negatively affect forest resources.

ALTERNATIVES CONSIDERED IN DETAIL

The Six Rivers NF developed four alternatives: the No Action, the Proposed Action, and two additional action alternatives to meet the purpose and need and to respond to the significant issues listed above. The four alternatives considered in detail for this analysis are listed in Table S-2 below. Complete details of the alternatives are found in Chapter 2 of this document.

Table S-2. List of Alternatives Considered in Detail

Alternative 1: No Action Alternative	The No Action alternative provides a baseline for comparing the other alternatives. This alternative maintains the status quo. Under the No Action alternative, current management plans would continue to guide management of the project area. No changes would be made to the current NFTS and no cross-country travel prohibition would be put into place. Travel Management Rule would not be implemented, and no Motor Vehicle Use Map (MVUM) would be produced. Motor vehicle travel by the public would not be limited to designated routes. The agency would take no affirmative action on any unauthorized routes. • **Does not prohibit cross-country motor vehicle travel** • **Adds no new NFTS roads or motorized trails**

Alternative 2: Proposed Action and Preferred Alternative	The Proposed Action is the proposed changes to the NFTS and the prohibition of cross-country travel as described in the Notice of Intent (NOI) published December 19, 2008 on the Federal Register (Volume 73, Number 245) with minor corrections. The Proposed Action proposes to: (1) Prohibit cross-country motor vehicle travel off designated National Forest Transportation System (NFTS) roads and motorized trails by the public except as allowed by permit or other authorization (excluding snowmobile use); (2) Add 57 miles of unauthorized routes to the current National Forest Transportation System (NFTS) as motorized trails and co-locate 7 miles of motorized trails on NFTS closed roads; and (3) Reclassify 42 miles of existing NFTS roads and motorized trails by vehicle type or season of use and remove 6 miles of motorized use from NFTS trails. • **Prohibits cross-country travel** • **Adds 64 miles of NFTS motorized trails** • **Changes vehicle class on 25 miles of NFTS roads** • **Changes vehicle class on 4 miles of NFTS motorized trail** • **Removes 6 miles of motorized use from NFTS trail** • **Establishes season of use on 12 miles of NFTS motorized trails: June 1 to Oct 31** • **Blocks vehicle access into North Fork Wilderness**
Alternative 3:	Includes all actions identified for the Proposed Action (as corrected) and 1) adds an additional 7 miles inventoried unauthorized routes to the NFTS: as companion trails along Forest Route 1 and along 07N31 on Lone Pine Ridge in the Horse Linto area; as short spurs for dispersed recreation access at Titlow Hill; and as a tie-through from NFTS road 2S30 and the Old Willburn Ranch and County Road 515; and 2) expands season of use for motorized trails for consistency with season of use on the NFTS roads which access the NFTS motorized trails. • **Prohibits cross-country travel** • **Adds 72 miles of NFTS motorized trails** • **Changes vehicle class on 25 miles of NFTS roads** • **Changes vehicle class on 4 miles of NFTS motorized trail** • **Removes 6 miles of motorized use from NFTS trail** • **Establishes season of use on 12 miles of NFTS motorized trails consistent with NFTS access roads: May 1 to Nov 15** • **Blocks vehicle access into North Fork Wilderness**
Alternative 4:	This alternative provides another baseline for comparing other alternatives and responds to the issues of non-motorized recreation experience and negative effects to forest resources. The Travel Management Rule would be implemented, and a Motor Vehicle Use Map (MVUM) reflecting the current NFTS would be published. Public use of unauthorized routes would be prohibited. • **Prohibits cross-country travel** • **Establishes season of use on 12 miles of NFTS motorized trails consistent with NFTS access roads: May 1 to Nov 15** • **Blocks vehicle access into North Fork Wilderness**

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The table below summarizes the environmental consequences by providing an average ranking of each alternative by resource area. Detailed information can be found in Chapter 3.

Table S-3. Summary Comparison of Alternatives by Resource Average Ranking

Resource Area	Alt. 1	Alt. 2	Alt. 3	Alt. 4
3.3 Geology	**1.8**	**3.0**	**2.5**	**4.0**
3.4 Soil Resources	**1.0**	**2.6**	**2.4**	**3.1**
3.5 Water Resources	**1.0**	**3.0**	**2.0**	**4.0**
3.6 Aquatic Biota	**1.0**	**3.2**	**2.5**	**3.5**
3.7 Terrestrial Wildlife	**1.0**	**3.0**	**2.0**	**4.0**
3.8 Botanical Resources	**1.0**	**3.0**	**2.0**	**4.0**
3.9 Noxious Weeds	**1.0**	**3.0**	**2.0**	**4.0**
3.10 Port-Orford Cedar	**1.3**	**3.6**	**2.3**	**4.0**
3.11 Cultural Resources	**1.0**	**3.0**	**2.0**	**4.0**
3.13 Visual Resources	**1.0**	**4.0**	**4.0**	**4.0**
3.14 Motorized Recreation	**4.0**	**2.0**	**3.0**	**1.0**
3.15 Inventoried Roadless	**1.0**	**3.0**	**2.0**	**4.0**

[1] A score of 4 indicates the alternative has the greatest potential beneficial impact for the specified resource; a score of **1** indicates the alternative is the greatest potential for adverse impact for specified resource. See Chapter 3 for more details.

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Chapter 1: Purpose of and Need for Action

1.1 Document Structure

The Forest Service has prepared this Environmental Impact Statement in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Impact Statement discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters:

Chapter 1. Purpose and Need for Action: This chapter briefly describes the proposed action, the need for that action, and other purposes to be achieved by the proposal. This section also details how the Forest Service informed the public of the proposed action and how the public responded.

Chapter 2. Alternatives, including the Proposed Action: This chapter provides a detailed description of the agency's proposed action, as well as alternative actions that were developed in response to comments raised by the public during scoping. The end of the chapter includes a summary table ranking the proposed action and alternatives with respect to their environmental impacts.

Chapter 3. Affected Environment and Environmental Consequences: This chapter describes the environmental impacts of the proposed action and alternatives.

Chapter 4. Consultation and Coordination: This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.

References: References are consolidated here, includes discreet grouping for each specialist section from Chapter 3.

Index: The index provides page numbers by document topic.

Appendices: The appendices provide detailed information to support the analyses presented in the environmental impact statement.

Maps: are posted on the Six Rivers National Forest website under Travel Management: *www.fs.fed.us/r5/sixrivers/projects/ohv* .

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Six Rivers National Forest Supervisor's Office in Eureka, California.

1.2 Background

Over the past few decades, the availability and capability of motor vehicles, particularly off-highway vehicles (OHVs) and sport utility vehicles (SUVs), has increased tremendously. Nationally, the number of OHV recreationists has climbed sevenfold in the past 30 years, from

approximately 5 million in 1972 to 36 million in 2000. California is experiencing the highest level of OHV use of any state in the nation. There were 786,914 all terrain vehicles (ATVs) and OHV motorcycles registered in 2004, up 330% since 1980. Annual sales of ATVs and OHV motorcycles in California were the highest in the U.S. for the last 5 years, and four-wheel drive vehicle sales in California also increased by 1500% to 3,046,866 from 1989 to 2002.

Unmanaged motor vehicle use, particularly OHV use, has resulted in thousands of miles of unplanned roads and trails, erosion, watershed and habitat degradation, and impacts to cultural resource sites. Compaction and erosion are the primary effects of motor vehicle use on soils. Riparian areas and aquatic dependent species are particularly vulnerable to damage from motor vehicle use. Unmanaged recreation, including impacts from OHVs, is one of "Four Key Threats Facing the Nation's Forests and Grasslands" (USDA Forest Service, June 2004).

On August 11, 2003, the Pacific Southwest Region of the Forest Service entered into a Memorandum of Intent (MOI) with the California Off-Highway Motor Vehicle Recreation Commission and the Off-Highway Motor Vehicle Recreation Division of the California Department of Parks and Recreation. That MOI set in motion a 5 step region-wide effort to "Inventory and Designate OHV roads, trails, and any specifically defined open areas for motor vehicle travel on maps of the 18 National Forests in California by 2007."

On November 9, 2005, the Forest Service published final travel management regulations in the Federal Register (FR Vol. 70, No. 216-Nov. 9, 2005, pp 68264-68291), 36 CFR 212, Subpart B of the final Travel Management Rule requires designation of those roads, trails, and areas that are open to motor vehicle use on National Forests. Only roads and trails that are part of a National Forest Transportation System (NFTS) may be designated for motorized use. Designations are made by class of vehicle and, if appropriate, by time of year. Part 261 – Prohibitions, Subpart A (36CFR 261.13) of the final rule, prohibits the use of motor vehicles off designated roads, trails and areas, as well as use of motor vehicles on roads and trails that is not consistent with the designations.

On National Forest System (NFS) lands open to cross-country motor vehicle travel, unrestricted repetitive motor vehicle travel has resulted in unplanned, unauthorized routes and areas (roads, trails, and areas). These roads, trails and areas were developed without agency authorization, environmental analysis, or public involvement and do not have the same status as NFTS roads and NFTS trails. Nevertheless, some unauthorized routes may be well-sited, provide excellent recreation opportunities for motorized and non-motorized recreationists, and may enhance the NFTS. Other unauthorized routes are poorly-sited and cause unacceptable environmental impacts. Only NFTS roads, NFTS trails and discrete, specifically delineated open areas can be designated for motor vehicle use. In order for an unauthorized road or trail to be designated for motor vehicle travel, it must first be added to the NFTS. In order for areas to be designated for motor vehicle travel, a discrete, specifically delineated space that is smaller, and in most cases much smaller, than a Ranger District must be identified.

The Lower Trinity and Mad River Ranger Districts of the Six Rivers NF has over 365,000 acres currently open to cross-country travel by motor vehicles. In 2008, the Six Rivers NF completed an extensive inventory of unauthorized routes (roads, trails, and areas) on NFS lands in the project area open to cross-country travel by motor vehicles as described in the MOI. Approximately 255 miles of unauthorized routes were identified. The Six Rivers NF then used an interdisciplinary process to review the existing NFTS and the inventory of unauthorized routes to identify proposals for limited changes to the NFTS in these two districts. This process included review of the Six Rivers NF Land and Resource Management Plan (LRMP), internal

and external discussion, including extensive public collaboration workshops and input, and internal and external validation of the locations of unauthorized routes using the inventory maps. The travel management regulations provide for the incorporation of previous decisions regarding travel management and roads and trails that are part of the existing Six Rivers NF NFTS and open to motor vehicle travel will remain designated for such use except as described below under the Proposed Action. This proposal makes needed changes (vehicle class restrictions, additional motorized routes, seasonal restrictions, etc.) to the Six Rivers NF NFTS roads and motorized trails on NFS lands in the Lower Trinity and Mad River Ranger Districts in accordance with 2005 Travel Management Rule at 36 CFR Part 212, Subpart B.

In accordance with Subpart B of the Travel Management Rule (36 CFR §212.56), following a decision on this proposal, the Six Rivers NF will publish a Motor Vehicle Use Map (MVUM) identifying all Lower Trinity and Mad River Ranger District NFTS roads and trails that are designated for motor vehicle use. The MVUM shall specify the classes of vehicles and, if appropriate, the time of year for which motor vehicle use is designated. Upon publication of the MVUM, it is prohibited for the public to possess or operate a motor vehicle on NFS lands other than in accordance with those designations. These maps will be made available to the public on the internet and at the headquarters of the corresponding administrative unit and Ranger Districts of the National Forest System. The unauthorized routes not included in this proposal are not precluded from future consideration for either removal from the landscape and restoration to the natural condition or addition to the NFTS and inclusion on an MVUM. Future decisions associated with changes to the NFTS and MVUM are dependent on available staff and resources and may trigger the need for additional environmental analysis, public involvement, and documentation.

1.2.1 Travel Management on the Lower Trinity and Mad River Districts of the Six Rivers National Forest

Management of the transportation system on the Lower Trinity and Mad River Districts of the Six Rivers National Forest (Six River NF) is a dynamic process. This proposal is just one project, among many, in the Six River NF's long-term goal of managing the transportation system. Over the last 12 years, previous decisions have reduced the number of miles of open NFTS roads available for motor vehicle travel. These previous decisions have resulted in almost 170 miles of NFTS roads being closed or decommissioned. These former open NFTS roads have had drainage structures removed and vehicle barriers installed. All have been left in a free draining condition. These actions were informed through the Roads Analysis Process (RAP). Subsequent NEPA analyses and decisions have helped to identify and manage the current transportation system.

In addition to this proposal, ongoing efforts to manage motor vehicle travel on the Lower Trinity and Mad River Districts of the Six Rivers NF include:

(1) reducing adverse environmental impacts associated with unauthorized routes through various project-level planning efforts; and

(2) addressing impacts associated with the current NFTS through the Six River NF's road and trail maintenance program.

Implementation of this proposal and the subsequent designation of motor vehicle routes through publication of the MVUM are only one step in the overall management of the Six Rivers NF NFTS.

1.2.2 Scope of the Analysis

This proposal is not intended to revisit previous decisions that resulted in the current NFTS. This proposal is narrowly focused on the prohibition of cross-country travel and limited changes to NFTS roads and motorized trails to improve motorized recreation opportunities on the Lower Trinity and Mad River Ranger Districts of the Six Rivers National Forest.

The parameters for limited changes to the NFTS roads and motorized trails follow:

- Considerations for additions to the NFTS are limited to 1) inventoried unauthorized routes; and 2) motorized trails on existing NFTS closed roads. Unauthorized routes are considered for addition only when 1) they have high recreational value; 2) they were inventoried and identified by the public and/or the agency during steps 1 and/or 3 of the Travel Management process also known as OHV Route Designation; and 3) they do not have resource concerns or other conflicts (or resource concerns can be readily mitigated). Routes proposed for addition may either 1) provide access to dispersed recreation opportunities or 2) contribute to the diversity of motorized recreation opportunities. Only routes outside of Wilderness, Research Natural Areas (RNAs), and Recreation Opportunity Spectrum (ROS) classification of Semi-primitive Non-motorized are considered. Dead-end routes, routes leading to/ or ending in private property, and redundant (or duplicate) routes are not considered. Consideration within Inventoried Roadless areas is limited.
- Considerations for changes to existing NFTS roads are limited to proposing mixed use (both highway legal vehicles and non-highway legal vehicles allowed) on segments of roads currently maintained for passenger cars. Where the road segments will continue to be maintained for passenger cars the following is required: 1) segments must provide loops and/or linkages within or between the existing and proposed NFTS motorized trail networks, including mixed use roads: 2) segments must be no more than 3 miles long; 3) vehicle operators must hold a valid driver's license; and 4) use is subject to California Vehicle Code Regulations (CVC) for *"Combined-use Highways."* Where prior roads analysis has recommended, the proposal may lower maintenance level to provide for high clearance vehicles rather than passenger cars.
- Considerations for changes to existing NFTS motorized trails are limited to 1) changes in allowed vehicle use; 2) identification of allowed season of use where NFTS road(s) which access the motorized trail are closed seasonally; and 3) removal of motorized use from trails which are also designated for non-motorized use where either topography and route geometry are not compatible with motorized use and/or resource concerns can not be mitigated with regular maintenance actions.

The parameters for blocking unauthorized routes follow:

- Considerations for blocking unauthorized routes are limited to 1) unauthorized routes not proposed for NFTS where the inventory and identification conducted under Steps 1 and 3 of the Travel Management process identified current and persistent use to gain motorized access to and within the North Fork Wilderness or 2) incidental to the mitigation prescribed for an adjacent route proposed for inclusion in the NFTS.

The end product of this Travel Management planning effort will be the publication of a Motorized Use Map (MVUM) for each district. The MVUM will identify the NFTS roads and

motorized trails open for public use, by vehicle type and season of use, where applicable, in accordance with 36 CFR Part 212, Subpart B. Only those actions within the capability of the Forest have been brought forward by the responsible official and proposed in accordance with the purpose and need for action.

The infrastructure of a national forest will always have room for improvement and the Six Rivers NF welcomes suggestions for improving the transportation system. Such suggestions are considered within the context of the overall mission of the Six Rivers NF and will be considered as the availability of staff and funding allow. Many Suggestions were received during public scoping for improving the NFTS by 1) designation of additional routes not considered in detail in this DEIS; 2) mixed use on additional segments of NFTS passenger car roads; and 3) the rehabilitation of unauthorized routes not proposed for addition, to either mitigate on-going resource damage and/or accelerate return to a natural condition. These ideas and concerns have been captured by the Six Rivers NF and may be considered in future programs of work.

1.2.3 Project Location

The project area includes all National Forest System lands on the Lower Trinity and Mad River Ranger Districts of the Six Rivers NF outside of Wilderness.

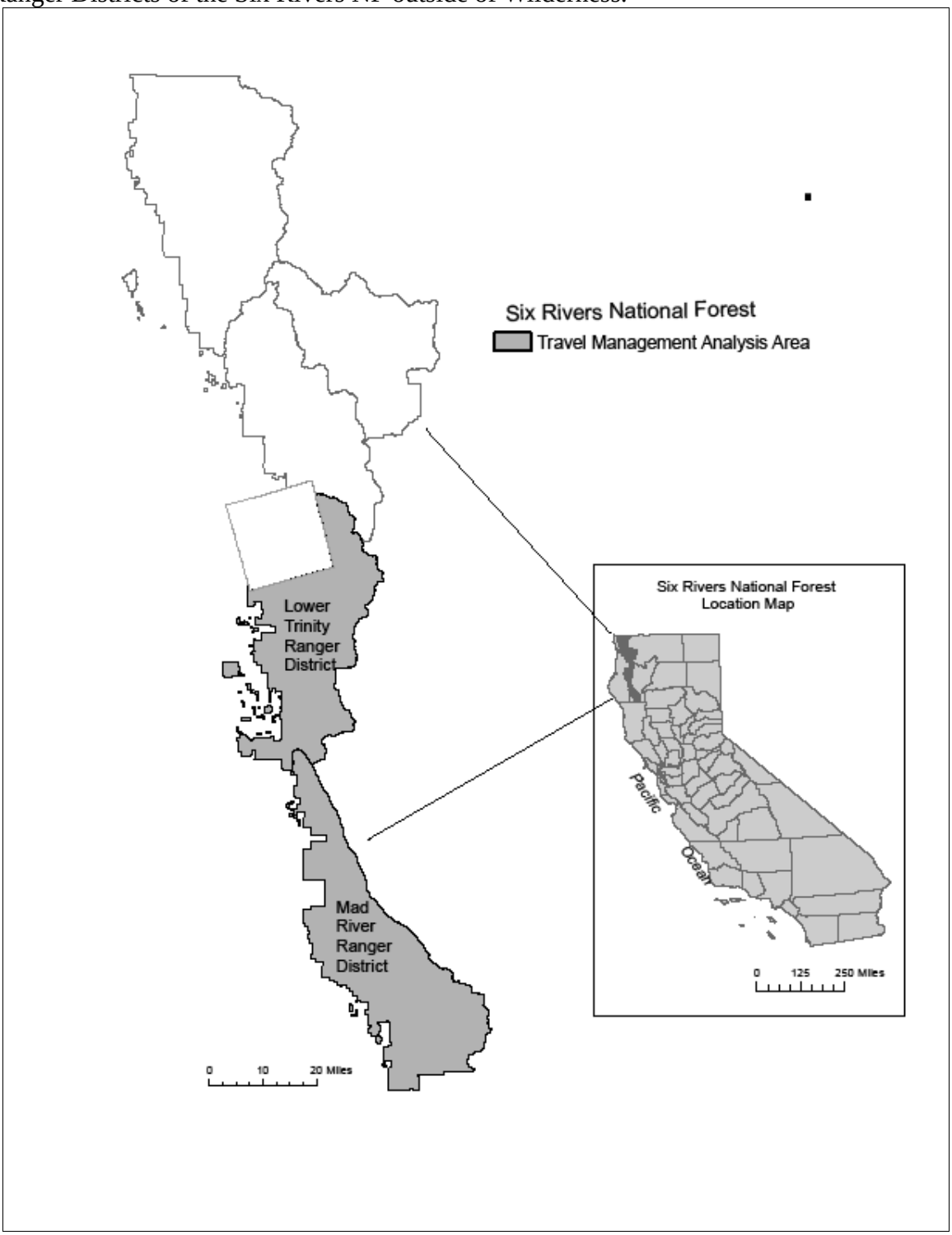

Figure 1 Location Map: Lower Trinity and Mad River Ranger Districts.

1.3 Purpose and Need

The following needs have been identified for this proposal:

1. **There is a need for regulation of unmanaged cross-country motor vehicle travel by the public**. The proliferation of unplanned, unauthorized, non-sustainable roads, trails, and areas created by cross-country travel adversely impacts the environment. The 2005 Travel Management Rule, 36 CFR Section 212. Subpart B, provides for a system of NFTS roads, NFTS trails, and areas on National Forest System lands that are designated for motor vehicle use. After roads, trails, and areas are designated, motor vehicle use off designated roads and trails and outside designated areas is prohibited by 36 CFR 261.13. Subpart B is intended to prevent resource damage caused by unmanaged motor vehicle use by the public. In accordance with national direction, implementation of Subpart B of the travel management rule for the Six Rivers National Forest is scheduled for completion in 2009.

2. **There is a need for limited changes to the NFTS on the Lower Trinity and Mad River Ranger Districts of the Six River National Forest to:**
   a. **Provide motor vehicle access to dispersed recreation opportunities** (camping, hunting, fishing, hiking, horseback riding, etc.). A substantial portion of known dispersed recreation activities are not typically located directly adjacent to NFTS roads or NFTS motorized trails. Some dispersed recreation activities depend on foot or horseback access, and some depend on motor vehicle access. Those activities accessed by motor vehicles are typically accessed by short routes that have been created primarily by the passage of motor vehicles. Many such unauthorized 'user-created' routes are not currently part of the NFTS. Without adding them to the NFTS and designating them on a MVUM, the regulatory changes noted above would make continued use of such routes illegal and would preclude access by the public to many dispersed recreation activities.
   b. **Provide a diversity of motorized recreation opportunities** (4X4 vehicles, motorcycles, ATVs, SUVs, passenger vehicles, etc.). It is Forest Service policy to provide a diversity of road and trail opportunities for experiencing a variety of environments and modes of travel consistent with the National Forest recreation role and land capability (FSM 2353.03(2)). Implementation of Subpart B of the Travel Management Rule will severely reduce acres and miles of motorized recreation opportunities relative to current levels. As a result, there is a need to consider limited changes to the NFTS.
   c. Remove motorized use from trails with low motorized recreational value where topography and route geometry are not compatible with motorized use and/or resource concerns can not be mitigated with regular maintenance actions.

3. **There is a need to permanently block locations where unauthorized (motorized) routes access the North Fork Wilderness** on the Mad River Ranger District of the Six River National Forest. The Forest Plan provides direction for unauthorized use specific to the North Fork Wilderness "All locations where vehicle access occurs will

be permanently blocked." During Steps 1 and 3 of the Travel Management process an unauthorized route was identified and inventoried which accesses the North Fork Wilderness and has current and persistent motorized use. As a result there is a need to consider blocking this access.

In making any limited changes to the National Forest Transportation system, the Six Rivers NF will be considering criteria contained in Subpart B of the Travel Management Rule, which include the following:

A. Impacts to natural and cultural resources.
B. Public safety.
C. Access to public and private lands.
D. Availability of resources for maintenance and administration of roads trails and areas that would arise if the uses under consideration are designated.
E. Minimizing damage to soil, watershed, vegetation, and other forest resources.
F. Minimizing harassment of wildlife and significant disruption of wildlife habitat.
G. Minimizing conflicts between motor vehicles and existing or proposed recreational uses of NFS lands or neighboring federal lands.
H. Minimizing conflicts among different classes of motor vehicle uses of NFS lands or neighboring federal lands.
I. Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factors.

When making any limited changes to National Forest System Roads, the Six Rivers NF will also consider the following:

1. Speed, volume, composition and distribution of traffic on roads.
2. Compatibility of vehicle class with road geometry and road surfacing.
3. Maintaining valid existing rights of use and access.

1.4 Proposed Action, also the Preferred Action

1. Prohibition of cross-country motor vehicle travel off designated NFTS roads and motorized trails by the public except as allowed by permit or other authorization (excluding snowmobile use).

2a. Additions to the NFTS, unauthorized routes: The Six Rivers NF currently manages and maintains approximately 1,400 miles of NFTS roads and 36 miles of NFTS motorized trails on the Lower Trinity and Mad River Ranger Districts. Based on the stated purpose and need for action, the Six Rivers NF proposes to add 57 miles of unauthorized routes to its NFTS motorized trails to access dispersed recreation sites and/or increase motorized recreation opportunities, bringing the total of NFTS motorized trails to approximately 93 miles. Note that the route delineation design feature for unauthorized route proposed as NFTS motorized trail results in blocking motorized access to the North Fork Wilderness.

2b. Additions to the NFTS, co-location of Motorized Trail on NFTS roads closed year-round: Approximately 7 miles of existing NFTS roads are proposed for dual management as both Maintenance Level 1 (closed) roads and as motorized trails open to vehicles 50-inches or less in width. Approximately 7 miles would be located on Lower Trinity Ranger District to expand motorized recreation opportunities by linking proposed motorized trails in the Waterman

Ridge and Hennessy Ridge networks. Approximately 0.23 mile would be located on the Mad River Ranger District to facilitate access from 2N17B into the Pilot motorized trail network.

3a. Changes to Existing NFTS Roads, vehicle class (mixed use): The Six Rivers NF proposes mixed use (allow both highway legal vehicles and non-highway legal vehicles) on 25 miles of NFTS roads currently open to highway-legal-vehicles-only to expand motorized recreation opportunities by linking NFTS (and proposed) motorized trails and NFTS roads which already allow non-highway legal vehicles. Approximately 23 miles would continue to be maintained for passenger cars and would be subject to California Vehicle Code (CVC) for Combined-use Highways and require the vehicle operator to hold a valid state driver's license.

3b. Changes to Existing NFTS Motorized Trails, vehicle class, season of use: The Six Rivers NF proposes to change vehicle class on 4 miles of motorized trails by allowing vehicles 50-inches or less in width on trails currently restricted to motorcycles only; and to restrict motor vehicle use within specified dates on approximately 12 miles of existing NFTS motorized trails where their NFTS access roads are subject to wet weather closures.

3c. Changes to Existing NFTS Motorized Trails, remove motorized use: The Six Rivers NF proposes to remove 6 miles of motorized use from trails (that also allow non-motorized use). with low motorized recreational value and where topography and route geometry are not compatible with motorized use and/or resource concerns can not be mitigated with regular maintenance actions.

A detailed description of the proposed action can be found in Chapter 2 of this EIS. Maps depicting the proposed action can be found on the Six Rivers NF web-site by selecting the *Travel Management / Off-Highway Vehicle Route Designation* link, and then *LOWER TRINITY & MAD RIVER TRAVEL MANAGEMENT PROJECT* »*www.fs.fed.us/r5/sixrivers/projects/ohv* .

1.5 Principle Laws and Regulations that Influence the Scope of this EIS

The National Environmental Policy Act of 1969 (NEPA) requires that all major federal actions significantly affecting the human environment be analyzed to determine the magnitude and intensity of those impacts and that the results be shared with the public and the public given opportunity to comment. The regulations implementing NEPA further require that to the fullest extent possible, agencies shall prepare environmental impact statements concurrently with and integrated with environmental analyses and related surveys and studies required by the Endangered Species Act of 1973, the National Historic Preservation Act of 1966, and other environmental review laws and executive orders. Principle among these are the Multiple Use and Sustained Yield Act of 1960, the National Forest Management Act of 1976 as expressed through the Six Rivers NF Land and Resource Management Plan, the Clean Air Act of 1955, the Clean Water Act of 1948, and the Forest and Rangeland Renewable Resources Planning Act of 1974.

Travel Management Rule (36 CFR 212, 251, 261, and 295): The Lower Trinity and Mad River Travel Management EIS is designed specifically to implement the requirements of the November 5, 2005, Rule for Travel Management, Subpart B.

1.6 Decision Framework

The responsible official will decide whether to adopt and implement the proposed action, an alternative to the proposed action, or take no action to prohibit cross-country motor vehicle travel by the public off the designated system and make limited changes to the Six Rivers NF NFTS.

The Forest Supervisor of the Six Rivers NF is the responsible official. The Forest Supervisor will sign the Record of Decision.

1.7 Public Involvement

The Interdisciplinary Team relied on public involvement to ensure that a full range of alternatives, representing a broad array of perspectives, would be analyzed. Public involvement occurred throughout the various "Steps." The public collaboration process began in 2005. The 45-day public scoping period for the Notice of Intent (NOI) began on December 19, 2008 and ended on February 2, 2009. During the scoping period, the Six Rivers NF held workshops with the public, including organized groups, to clarify the proposed action, explain the comment process, and explore public concerns.

Public Collaboration Workshops

During 2007, the Six Rivers NF initiated workshops open to the public, including a variety of motorized and non-motorized trail recreationists, to gather comments on the maps illustrating the unauthorized routes on the Six Rivers National Forest. These comments included

- Validation (presence or absence) of an unauthorized route on inventory map(s)
- Type of recreation or access the route provides (touring, challenge, fishing, hunting, etc)
- Types of vehicles used on route

Additional public workshops during April, May, and June 2008 were also initiated to identify which of the routes should become part of the Proposed Action, the type of use that each route would provide, and locations of popular dispersed camping areas and their access routes. These meeting were attended by stakeholders with a variety of interests regarding OHV routes and motorized recreation. The Interdisciplinary Team took this information and in consideration of the scope of analysis as described in Section 1.2.2, developed the Proposed Action.

45-day public scoping period for the Proposed Action

On December 19, 2008, the Forest Service published a Notice of Intent to Prepare an Environmental Impact Statement in the Federal Register (FR Volume 73, Number 245) for the Lower Trinity and Mad River Travel Management Project, including a description of the Proposed Action. The public comment period began on December 19, 2008, and ended on February 2, 2009. Phone calls, news releases, website postings and mailing were used to alert the public of the opportunity to comment on the Proposed Action. Public scoping meetings were held in Willow Creek (January 6, 2009), in mad River (January 8, 2009) and in Eureka (January 12, 2009) to explain the Proposed Action. Fifty-eight comments were received via e-mail, hard mail; and comments forms turned in during or following public meetings.

1.8 Issues

Comments from the public, other agencies, and groups were used to formulate issues concerning the proposed action. An issue is a matter of public concern regarding the proposed action and its environmental impacts. The Forest Service separated the issues into two groups: significant and non-significant. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: (1) outside the scope of the proposed action; (2) already decided by law, regulation, Forest Plan, or other higher level decision; (3) irrelevant to the decision to be made; or (4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…"

1.8.1 Significant Issues

1. **Issue: The proposed action unreasonably restricts motorized recreation use** by prohibiting cross-country travel and restricting use to designated routes. The addition of only 64 miles of motorized trails to the NFTS provides insufficient public access to Six Rivers NF lands and unfairly limits motorized recreation.
   Discussion: Concerns were raised that restricting cross-country travel across the entire forest by restricting use to designated routes severely impacts motorized recreation opportunities and unfairly restricts access for hunting, fishing, camping, and a host of other outdoor activities. The route inventory identified 255 miles of unauthorized routes being used and the proposed action only retains 57 miles of these. This is insufficient to provide a quality motorized recreation experience on the Lower Trinity and Mad River Districts of the Six Rivers NF.
2. **Issue: Public motorized use of roads and trails as described in the Proposed Action will negatively affect non-motorized recreation opportunity and Inventoried Roadless Area character**
   Discussion: Concerns were raised that inventoried roadless areas are already impacted by NFTS roads and trails and unauthorized routes that detract from their roadless character. The proposed action only compounds this problem by adding 4 miles of additional motorized trails. Motorized trails change the character of these otherwise undisturbed landscapes.
3. **Issue: Many of the unauthorized motorized routes proposed for addition to the NFTS are poorly located and will cause adverse impacts to plants, wildlife, wildlife habitat, water quality, soils, and other natural resources.**
   Discussion: Concerns were raised that impacts to a variety of natural resources, citing stream crossings, habitat fragmentation, wildlife disturbance, sedimentation, cultural resource concerns, invasive weeds, and other resources that would be impacted by motorized use of trails added to the NFTS.

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Chapter 2: The Alternatives

2.1 Introduction

This chapter describes and compares the alternatives considered for the Lower Trinity and Mad River Motorized Travel Management Environmental Impact Statement (EIS). It describes the alternatives considered in detail and those eliminated from detailed study. The end of this chapter presents a summary of the alternatives in tabular format so that the alternatives considered in detail and their environmental impacts can be readily compared. Route specific data for each alternative is tabulated in Appendix A.

Based on the issues identified through public comment on the proposed action, the Forest Service developed **two** alternative proposals that achieve the purpose and need differently than the proposed action. In addition, the Forest Service is required to analyze a No Action alternative. The no action, proposed action, and other action alternatives are described in detail below.

The chapter is divided into four parts:

- How the alternatives were developed.
- Alternatives considered in detail.
- Alternatives that were considered, but eliminated from detailed analysis. It includes the rationale for eliminating these alternatives.
- Comparison of the alternatives based on their environmental, social, and economic consequences, and includes a comparative display of the projected effects of the alternatives.

2.2 How the Alternatives were developed

The Forest Service used the significant issues listed in Chapter 1 to develop alternatives to the Proposed Action. The Alternatives provide different approaches to:

- Fulfill the purpose and need for the project as described in Chapter 1, and;
- Address the significant issues.

In addition to the issues raised during the 45 day public scoping period, several groups submitted alternatives for consideration by the Forest Service. The four alternatives incorporate elements of these proposals as well as other comments submitted by the public. In addition, information gathered by the Forest Service in their consultation and discussions with tribal representatives, local counties, State and Federal agencies, and Forest Service employees. was used to develop and refine the alternatives.

2.3 Alternatives Considered in Detail

Three action alternatives (Alternatives 2, 3, 4) and a no action alternative (Alternative 1) are analyzed in detail in this DEIS. The no action alternative represents the continuation of cross-country travel including continued use of all unauthorized routes by motorized vehicles. This alternative serves as a baseline for comparison among the alternatives, and is required by the implementing regulations of the National Environmental Policy Act (NEPA).

The project area for the alternatives includes National Forest System (NFS) lands on the Lower Trinity and Mad River Ranger Districts of the Six Rivers NF outside of Wilderness. It does not include any private, state, or other federal lands.

Each alternative assumes that other adjacent federal lands will be managed according to the existing management plans and applicable federal laws. Each alternative also assumes that activities on state and private lands will meet applicable state and federal land use regulations.

Monitoring and Condition Surveys

Monitoring is critical for evaluating the effectiveness of management decisions and the accuracy of analysis assumptions and conclusions. Monitoring of road and trail conditions is required each year. Road and trail condition surveys are conducted using a random sample and must meet national standards. If monitoring, or road and trail condition surveys, determine motor vehicle use on a National Forest is directly causing or will directly cause considerable adverse effects on public safety or soil, vegetation, wildlife, wildlife habitat, or cultural resources associated with that road or trail the responsible official, in accordance with 36 CFR 212.52(2) shall immediately close that road or trail to motor vehicle use until the official determines that such adverse effects have been mitigated or eliminated and that measures have been implemented to prevent future reoccurrence.

The dispersed recreation monitoring element as provided in the Forest Plan includes annual assessment of project effects on 1) recreation setting and recreation opportunity spectrum (ROS) category in primitive and semi-primitive areas; and 2) sampling of 20% of OHV routes. A threshold of concern is triggered where there is 1) more than 10% variance from planned use levels; and 2) visible damage of Forest resources along or adjacent to OHV routes. More intensive monitoring of OHV use is conducted by the Forest to meet eligibility requirements for state cooperative agreements.

No additional monitoring is indicated for either recreation or wildlife resources. Project specific monitoring is identified for: 1) water and geologic resources, 2) serpentine vegetation and Sensitive plant species, 3) noxious weeds, 4) Port Orford Cedar (POC), and 5) cultural resources. The regular annual monitoring of OHV routes (20% of routes) will be refocused to include routes of specific resource interest. See *Appendix H* for the full details of the monitoring plans developed specific to this project.

Mitigation Measures

All added routes will have route identification signing. Allowed seasons of use are identified for motorized trails where appropriate to protect resource values from potential spread of Port Orford cedar root disease, wet weather associated damage, wildlife disturbance, or a combination of the preceding. Mitigations identified in the “subject to mitigation” column(s) in Tables 1 and 2 of *Appendix A Route Specific Data* are specific to added motorized trails and include: the construction of waterbars, installation of a culvert, and correction of stream diversions; noxious weed removal; signing and route definition. Inclusion of the respective routes on the motorized use map is subject to completion of specific mitigations listed. These mitigations affect 38 miles of proposed motorized trail additions under Alternative 2 and 44 miles of proposed motorized trail additions in Alternative 3. Mitigations for cultural values are not identified by route number in *Appendix A* because of cultural site sensitivity, but are listed by

cultural site number for specialist reference in the Cultural Resources analysis section in Chapter 3 (3.11). Cultural Resource mitigations include signing, physical barriers, avoidance, and archeological padding. Monitoring is integral to these mitigations, see above and *Appendix H Resource Monitoring Plans*.

The proposed mixed use is expected to require specific mitigations which will be identified once the mixed use analyses are finalized and will be included in the Final EIS. The mixed use mitigations are expected to include a combination of: a communication plan; route identification signing, regulatory and warning signing; improvement of road conditions (such as clearing rather than construction related improvements); improve sight distance at intersections; education of law enforcement officials; and possibly removal of obstacles adjacent to roadbed. Actions which would lower the maintenance level from passable by a passenger car (ml3) may only be considered for the final segment of 2N14. No construction actions are anticipated. While not mitigation per se, mixed use on passenger car roads is subject to California Vehicle Code for "Combined-use Highways" and the vehicle must be operated by a state licensed driver.

Descriptions of the Alternatives

This section describes each of the four alternatives considered in detail. Each action alternative is comprised of one or more of the following actions:

1. Prohibition of cross-country travel/ Forest Plan conformance with the Travel Management Rule: All of the action alternatives prohibit motor vehicle travel off designated NFTS roads and NFTS motorized trails by the public except as allowed by permit or other authorization. Prohibition of cross-country travel is included in order to address the need to regulate unmanaged motor vehicle use.
2. Additions to the NFTS motorized trails: Alternatives 2 and 3 include the addition of unauthorized routes to the NFTS as motorized trails. Alternatives 2 and 3 include the co-location of motorized trails on existing NFTS closed roads for dual management. Vehicle class and, if appropriate, season of use for those proposed additions are identified. Additions are considered in order to respond to the need to provide motor vehicle access to dispersed recreation opportunities and to provide a diversity of motorized recreation opportunities. For purposes of this analysis, each proposed trail (or trail segment) is identified by a unique alpha/numeric reference for unauthorized routes and NFTS road number for co-location with closed roads. All trail additions have a proposed trail management objective. Considerations include vehicle type, recreational opportunity, and difficulty level, as identified for each proposed motorized trail. This information for each proposed trail is contained in Tables 1 and 2 of Appendix A. This action component responds to the need to provide a diversity of wheeled motorized recreation opportunities and access and minimize potential adverse resource effects.
3. Changes to NFTS roads and motorized trails: The action alternatives include limited changes to vehicle class and/or season of use allowed on existing NFTS roads and motorized trails. Vehicle class indicates the type of vehicle (passenger car, motorcycle, all-terrain vehicle, etc) allowed to operate on a road or trail. Changes in vehicle class from highway-legal only to include all vehicles (mixed use) on passenger car roads (Maintenance Level 3 and higher) requires a mixed-use analysis. Changes in vehicle class for trails are based on existing trail width and design features

based on management objectives for each trail. Season of use indicates the time of year vehicles are allowed to operate on a trail. Changes to the NFTS season of use are considered where damage to soil or aquatic resources, harassment of wildlife, spread of Port Orford Cedar root disease may otherwise occur, and where a NFTS motorized trail is accessed by a NFTS road which is subject to seasonal closure. Also included in this group of actions is the removal of motorized use from trails which are also designated for non-motorized use where either topography and route geometry are not compatible with motorized use and/or resource concerns can not be mitigated with regular maintenance actions. This action component responds to the need to provide a diversity of wheeled motorized recreation opportunities and access and minimize potential adverse resource effects.

4. Block inventoried unauthorized route which provides motorized access to the North Fork Wilderness: Inventoried unauthorized route TH1082 will be blocked at its junction with county road 520 either incidental to defining the correct alignment of proposed motorized trail JM1061, or as an independent action. This action responds to the need to permanently block locations where unauthorized routes access the North Fork Wilderness. Where it is an incidental action (Alternatives 2 and 3), its effects are considered with the *additions to the NFTS motorized trails* actions.

Alternative 1: No Action

The No Action Alternative provides a baseline for comparing the other alternatives. Under the No Action Alternative, no changes would be made to the NFTS and there would be no prohibition of cross-country travel (see Table 2.4). Current management plans would continue to guide project area management. The Travel Management Rule would not be implemented, and no Motor Vehicle Use Map (MVUM) would be published. Unauthorized routes would continue to have no status or authorization as NFTS facilities.

1. **Cross-Country Travel:** Public motor vehicle travel off designated NFTS roads and NFTS trails would continue except as otherwise prohibited.
2. **Additions to the NFTS motorized trails:** No roads or motorized trails would be added to the NFTS under this alternative.
3. **Changes to the NFTS roads and motorized trails:** No changes to type of vehicle or season of use would be made to NFTS under this alternative.

Alternative 2: Proposed Action, also the Preferred Alternative

Alternative 2 is the Proposed Action as described in the Notice of Intent (NOI) published on December 19, 2008 (Volume 73, Number 245) with minor corrections. It includes the following actions:

1. **Cross-Country Travel:** Public motor vehicle travel off designated NFTS roads and NFTS trails would be prohibited, except as allowed by permit or other authorization.
2. **Additions to the NFTS motorized trails:** The Proposed Action would add a total of 64 miles as new NFTS motorized trails by vehicle type and season of use:
   a. 33 miles of unauthorized routes would be added to the NFTS as motorized trails open to high clearance vehicles; note that implementing the mitigation to define route JM1061, incidentally blocks motorized access to North Fork Wilderness.
   b. 23 miles of unauthorized routes would be added to the NFTS as motorized trails open to wheeled vehicles 50-inches or less in width.

c. 7 miles of motorized trails open to wheeled vehicles 50-inches or less in widthwould be co-located on NFTS closed roads (Maintenance Level 1) for their dual management as motorized trail and closed road.

3. **Changes to the NFTS roads and motorized trails:**
   a. 2 ½ miles of NFTS road would change vehicle type from highway legal only to mixed use (highway legal and non-highway legal vehicles); and would change from being maintained for passenger cars (Maintenance Level 3) to being maintained for high clearance vehicles (Maintenance Level 2).
   b. 23 miles of NFTS road would change vehicle type from highway legal only to mixed use (highway legal and non-highway legal vehicles) with no change in maintenance level. Road segments are up to 3 miles long and provide connecting links between motorized trails and/or mixed use roads where alternate routes do not exist and/ are unfeasible.
   c. 4 miles of NFTS motorized trail would change vehicle class from motorcycle only to wheeled vehicles 50-inches or less in width.
   d. Remove 6 miles of motorized use from NFTS trails.
   e. 12 miles of motorized trail accessed from NFTS roads subject to seasonal closure would change season of use from “none designated” and “July 10 to Jan 30” to include a wet weather closure.

A complete listing of routes proposed for addition to the NFTS as motorized trails, including vehicle class and season of allowed use, can be found in Appendix A.

The following seasonal restrictions are proposed under Alternative 2 (the Proposed Action). Seasonal use may also reflect a combination of wildlife and wet weather dates.

Table 2.3-1. Alternative 2 - Seasonal Closures by Resource Concern

Resource	Reason for Restriction	Open Period
Wildlife	Species disturbance	July 10 – Jan 31, or July 10 - Nov 14
Port Orford Cedar (POC)	Prevent spread of POC root disease	June 1 – Oct 19
Wet Weather	Facility protection & minimize sediment mobilization or accessed over NFTS road subject to wet weather closure	June 1 – Oct 31
Combination	Wildlife and Wet Weather	July10-Oct31

Alternative 3

Alternative 3 responds to the issue of access and motorized recreation opportunity. During scoping the Six Rivers NF received suggestions for additional routes for inclusion in the NFTS and management of wet weather closures. Some unauthorized routes identified during Steps 1 and 3 of the Travel Management process but not included in the proposed action because of lower recreational value and/or higher resource concerns were identified as important to the public during scoping, and are added as motorized trails in this alternative, in addition to other actions proposed under Alternative 2. The season of use corresponding to wet weather restrictions was reviewed and found NFTS roads on the Mad River Ranger District which access

the subject NFTS motorized trails are open from May 1 through November 15. The proposed season of use for NFTS motorized trails subject to wet weather closures was therefore expanded for consistency with the NFTS access roads.

1. **Cross-Country Travel:** Public motor vehicle travel off designated NFTS roads and NFTS trails would be prohibited, except as allowed by permit or other authorization.
2. **Additions to the NFTS motorized trails:** This expanded motorized recreation alternative would add a total of 71 miles as new NFTS motorized trails by vehicle type and season of use:
   a. 35 miles of unauthorized routes would be added to the NFTS as motorized trails open to high clearance vehicles; note that implementing the mitigation to define route JM1061, incidentally blocks accesses to the North Fork Wilderness.
   b. 23 miles of unauthorized routes would be added to the NFTS as motorized trails open to wheeled vehicles 50-inches or less in width.
   c. 6 miles of unauthorized routes would be added to the NFTS as motorized trails open to motorcycles only.
   d. 7 miles of motorized trails open to wheeled vehicles 50-inches or less in width would be co-located on NFTS closed roads (Maintenance Level 1) for their dual management as motorized trail and closed road.
3. **Changes to the NFTS roads and motorized trails:**
   a. 2 ½ miles of NFTS road would change vehicle type from highway legal only to mixed use (highway legal and non-highway legal vehicles); and would change from being maintained for passenger cars (Maintenance Level 3) to being maintained for high clearance vehicles (Maintenance Level 2).
   b. 23 miles of NFTS road would change vehicle type from highway legal only to mixed use but would still be maintained for passenger cars (Maintenance Level 3 and higher);
   c. 4 miles of NFTS motorized trail would change vehicle type from motorcycle to 50-inches or less in width.
   d. Remove 6 miles of motorized use from NFTS trails.
   e. 12 miles of motorized trail accessed from NFTS roads subject to seasonal closure would change season of use from “none designated” and “July 10 to Jan 30” to include a wet weather closure.

A complete listing of motorized trails to be added into the NFTS, including vehicle class and season of allowed use, can be found in Appendix A.

The following seasonal restrictions are proposed under Alternative 3 Expanded Motorized Recreation. Seasonal use may also reflect a combination of wildlife and wet weather dates.

Table 2.3-2. Alternative 3 - Seasonal Closures by Resource Concern

Resource	Reason for Restriction	Open Period
Wildlife	Species disturbance	July 10 – Jan 31, July 10 - Nov 14
Port Orford Cedar (POC)	POC root disease	June 1 – Oct 19

Resource	Reason for Restriction	Open Period
Wet Weather	Facility protection & minimize sediment mobilization or accessed over NFTS road subject to wet weather closure	Lower Trinity Ranger District: June 1- Oct 31 Mad River Ranger District: May 1 – Nov 15
Combination	Wildlife and Wet Weather	July10-Nov 15

Alternative 4

Alternative 4 responds to the issues of non-motorized recreation experience and affects to forest resources resulting from the addition of motorized trails by not adding any motorized trails. Alternative 4 responds to the need of prohibiting cross-country travel, includes seasonal closures on NFTS motorized trails accessed by NFTS roads subject to wet weather closures, and blocks access to the North Fork Wilderness. This alternative also provides a baseline for comparing the impacts of other alternatives since it both prohibits cross country travel and adds no additional routes.

1. **Cross-Country Travel:** Public motor vehicle travel off designated NFTS roads and NFTS trails would be prohibited, except as allowed by permit or other authorization.
2. **Additions to the NFTS motorized trails:** Neither inventoried unauthorized routes nor motorized trails co-located on closed NFTS roads would be NFTS additions under this alternative.
3. **Changes to the NFTS roads and motorized trails:** 12 miles of motorized trail accessed from NFTS roads subject to seasonal closure would change season of use from “none designated” and “July 10 to Jan 30” to include a wet weather closure.
4. **Block motorized access to North Fork Wilderness:** Unauthorized route TH1082 will be blocked at its junction with county road 520 to permanently block motorized access to the North Fork Wilderness.

A complete listing of existing NFTS motorized trails proposed to change season of use can be found in Table 4 of *Appendix A Route Specific Data*.

The following seasonal restrictions are proposed under Alternative 4.

Table 2.3-3. Alternative 3 - Seasonal Closures by Resource Concern

Resource	Reason for Restriction	Open Period
Wet Weather	Accessed by NFTS roads with wet weather restriction	May 1 – Nov 15

The Preferred Alternative

Alternative 2, the Proposed Action, is also the preferred alternative.

2.4 Comparison of Alternatives

This section of Chapter 2 compares the alternatives by summarizing key differences between the alternatives and provides a summary of the effects analysis for all alternatives. Chapter 3 describes the environmental consequences of the alternatives in detail.

Table 2.4-1. Summary Comparison of Alternatives

Item		Alt. 1	Alt. 2	Alt. 3	Alt. 4
Cross Country Travel – Action Proposed		No change to current management	Prohibited	Prohibited	Prohibited
Cross Country Travel – Available Acres Outside Wilderness		365,000	0	0	0
Additions to the NFTS Motorized Trails		-	64.09	71.35	-
Motorized Trails (inventoried routes) added (miles)		0	56.87	64.13	0
Motorized Trails Co-Located on Closed Roads (miles)		0	7.22	7.22	0
Changes to Vehicle Class from Highway Legal Only to Mixed Use (Both Highway-Legal and Non-Highway Legal Allowed)	**Passenger Car Roads Altered to Meet High Clearance Conditions**	0 miles	2.49 miles	2.49 miles	0 mile
	Passenger Car Roads not Altered Due to Low Mixed Use Safety Risk	0 miles	22.97 miles	22.97 miles	0 miles
Seasonal Restrictions	**Wildlife**	n/a	July10-Jan31 July 10-Nov14	July10-Jan31 July10-Nov14	n/a
	Port Orford Cedar	n/a	June1-Oct19	June1-Oct19	n/a
	Wet Weather (Lower Trinity Ranger District)	n/a	June 1-Oct31	June1-Oct31	n/a
	Wet Weather (Mad River Ranger District)	n/a	June1-Oct31	May1-Nov15	May1-Nov15
	combination	n/a	July10-Oct31	July10-Nov15	July10-Nov15

Table 2.4-2. Summary Comparison of Alternatives by Vehicle Type.

Item		Alt. 1	Alt. 2	Alt. 3	Alt. 4
Motorized Trails Added To National Forest System	**Trails Added Open to High Clearance Vehicles, includes ATV's and Motorcycles**	0 miles	33.38 miles	34.96 miles	0 miles
	Trails Added Open to ATV's & Motorcycles	0 miles	23.49miles	23.49 miles	0 miles
	Trails Added Open to Motorcycles	0 miles	0 miles	5.68 miles	0 miles
	Trails Co-located on NFTS closed roadsOpen to ATV's & Motorcycles	0 miles	7.22 miles	7.22 miles	0 miles
	Total	0 miles	64.09 miles	71.35 miles	0 miles

2.5 Summary Comparison of Alternatives by Environmental Effects

The table below summarizes the environmental consequences by providing an average ranking of each alternative by resource area. Detailed information can be found in Chapter 3 in the respective resource section.

Table 2.5-1. Summary Comparison of Alternatives by Resource Average Ranking

Resource Area	Rankings of Alternatives, Averaged Across Indicators[1]			
	Alt. 1	Alt. 2	Alt. 3	Alt. 4
3.3 Geology	1.8	3.0	2.5	4.0
3.4 Soil Resources	1.0	2.6	2.4	3.1
3.5 Water Resources	1.0	3.0	2.0	4.0
3.6 Aquatic Biota	1.0	3.2	2.5	3.5
3.7 Terrestrial Wildlife	1.0	3.0	2.0	4.0
3.8 Botanical Resources	1.0	3.0	2.0	4.0
3.9 Noxious Weeds	1.0	3.0	2.0	4.0
3.10 Port-Orford Cedar	1.3	3.6	2.3	4.0
3.11 Cultural Resources	1.0	3.0	2.0	4.0
3.13 Visual Resources	1.0	4.0	4.0	4.0
3.14 Motorized Recreation	4.0	2.0	3.0	1.0
3.15 Inventoried Roadless	1.0	3.0	2.0	4.0

[1] A score of 4 indicates the alternative has the least impact for the specified resource; a score of 1 indicates the alternative has the most adverse impact to the specified resource. See Chapter 3 for more details.

2.6 Alternatives Considered, but Eliminated from Detailed Analysis

The following describes those alternatives that were considered but eliminated from detailed study and the rationale why they were eliminated.

Rehabilitation of Unauthorized Routes

Preliminary review of the inventoried unauthorized routes not proposed for inclusion in the NFTS identified 98 segments, totaling 31 miles, where outsloping, construction of water bars and blocking could improve watershed conditions. This action is outside the scope of this analysis, after consideration of this action and review of the purpose and need for the project this action was eliminated from detailed analysis.

Citizen's Recreation Alternative

Numerous commenters who provided comments during the scoping period for the proposed action identified themselves as affiliated with and/or in coordination with the Blue Ribbon Coalition and/or the Far West Motorcycle Club and provided support for the development of a pro-recreation Citizen's Recreation Alternative. Elements of most of the eight points of the Citizen's Recreation Alternative have been incorporated in the Proposed Action or Alternatives. Most commenters also identified specific routes desired for inclusion in the NFTS. Some of the desired routes had been included in the proposed action, and after consideration some were studied in detail as an alternative to the proposed action (Route 1 Companion at Pilot Ridge, Titlow Hill routes, Lone Pine Ridge above Tish-Tang, and the jeep route from 2S30 to the Wilburn Ranch) and others, after review and consideration were recognized as being beyond the scope of the analysis, see expanded discussion in Chapter 1 at section 1.2.2 *Scope of Analysis*. Discussion specific to routes identified for addition to the NFTS and rationale why they were eliminated from detailed study and discussion of a rainfall based wet weather closure plan also identified in the Citizen's Recreation Alternative follow:

Route 1 Companion Trail, incl. Pilot Rock Jeep Road

Route 1 Companion Trail, from Horse Mountain south, for street legal or non-street legal OHV use. Approximately 15 miles south of Horse Mountain an intermittent companion route along Pilot Ridge (the Pilot Rock Jeep Road) is proposed under Alternative 3. South of the Dan East motorized trail (5E14), another segment of companion trail and mixed use are proposed, under both Alternatives 2 and 3, connecting these routes into the Pilot Creek motorized trail network in the vicinity of Blake Mountain. An approximately 3½ mile companion trail between Pilot Rock and Last Chance motorized trail (5E39) awaits funding for construction (analyzed and decided under a separate completed analysis). A companion route along most of the remaining segments of Route 1 would require construction, and is therefore beyond the scope of this analysis.

Add More Routes to the NFTS

Routes identified by the public during the comment period that were considered, but eliminated from detailed study because they were found to be beyond the scope of this analysis follow. See Section 1.2.2 for detailed discussion of the scope of analysis. Several routes have multiple reasons why they are outside the scope of this action.

<u>Routes that are existing NFTS non-motorized trails</u>. Adding routes that are existing NFTS non-motorized trails as motorized trail is beyond the scope of analysis: 4E26 - Bug Creek Trail; 5E21 - Skull Camp Trail; 12N04 – North Fork; 12N06 – Cow Mountain; 12N07 – Waterspout; 12N08 – Swim Ridge; 12N09 – Grouse Ridge; 12N11 – Lost Creek; 12W14 – Clover Gulch; existing road 6N06J upriver from mule bridge trailhead was closed to motorized vehicles/ open to foot traffic per South Fork Trinity ATM.

Routes in ROS class Semi-Primitive Non-motorized. Adding routes in ROS class Semi-Primitive Non-motorized as motorized trails is beyond the scope of analysis: 4E26 - Bug Creek Trail; and 4E28 which was on the motorized trail system at one time.

Routes enter, access, or traverse in and out of private lands; are for a private use; and/or the Six Rivers National Forest does not otherwise have jurisdiction. Adding these routes is beyond scope of analysis: west end of 8 mile ridge road; 8N03 – between Willow Creek and Horse Linto Road; across from "Whole Enchilada" northwest of Salyer; Boy Scout Trail – down ridge from 7N16 to upper limit of Bigfoot Subdivision; the road in and round Cold Springs Lookout, 2N43, is on the Shasta-Trinity National Forest; Willow Creek Fire Protection District (WCFPD) emergency access to repeater out Baldwin Ridge should be considered under an authority other than public access provided through MVUM.

Routes with resource concerns not readily mitigated. Adding routes with resource concerns not readily mitigated is beyond scope of analysis: Humboldt Historic Trail (also appears low recreational value w/ low or no use); 4N18 (also appears to require new construction); segments of the Pilot Rock Jeep Road; JM937 crosses sequential draws that are all blown out; and the County Line Trail (aka 5E19).

Additional Motorized Mixed Use on Passenger Car Roads

Consideration of new motorized mixed use on existing NFTS roads requires a mixed use analysis, approval by the Regional Engineer, and approval of the California Highway Patrol. Because of the time frames established for this project by the Regional Forester, limited forest resources to conduct mixed use analysis, and the lengthy analysis and review processes, consideration of additional mixed use is beyond the capability of the Forest. (Roads identified in the Proposed Action are currently in the analysis and review process.) Roads identified by the public during scoping for consideration as mixed use roads did not meet the parameters established in the scope of analysis, they are beyond the scope of analysis: 3S13 does not link motorized trails; the two segments of 2S05 (together) exceed the 3 mile limit; 2S12 exceeds the 3 mile limit; 1N03, at Mad River Rock Road, exceeds 3 mile limit.

Rainfall Based Wet Weather Closure

"Develop a rainfall-based wet weather closure plan. Avoid long period forest –wide closures." The Forest explored using a rainfall basis or ground condition basis to trigger motorized trail closure for use in conjunction with established dates for a more flexible allowed season of use responsive to ground conditions and potential resource damage. However closure orders are now limited to emergencies, not on-going management needs; and Motorized Visitor Use Maps (MVUM) are required to use set dates to facilitate enforcement of closures, hence developing a rainfall based wet weather closure plan is beyond the scope of analysis.

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Chapter 3: Affected Environment and Environmental Consequences

3.1 Introduction

This chapter summarizes the physical, biological, social, and economic environments that are affected by the proposed action and alternatives and the effects (or consequences) that would result from implementation of those alternatives. The effects disclosed in this chapter provide the scientific and analytical basis for comparison of the benefits and risks of the alternatives.

The environmental consequences discussion centers on direct, indirect, and cumulative effects, along with applicable mitigation measures. Effects can be neutral, beneficial, or adverse. 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.

3.1.1 Analysis Process

The environmental consequences presented in Chapter 3 address the impacts of the actions proposed under each alternative for the project area, the Lower Trinity and Mad River Ranger Districts of the Six Rivers National Forest. This effects analysis was done at the project scale. However, the effects findings in this chapter are based on site-specific analyses of the unauthorized routes proposed for addition to the National Forest Transportation System (NFTS or system) as well as proposed changes to vehicle class and season of use for existing NFTS roads and NFTS motorized trails. Unauthorized routes proposed as NFTS motorized trails in the alternatives have been reviewed by appropriate resource specialists. For information on individual routes, see the route-by-route summary in Appendix A which includes mitigations required prior to designation for public use. Additional information concerning the existing condition or environmental effects associated with a specific route is available upon request.

For ease of documentation and understanding, the effects of the alternatives are described separately for each of three groups of actions and then combined to provide the total direct and indirect effects of each alternative (see below). The combination of the direct and indirect effects of these discrete actions is then added to effects of the past, present, and reasonably foreseeable actions in the cumulative effects analysis. The three groups of actions common to all action alternatives are:

1. **Prohibition of cross-country motor vehicle travel.** The direct and indirect effects of this action are described in each alternative discussion, considering both current conditions and projected trends. Both short (1 year) and long-term (approximately 20 years) effects are presented where applicable.

2. **Addition of new facilities** (motorized trails) to the National Forest Transportation System (NFTS). As described above, the impacts of new facilities are addressed in sum total in this chapter. For most resources, one or more resource indicators are used to measure the direct and indirect effects of each alternative. Both short (1 year) and long-term (approximately 20 years) impacts are presented. In Alternative 4, a single action is included in this group, blocking vehicle access to North Fork Wilderness.
3. **Changes to vehicle class and/or season of use on the existing NFTS**. Impacts caused by changes to vehicle class and season of use on the existing NFTS are described generally by alternative. For some impacts (for example public safety), impacts are also addressed by route.

Note that the co-location of motorized trails on existing NFTS closed roads may be considered with either group 2. or group 3. The aligned group varies depending on the nature of potential impacts to the resource being discussed. For example, under the soils resource since the route alignment has already been committed to the NFTS, effects of co-location of a new NFTS trail are best aligned with the fact that the alignment is an existing NFTS road; whereas under the recreation resource, since a closed NFTS road does not provide for any recreation use, consideration as an additions to the NFTS best reflects recreation impacts. Note also that blocking motorized access to wilderness is considered for Alternatives 2 and 3 under group 2 actions.

3.1.1.1 Analysis of Cumulative Effects

According to the Council on Environmental Quality (CEQ) NEPA regulations, "cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions (40 CFR 1508.7). The cumulative effects analysis area is described where applicable. In most cases, it includes both the Lower Trinity and Mad River Ranger Districts, including private and other public lands that lie within the Forest boundary. Past activities are considered part of the existing condition and are discussed in the "Affected Environment" and "Environmental Consequences" section under each resource. Each resource area identifies the present and reasonably foreseeable future actions relevant to the discussion of cumulative effects for that resource. Relevant actions are those expected to generate effects on a resource that will occur at the same time and in the same place as effects from the proposed action or alternatives.

In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects.

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of

past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one cannot reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Finally, the Council on Environmental Quality (CEQ) issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." For these reasons, the analysis of past actions in this section is based on current environmental conditions.

The cumulative effects analysis in this (EA or EIS) is also consistent with Forest Service National Environmental Policy Act (NEPA) Regulations (36 CFR 220.4(f)) (July 24, 2008), which state, in part:

> CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal for agency action or its alternatives will add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered (including past, present, and reasonable foreseeable future actions) on the affected environment. With respect to past actions, during the scoping process and subsequent preparation of the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some contexts be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decision making. (40 CFR 1508.7)

3.1.2 Affected Environment Overview

There are many aspects of the affected environment that are shared by all resources. In order to avoid repeating these shared elements of the affected environment in each resource section, the following general elements of the affected environment are provided.

On National Forest System lands on the Lower Trinity and Mad River Ranger Districts unmanaged OHV use has resulted in unplanned unauthorized routes, erosion, watershed and habitat degradation, and impacts to cultural resource sites. These routes generally developed without environmental analysis or public involvement, and do not have the same status as NFTS roads and NFTS trails included in the National Forest Transportation System. Considerations in developing the scope of the action include the following:

- Previous decisions on the NFTS do not need to be revisited to implement 36 CFR 212, Subpart B of the Travel Management Rule (36 CFR 212.50(b)). The NFTS contains existing facilities (roads & trails) that either underwent NEPA or predate

NEPA. Allowing continued motor vehicle use of the facilities in the NFTS in accordance with existing laws and regulations does not require NEPA analysis and decision.

- NEPA analysis and decision is not required to identify existing NFTS roads and trails with printing of a Motor Vehicle Use Map (MVUM).
- User-created roads, trails, and areas are not NFTS facilities. They are unauthorized. Proposals to add these to the NFTS require a NEPA analysis and decision.
- The unauthorized routes not included in the Proposed Action are not precluded from future consideration for either addition to the NFTS or removal from the landscape and restoration to the natural condition.
- Any activity associated with contract, permit, lease or other written authorization is exempt from designation under the Travel Management Rule (36 CFR 212.51 (a) (8) and is not part of the proposal (e.g., fuelwood permits, motorized SUP permits, mining activity etc.). Such actions are subject to separate NEPA analysis and decision.
- NEPA analysis and decision is required for change to current restrictions or prohibitions regarding motorized travel by the public (e.g., prohibiting cross-country travel, adding or removing roads or trails, or changing vehicle class or season of use).

3.1.3 Appendix A

Appendix A provides tables with route by route details for each group of actions. The first table lists the unauthorized routes proposed for addition to the NFTS as motorized trails. The table identifies the alternative(s) under which the route is proposed, the type of vehicle(s) allowed, the season of allowed use, whether the route is primarily access to a dispersed recreation site or provides for motorized recreational experience, and level of difficulty. Appendix A also identifies necessary mitigation measures. These mitigations measures will be implemented on the route prior to publication on a MVUM and allowing public use.

3.1.4 Law Enforcement Assumptions Common to Effects Analyses

Enforcement of the laws and regulations related to Travel Management will be enforced equally in authority and weight as with all other Federal laws and regulations.

As with any change in a regulation on NFS lands, there is usually a transitional period for the public to understand the changes. Publication of the motor use vehicle map, combined with signage, user education programs, and enforcement, will reduce the number of violations, and the number of violations will decline as the users understand and comply with the rules.

Once the motor use vehicle map is published, the implementation of the established dedicated network of motorized trails with signs and user education programs, will reduce the number of motor vehicles traveling off of designated routes.

Providing motorized recreation opportunities in popular, key areas will help relieve pressure to travel off of designated routes.

Public education and enforcement of travel management restrictions will successfully limit most public motorized use to designated routes. Implementation of additional mitigation measures, such as education, enforcement, and engineering efforts, is expected to effectively manage motorized use in areas prone to violation.

3.1.5 Analysis Framework: Statute, Regulation, Forest Plan and Other Direction

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." Each resource section includes a list of applicable laws, regulations, policies and Executive Orders that are relevant to that resource. Surveys, analyses, and findings required by those laws are addressed in those sections.

National Forest Management Act. Each resource area specifically addresses compliance with the applicable standards and guidelines from the Forest Plan.

2005 Travel Management Rule 36 CFR 212. Public involvement (212.52) was solicited and considered in development of the proposed action as described in Chapter 1. The NEPA process has provided a framework for public involvement since publication of the proposed action in December, 2008. Public comment was solicited and considered in identification of significant issues and development of alternatives to the proposed action. Again, see discussion in Chapter 1. Public comment is again sought during the comment period following publication of this draft EIS. Coordination, including consultation, with Federal, State, county, and other local governmental entities and tribal governments (212.53) is documented in Chapters 1 and 4, and under applicable resource areas in this chapter**.**

The prohibition of cross-country travel (212.50) is proposed in all action alternatives, see Chapter 2. The action alternatives also propose additions to the motorized trail system (212.51) and/or changes to existing NFTS motorized trails and roads (212.54). The consideration of effects including the specific criteria (212.55) identified in Chapter 1 is documented in this chapter (Chapter 3). After the decision is made, publication of a motor vehicle use map (MVUM) for each district will serve to identify the NFTS roads and motorized trails open to public use (212.56). Annual monitoring will continue (212.57).

Wilderness Act of 1964. The actions proposed are in compliance with Wilderness Designations and the Wilderness Act of 1964. Motorized activity continues to be prohibited in Wilderness under all the alternatives per the Wilderness Act of 1964.

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3.2 Physical Environment Overview

This introduction focuses on common effects of motorized trails on the physical watershed resources: geology, soil, and hydrology. Several attributes of watershed resources can be impacted by management activities: soil hydrologic function and erosion rates and the amount and rate of sedimentation, and stream flow (quantity, timing, and quality). Forest management activities, including development of geologic resources, can result in ecosystem damage when the activity's location, construction or implementation is not based on an understanding of watershed and geomorphic processes (e.g. unstable areas). The protection of soil and water quantity and quality are important parts of the mission of the Forest Service. The use of trails on National Forests for the operation of motor vehicles has the potential to affect these hydrologic functions through the compaction of soils, interception of runoff; and detachment, transport, and deposition of sediment. Management decisions to prohibit cross country travel, add new motorized trails to the National Forest Transportation System (NFTS), and make changes to the existing vehicle class and season of use on the NFTS must consider effects on geomorphic, soil and watershed functions.

The risks to physical and water quality resources from unauthorized motorized trails vary considerably based on location and inherent site characteristics. In order to characterize the physical and water quality risks of the unauthorized motorized routes, a Watershed Risk Rating system was developed. The Watershed Risk Rating system integrates geologic instability, water quality and soil erosion concerns using a combination of field inventoried data and GIS analysis for each unauthorized motorized route and places each route into a low, moderate, or high watershed risk category. A more detailed discussion of the Watershed Risk Rating system is found in Appendix C. Table 3-1 shows the miles unauthorized motorized routes in the high, moderate, and low Watershed Risk Rating. A high rating has the highest risk to the trail facility and off-site resources and a low risk rating has the lowest risk. The majority (70%) of the unauthorized routes have a high watershed risk rating, meaning that the routes are either located within riparian reserves, have active erosion (rilling or rutting), or are located in a geologically sensitive area.

Table 3.2-1: Watershed Risk Rating for all Unauthorized Motorized Routes

Routes	Low Risk		Moderate Risk		High Risk	
	miles	%	miles	%	miles	%
	43.7	17	19.5	8	192.2	75

Generally speaking, shorter segments of motorized trail are less likely to result in off-site impacts and have the potential to impact watershed resources. Table 3-2 shows the general characteristics of the unauthorized motorized trails. The vast majority of unauthorized trails are short routes (<0.2 mile) to dispersed camping sites. Likewise, the majority of routes are native surfaced roads which have a greater risk of on-site and off-site erosion. Approximately twenty percent of the roads are below 3000 feet elevation and are potentially accessible all year long as

they are below the winter snow level. Year long access on native surface roads increases the risk of motorized tread ware and off-site impacts, particularly during the wet winter months.

Table 3.2-2: General facts regarding unauthorized trails

Route Lengths		Road Surface Type			Routes with potential year round access
Ave Length	Max Length	Natural	Rocked	Unknown	
0.22	4.59	173.00	0.54	81.59	53.12

The information used in this analysis comes from several sources including: the Six Rivers National Forest Soil Resource Inventory, Six Rivers National Forest GIS analysis, existing NEPA project documents and field observations and/or inventories. Information in this analysis has been summarized at a variety of scales, including: District level, river basin and sub-basin, the Hydrologic Unit Code 6 (HUC6) scale, and site-specifically by motorized trail (where available). The HUC6 subwatershed is the scale usually used for cumulative watershed effects for projects on the Six Rivers National Forest.

3.3 Geology

Forest management activities, including the development of geologic resources, can result in ecosystem damage when the activity's location, design, construction, or implementation is not based on an understanding of geologic conditions and geomorphic processes.

Geologic resources affect all aspects of national forest lands, including cave management, paleontological resources, geologic special interest areas, and ground water management. Geologic hazards can impact public safety on national forest lands. Hazards can include rock falls, debris flows, unstable slopes, abandoned mine sites, and naturally occurring asbestos (NOA).

The pertinent geologic hazards within the project area are unstable slopes, areas which have the potential to contain NOA and abandoned mine sites. The project area on the Six Rivers NF does not have any known paleontological sites, caves, rock falls, mineral claims, or significant groundwater aquifers. These resources will not be discussed further in this analysis.

3.3.1 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

The following statutory authorities govern geologic resources essential to Forest Service programs:

FSM-2880.11 - Statutory Authority

Organic Administrative Act of June 4, 1897, as Amended (30 Stat. 34, as Supplemented and Amended; 16 U.S.C. 473-478, 482-482(a), 551. (FSM 2501.1.) This act authorizes the Secretary of Agriculture to issue rules and regulations for the occupancy and use of the National Forests. This is the basic authority for issuing special use permits for the collection of vertebrate paleontological resources for scientific and educational purposes on National Forest System lands.

Preservation of American Antiquities Act of June 8, 1906 (34 Stat. 225; 16 U.S.C. 431 et seq.). (FSM 2361.01.) This act authorizes permits for archeological and paleontological exploration involving excavation, removal, and storage of objects of antiquity or permits necessary for investigative work requiring site disturbance or sampling which results in the collection of such objects.

Multiple Use -- Sustained Yield Act of June 12, 1960 (MUSY) (74 Stat. 215; 16 U.S.C. 528-531). (FSM 2501.1.) This act requires due consideration for the relative values of all resources and implies that the administration of nonrenewable resources must be considered.

Watershed Protection and Flood Prevention Act of August 4, 1954, as Amended (68 Stat. 666; 16 U.S.C. 1001). (FSM 2501.1.) This act authorizes the Secretary of Agriculture to share costs with other agencies in recreational development, ground-water recharge, and water-quality management, as well as the conservation and proper use of land.

Federal Water Pollution Control Act of July 9, 1956, as Amended (33 U.S.C. 1151) (FSM 2501.1); Federal Water Pollution Control Act Amendments of 1972 (86 Stat. 816) (FSM 2501.1), and Clean Water Act of 1977 (91 Stat. 1566; 33 U.S.C. 1251). (FSM 2501.1, 7440.1.) These acts are intended to enhance the quality and value of the water resource and to establish a national policy for the prevention, control, and abatement of water pollution. Ground water information, including that concerning recharge and discharge areas, and information on geologic conditions that affect ground water quality are needed to carry out purposes of these acts.

Wilderness Act of September 3, 1964 (78 Stat. 890; 16 U.S.C. 1131-1136). (FSM 2501.1.) This act describes a wilderness as an area which may also contain ecological, geologic, or other features of scientific, educational, scenic, or historical value. These geologic features are generally identified for wilderness classification purposes.

National Forest Roads and Trails Act of October 13, 1964 (78 Stat. 1089; 16 U.S.C. 532-538). (FSM 7701.1.) This act provides for the construction and maintenance of an adequate system of roads and trails to meet the demands for timber, recreation, and other uses. Geologic conditions influence the final selection of route locations. It further provides that the user or users of roads and trails maintain them, or fund their maintenance, in a satisfactory condition commensurate with the particular use requirements of each. Such maintenance to be borne by each user shall be proportionate to total use (16 USC 537).

Wild and Scenic Rivers Act of October 2, 1968 (82 Stat. 906 as Amended; 16 U.S.C. 1271-1287). This act states that it is the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstanding scenic, recreation, geologic, fish and wildlife, cultural, or other similar values shall be preserved in free-flowing condition.

National Environmental Policy Act of January 1, 1970 (NEPA) (83 Stat. 852 as Amended; 42 U.S.C. 4321, 4331-4335, 4341-4347). (FSM 1950.2.) This act directs all agencies of the Federal Government to utilize a systematic interdisciplinary approach which will ensure the integrated use of the natural and social sciences in planning and in decision making which may have an impact on man's environment. Geology is one of the applicable sciences.

Mining and Minerals Policy Act of December 31, 1970 (84 Stat. 1876; 30 U.S.C. 21a). This act provides for the study and development of methods for the disposal, control, and reclamation of mineral waste products and the reclamation of mined lands. This requires an evaluation of geology as it relates to ground water protection and geologic stability.

Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531-1536, 1538-1540). This act provides for the conservation of endangered and threatened species and their habitats.

Archeological and Historical Conservation Act of 1974 (AHCA) (88 Stat. 174; 16 U.S.C. 469). (FSM 2361.01.) This act requires all Federal agencies to notify the Secretary of the Interior when a construction project threatens to irreparably harm or destroy significant

scientific, prehistoric, historic, or archeological data. The paleontological resource may have significant scientific and historic value.

Disaster Relief Act of 1974 (88 Stat. 143; 42 U.S.C. 5121, 5132). Section 202(b) states that the President shall direct appropriate Federal agencies to ensure timely and effective disaster warnings for such hazards as earthquakes, volcanic eruptions, landslides, and mudslides. The Federal Register, Vol. 42, No. 70 of April 12, 1977, "Warnings and Preparedness for Geologic Related Hazards," implies coordination with the U.S. Geologic Survey in such warnings.

Forest and Rangeland Renewable Resources Planning Act of August 17, 1974 (RPA) (88 Stat. 476; 16 U.S.C. 1600-1614) as Amended by National Forest Management Act of October 22, 1976 (90 Stat. 2949; 16 U.S.C. 1609). (FSM 1920 and FSM 2550.) This act requires consideration of the geologic environment through the identification of hazardous conditions and the prevention of irreversible damages. The Secretary of Agriculture is required, in the development and maintenance of land management plans, to use a systematic interdisciplinary approach to achieve integrated consideration of physical, biological, economic, and other sciences.

Resource Conservation and Recovery Act of 1976 (RCRA) (90 Stat. 2795; 42 U.S.C. 6901) as Amended by 92 Stat. 3081. This act, commonly referred to as the Solid Waste Disposal Act, requires protection of ground water quality and is integrated with the Safe Drinking Water Act of December 16, 1974, and Amendments of 1977 (42 U.S.C. 300(f)). (FSM 7420.1.)

Surface Mining Control and Reclamation Act of August 3, 1977 (SMCRA) (30 U.S.C. 1201, 1202, 1211, 1221-43, 1251-79, 1281, 1291, 1309, 1311-16, 1321-28). This act enables agencies to take action to prevent water pollution from current mining activities, and also promote reclamation of mined areas left without adequate reclamation prior to this act.

Archaeological Resource Protection Act (ARPA) October 31, 1979 (93 Stat. 721; 16 U.S.C. 470 aa). This act protects archeological resources, and prohibits the removal, sale, receipt, and interstate transport of archeological resources obtained illegally from public lands. Archeological resources include paleontological resources in context with archeological resources. Also, this act authorizes the Secretary of Agriculture to issue permits for archeological research, investigations, studies, and excavations.

Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA) (94 Stat. 2767; 42 U.S.C. 9601, et seq). This act provides authority to the Environmental Protection Agency and to other federal agencies, including the United States Department of Agriculture, to respond to release of hazardous substances, pollutants, and constituents. It also provides for joint and several liabilities to potentially responsible parties (PRPs) for cleanup costs of existing water contamination. See also FSM 2160.

Federal Cave Resources Protection Act of 1988 (102 Stat. 4546; 16 U.S.C. 4301 et seq). This act provides that Federal lands be managed to protect and maintain, to the extent practical, significant caves.

FSM-2880.12 - Executive Orders

The following Executive Orders provide direction for geologic resources and services activities on National Forest System lands:

Executive Order 11593, Protection and Enhancement of Cultural Environment, May 13, 1971 (3 CFR 559, 1971-75 Compilation). This Executive Order directs agencies to preserve, restore, and maintain the historic and cultural environment of the Nation.

Executive Order 12113, Independent Water Project Review, January 5, 1979. This Executive Order requires an independent water project review by the Water Resources Council on preauthorization reports and preconstruction plans for Federal and federally assisted water and related land resource plans. The technical review will evaluate each plan for compliance with the Council's principles and standards, agency procedures, other Federal laws, and goals for public involvement.

3.3.2 Six Rivers Land and Resources Management Plan (LRMP)

There are three areas pertaining to geologic resources within the Six Rivers LRMP that influence this project. They are the Physical Environment, Special Interest Areas (SIAs) and Riparian Reserves.

Physical Environment: Geology

Goals

- The primary management goal is maintenance of long term soil productivity and high water quality.
- Identify geologic hazards and minimize the impacts from management activities on streams and facilities.
- Plan and conduct all forest management activities to maintain existing water quality or, where degraded, restore water quality to meet State water quality standards for the North Coast Region.
- Maintain the integrity of watersheds and riparian ecosystems, including riparian zones, for the protection or enhancement of riparian-dependent resources.

Direction

- Manage soil and water resources to protect and enhance long term productivity of the forest, water quality, associated beneficial uses, and aquatic ecosystems.
- Program emphasis is to avoid or mitigate the impacts of management activities on slope instability, water quality and soil productivity.
- Identify watershed improvement needs to be included on the Forest’s Watershed Improvement Needs Inventory. Prioritize projects based on severity, needs, effects on beneficial uses, and potential for recovery.
- Design all resource management activities to meet State water quality criteria. Best Management Practices will be applied in planning, implementation and maintenance of all Forest activities as means to achieve water quality standards. Proper installation, operation and maintenance of State approved BMPs are presumed to meet the manager’s obligation for compliance with applicable water quality standards as well as compliance

with the Clean Water Act (EPA, Water Quality Standards Handbook, Chapter 2. 1987/ MAA with SWRCB 1981.)

- Assessments of the cumulative effects of project level activities on soil and water resources will be provided during project analysis at whatever level of analysis is necessary (site, watershed, or basin).

Soil Erosion and Mass Movement

Standards and Guidelines

- 1-6 The potential for increased mass movement and soil erosion will be addressed for proposed timber harvest and road building. Landslide hazard maps and a risk assessment should be developed for timber harvest planning. Alternate road specifications or road locations should be evaluated where proposed management would increase the potential for mass movement and soil erosion.
- 1-7 Roads, landings, and timber harvest units will be located and designed to avoid triggering or accelerating mass movements that would adversely affect a stream or degrade a commercial timber growing site by removing a substantial volume of topsoil.

Management Area 10: Special Interest Areas (SIAs)

Fisheries, Wildlife, Watershed Management

Standards and Guidelines

- Adverse impacts to riparian/wetland areas shall be mitigated through educational means, barrier placement, fencing, or access closure.

Recreation

Standards and Guidelines

- The Recreation Opportunity Spectrum (ROS) classes provided within these areas include roaded natural, semi-primitive motorized and semi-primitive non-motorized. Opportunities exist to manage portions of the areas as semi-primitive non-motorized to avoid resource conflicts.
- Primitive camping is permitted in designated areas. Campsites will be located to minimize adverse impacts. Impacts associated with heavy visitor use may warrant site closure for camping or the development of appropriate support facilities.
- Recreational access will be determined on an area-by-area basis.

Transportation and Facilities

Standards and Guidelines

- Development of water and rock sources, stockpiling of rock materials and water sources within the areas are not compatible with the management direction for SIAs.
- Roads which are identified as contributing to resource damage shall be repaired to mitigate the problem, closed on a seasonal or year-round basis, or decommissioned. The course of action will depend on the severity of the resource problem and the potential for continued damage.
- Consider existing routes (old roads, trails) within the areas for designation as multiple-use routes where possible and appropriate. If identified as appropriate during SIA recreation planning, use existing routes for public access. Construct new routes as necessary to direct use so as not to impact sensitive areas and/or to encourage access to areas with interpretive values.

Management Area 9: Riparian Reserves

Riparian Reserve Widths

This direction was taken from the FSEIS ROD pages C-30 to C-31.

Riparian Reserves are specified …..as follows (only the specifications which pertain to geologic areas are listed here):

- The extent of unstable and potentially unstable areas (including earthflows)

Standards and Guidelines

This direction was taken from the FSEIS ROD pages C-31 to C-38.

As a general rule, standards and guidelines for Riparian Reserves prohibit or regulate activities in Riparian Reserves that retard or prevent attainment of the Aquatic Conservation Strategy objectives. Watershed analysis and appropriate NEPA compliance is required to change Riparian Reserve boundaries in all watersheds.

Recreation

Standards and Guidelines

- New recreational facilities within Riparian Reserves, including trails and dispersed sites, should be designed to not prevent meeting Aquatic Conservation Strategy objectives. Construction of these facilities should not prevent future attainment of these objectives. For existing recreation facilities within Riparian Reserves, evaluate and mitigate impact to ensure that these do not prevent, and to the extent practicable contribute to, attainment of Aquatic Conservation Strategy objectives.
- Adjust dispersed and developed recreation practices that retard or prevent attainment of Aquatic Conservation Strategy objectives. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective, eliminate the practice or occupancy.

Transportation and Facilities

Standards and Guidelines

For each existing or planned road, meet Aquatic Conservation Strategy objectives by:

- minimizing road and landing locations in Riparian Reserves.
- preparing operation and maintenance criteria that govern road operation, maintenance, and management.
- minimizing disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow.
- Minimize sediment delivery to streams from roads. Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is not feasible or unsafe. Route road drainage away from potentially unstable channels, fills, and hillslopes.
- Traffic regulation during wet periods to prevent damage to riparian resources.

3.3.3 Effects Analysis Methodology

This section describes the methodology and assumptions used for the effects analysis of the alternatives. Impacts relevant to geologic hazards, resource specific assumptions, resource indicators, sources of information, timeframes (short term and long term), and spatial boundary of the effects analysis are addressed.

3.3.3.1 Assumptions

For every scientific analysis, it is necessary to make some assumptions. For this project, the assumptions made are necessary because of the variable geologic conditions on the ground, the routes already exist, and the size of the project boundary is large.

See the Introduction to Chapter 3 for a list of common assumptions and limitations. The geology effects analysis assumptions are common to each of the 3 actions within every alternative and are listed in Table 3.3-1, below. The three discreet actions common to every alternative are: (1) the prohibition of cross-country travel; (2) the addition of facilities (unauthorized roads, trails, and/or areas) to the National Forest Transportation System (NFTS), including identifying seasons of use and vehicle class; and (3) changes to the existing NFTS vehicle class and season of use.

Table 3.3-1: Assumptions for Geologic Analysis

Analysis	Assumptions
Time	Short-Term: 1 Year Long Term: 50 Years
Cross-Country Ban	Without a cross-country ban, the number of routes currently present (the existing condition) will likely increase in the future.
Designated Routes	Users will stay on designated routes and NFTS roads.
Non-designated Routes	Non-designated routes will not be used. They will completely re-vegetate and cease to erode within the long term time frame. Non-designated routes may continue to affect slope stability after they have re-vegetated. This is likely to persist beyond the long term timeframe.
Mitigations	Where necessary, routes will receive mitigations (i.e. waterbars) prior to allowed use.
Maintenance	All additions to the NFTS will receive regular maintenance which will adequately prevent water from concentrating on the route surface.
Earthflow Terrain	All earthflows are at least seasonally active and therefore present a risk to water quality.
Sensitive Terrain	Routes in sensitive terrain are more likely to instigate mass wasting than routes on stable terrain.
NOA Hazard	Serpentine and ultra-mafic bedrock is more likely to contain NOA than other bedrock types found within the project boundary.
Mine Hazard	The Abandoned Mine Land Inventory is accurate and complete. Mine sites more than 500 feet from a travel route are not accessible or visible from the travel route, and therefore are not considered a hazard along the route.
GIS Data	Data is an accurate representation of the ground conditions.

3.3.3.2 Data Sources

Field Data

Forest Service contractors previously mapped (using hand held GPS units) every unauthorized route they could find within the project area. During the summer and fall of 2008, watershed personnel then used their data to make field visits. Routes to be visited were prioritized in the office by assumed risk to water quality (see Water Resources, Chapter 3.5.This risk was largely based on the proximity of each route to a drainage channel. Routes which are next to, cross, or are within a channel were prioritized for a field visit. Routes in open glades (usually earthflows) were also prioritized. Therefore, not every route within the project boundary was visited, only the routes most likely to affect water quality.

In addition to photographs, data was collected on:

- Slope of the route
- Number of drainage crossings
- Presence of erosion
- Sediment delivery potential
- Presence of, or need for erosion mitigations (i.e. waterbars)
- Surface of the route (native, gravel or chip seal) and construction of the route (cut and filled?)
- Signs of usage (heavy or slight)
- Signs of instability
- Presence of mining activity
- Presence of serpentine bedrock

GIS Analysis

- A GIS layer of route locations and lengths was created from GPS data.
- Miles of routes crossing earthflow terrain were calculated through GIS analysis using the Forest geomorphology layer which was manipulated to isolate earthflows. The Forest geomorphology layer was created from aerial photo interpretation.
- Miles of routes crossing sensitive terrain were calculated through GIS analysis using the Forest geomorphology layer which was refined to isolate toe-zones of unstable units and deeply weathered and dissected hillslopes. Results indicating routes in debris slide areas were cross checked with the active landslide layer. The active landslide layer was generated from aerial photo interpretation.
- Miles of unauthorized routes within bedrock units which may contain NOA were analyzed through GIS analysis using the Forest bedrock layer. Serpentine and Ultra-mafic bedrock polygons were isolated and intersected with route lines.
- The number of routes within 500 feet of abandoned mine sites were calculated using a combination of GIS and field data. The Abandoned Mine Land Inventory (Fall 1998) survey was used to digitize the locations of all known mines within the project boundary. The inventory included field visits to most of the mine sites and consequently rated the sites for physical and chemical hazards. A 500 foot buffer was applied to the sites and intersected with the route lines.

3.3.3.3 Resource Indicators

Geologic changes occur not only over spans of geologic time, but also at observable intervals of time that can be monitored or measured. Geoindicators have been developed by the

international Union of Geologic Sciences as high-resolution measures of short term changes in the geologic environment. Geoindicators are significant and useful gages during environmental monitoring and assessment, as well as in environmental reporting and ecosystem management (FSM 2880.61, paragraph 2). The geoindicators which are valuable for measuring and predicting the consequences of travel management activities on the Six Rivers NF within the project boundary are listed below in Table 3.3-2.

Table 3.3-2: Indicators Used in Geologic Analysis

Indicator	Is a Useful Measure of:
Miles of routes located on **earthflows**	The longevity and effectiveness of maintenance and mitigations to prevent surface erosion
Miles of routes located on **sensitive terrain**	Likelihood the route will cause or exacerbate mass wasting
Miles of routes located on bedrock that may contain naturally occurring asbestos **(NOA)**	The risk of human exposure to asbestos fibers
Number of routes within 500 ft. of abandoned **mine sites**	The risk of human injury or death due to the dangerous structures or chemicals present at a mine site

The indicators were chosen for the following reasons:

- Earthflows are common within the project boundary. They are favored terrain for cross-country travel because they usually lack dense vegetation and have gentle rolling slopes. They are composed of highly erodible and malleable soils which concentrate water during the wet season. Earthflows may also generate shallow debris slides at their toe-zones.
- Large deep seated landslides are most sensitive to disturbance in their toe-zones. Toe-zones are areas at the base of the slide, usually in the valley bottom. They are less stable than the rest of the landslide because they are stressed by the earth mass above them. Toe-zones are more likely to generate shallow debris slides than other terrain within the project boundary. Deeply dissected hillslopes are also sensitive to disturbance. They usually occur within decomposed granitic bedrock. The hollows on these slopes are prone to debris flows. Landslides can be detrimental to water quality as well as hazardous to humans when they affect the travel way.
- Routes within NOA will generate dust which may contain asbestos fibers when motor vehicles travel on them. Areas of bedrock which may contain NOA need to be disclosed to the public.
- Mine sites are hazardous to users both because they may be chemically toxic and physically dangerous. Hazards to the user need to be considered during project planning and disclosed to the public.

3.3.3.4 Effects Analysis Methodology by Action

The analysis methodology and assumptions are common to each of the 3 actions within every alternative. The three discreet actions common to every alternative are: (1) the prohibition

of cross-country travel; (2) the addition of facilities (unauthorized roads, trails, and/or areas) to the National Forest Transportation System (NFTS), including identifying seasons of use and vehicle class; and (3) changes to the existing NFTS vehicle class and season of use.

The four indicators listed above in Table 3.3-2 are used to evaluate the direct and indirect effects of each of the 3 actions, for every alternative. Direct effects are those effects which are caused by the project actions and which occur at the same time and place as the action. Indirect effects are those caused by the action, which are later in time or farther removed in distance from the location of the action. Direct and indirect effects of each project alternative will be analyzed and compared separately for the three action components.

Direct/indirect effects of the prohibition of cross-country motorized vehicle travel.

The prohibition of cross-country travel means users will be required to stay on designated routes. Currently, a user may travel cross-country over earthflows, sensitive terrain, bedrock which may contain NOA, and directly to an abandoned mine site (these are the four geologic indicators).

This action was analyzed by focusing on the undesignated routes which intersect with these indicators because limiting use to designated routes will reduce the risk to geologic resources and public hazard. Miles (or number of routes) within the indicator areas were summed. A comparison was made between the existing condition (all routes created during the absence of a cross-country ban) and each alternative. Every alternative except the No Action Alternative prohibits cross-country travel.

Direct/Indirect effects of adding facilities (presently unauthorized roads, trails, and/or areas) to the NFTS.

This action will add facilities to the NFTS within earthflows, sensitive terrain, bedrock which may contain NOA, and routes which travel directly to abandoned mine sites. This action was analyzed by focusing on the routes within these four geologic indicators because:

1. The added routes will need to be maintained. Maintenance will need to be more frequent on earthflow routes compared to routes on stable terrain..
2. Routes added on sensitive terrain are likely to degrade water quality by causing debris slides. Minimizing the likelihood of mass wasting is necessary to achieve the Aquatic Conservation Strategy Objectives (Record of Decision, 1994, Northwest Forest Plan).
3. Adding routes on bedrock which may contain NOA may pose an exposure hazard to users. This hazard will need to be disclosed to the public and is important to consider and minimize during project planning.
4. Adding routes which travel to or near abandoned mine sites creates a public hazard. Potentially hazardous abandoned mines are not an appropriate recreation destination.

Miles or numbers of routes within the indicator areas were summed for each alternative and compared.

Direct/Indirect effects of identifying vehicle class and season of use on the NFTS.

This action is common to every alternative except the No Action Alternative which would not change the type of use on the existing NFTS. The proposed changes to the existing NFTS described in Chapter 2 are not analyzed further within the geologic resources section. This is because the potential changes would not remove or drastically change the existing effects of

these routes on the landscape, regardless of the type of use they receive (the routes would not completely re-vegetate because they will continue to be used).

The proposed limited changes to the existing NFTS road network include mixed use (managing routes as motorized trails and roads), changing the permitted vehicle user class of the road, changing the type of use allowed, and changing the season of use.

The effects of this action on surface erosion are difficult to analyze. Mass wasting and surface erosion depend on a hydrologic-topographic interaction which is site specific. For example, if a route's user class is reduced from high clearance vehicles to motorcycles, the change in surface erosion from the narrowed travel way (due to partial vegetation recovery) would be unpredictable. A single track trail may or may not cause more gully erosion than a full bench road. Similarly, widening the travel way may, or may not increase surface erosion. On roads which intercept and concentrate groundwater or overland surface flow, the mass wasting potential due to the road would remain the same. Concentrated water would continue to saturate or otherwise undermine the stability of the hillslope or fill, regardless of the *type* or *season* of use.

There are no hazardous health effects from this action. The NFTS roads have already been constructed. The change in type or season of use will not alter the presence of NOA or stability hazards along the roadway.

Cumulative Effects

The cumulative environmental effects of this project on geologic resources ultimately impact water quality. They are addressed within Hydrology/Water Resources, Chapter 3.5. Cumulative impacts on human health are specific to the individual and depend on their personal history. They are not analyzed here because they are beyond the scope of this analysis.

3.3.4 Affected Environment

3.3.4.1 Overview

The Six Rivers National Forest is located within the northern Coast Range. The forest boundary stretches southward from the Oregon border for approximately 140 miles. The affected project area is the Lower Trinity and Mad River Ranger Districts. They are located between 20 and 50 miles due east from the northern California coast, within Humboldt and Trinity counties, in the southern portion of the Forest.

Together these districts represent 505,431 acres, or 790 square miles. The area is composed of northwest-southeast trending ridges and valleys. The valleys drain several major rivers including (from north to south) the Main-Stem Trinity, the South Fork Trinity, the Mad, the Van Duzen, and the Middle Fork Eel rivers. At the 6th field Hydrologic Unit Code (HUC) scale, the area represents 54 drainage basins.

3.3.4.2 Geologic Setting

Bedrock

The project area is underlain by several bedrock belts which trend northwest-to-southeast. While the Mad River Ranger District is almost entirely composed of a single belt (the Franciscan Mélange complex), the Lower Trinity Ranger District is more diverse. These units are listed west to east:

- The Franciscan Mélange complex: The assemblage is the youngest belt in the area (120 million years or less). It is composed of greywacke sandstone, schist, and a mélange of argillaceous rock. Franciscan graywacke sandstones are mostly unmetamorphosed, massive or interbedded with shale, and form moderately steep forested slopes with fairly deep gravelly loam soils. Some are moderately metamorphosed and form steeper slopes with less deep, gravelly soils and typically less dense vegetation. Mélange typically has hummocky topography related to chronic instability. Grasslands with scattered oaks and conifers are the typical vegetation. (Van Duzen Watershed Analysis, 1998)
- The Western Klamath Belt: This belt consists of mildly slatey to phyllitic argillite, greywacke, and stretched-pebble conglomerate (Irwin 1994). A major component of this belt is the Galice formation. It is of the Jurassic Age and is extensively folded and structurally deformed (Young 1978). The Trinity River flows entirely within this formation.
- The Western Paleozoic and Triassic Belt: Within the project area, this belt is represented by The Rattlesnake Creek Terrane (approximately 200 million years). It contains a variety of sedimentary, igneous and metamorphic rocks such as slate, diamictite, gabbro, and peridotite. (Irwin 1960)
- The Ironside Mountain Pluton- Igneous rock such as diorite, tonalite, and gabbro intrude into the overlying formations. (Mainstem Trinity Watershed Analysis, 2003)

3.3.4.3 Geomorphology

The Lower Trinity Ranger District landscape is characterized by deep, steep-sided canyons, relatively high-gradient, high-energy streams with large sediment loads, and widespread mass wasting. In contrast, the Mad River Ranger District is characterized by rolling grassland meadows (often earthflows) and forested ridges. The hillslopes are not as steep, nor as deep as in the Lower Trinity Ranger District and the rivers and streams are lower gradient.

Earthflows occur when coarse debris, fine-grained soil, or clay is hydrated and begins to move under its own weight. They are most active, or unstable, during the wet winter months. The tendency for earthflows to develop in areas where rainfall is high may be due to the presence of clays with high liquid limits (Selby, 1993).

Landsliding within the Lower Trinity and Mad River Ranger Districts is a relatively sporadic process which varies considerably across the landscape. Landslide occurrences and rates depend on many factors including: competence of underlying bedrock, texture, depth and degree of weathering of the overburden, density of vegetative cover, slope, saturation, and presence of older landslide features. Landsliding within the project area has probably been the most significant mass wasting process overall in terms of frequency and amount of sediment delivered to streams. Large deep-seated slides are common in mélange units. Shallow debris slides are common on steep, lower slope positions and toe-zones of deep-seated slides.

3.3.4.4 Geologic Hazards

Aside from instability related hazards, there are two other relevant hazards within the affected environment. The Lower Trinity and Mad River Ranger Districts were both explored for minerals in the 1800s and 1900s. In 1998 an inventory of Abandoned Mine Lands (AML) was completed to assess the existing dangers. There are 31 abandoned mine sites inventoried and mapped within the Trinity and Mad River Ranger Districts. The minerals extracted were

gold, silver, copper, platinum, chromium, and manganese. Most of these sites were shallow pit or trench mines. Only a few of them used adits or shafts. Of the 31 sites inventoried, two were placed in the high physical hazard category and one was a high chemical hazard. The other sites were rated as low, or unknown due to a lack of data.

Also within the project area is bedrock which may contain NOA. NOA can be found within serpentine and ultramafic bedrock units. Some areas within the Lower Trinity and Mad River Ranger Districts are underlain by these bedrock types. The only known location of asbestos is at the Horse Mountain Mine (located in the Lower Trinity Ranger District). It tested positive for NOA in 2007 (it was tested as part of a mine reclamation project). See the Air Quality section, Chapter 3.12 for more information on NOA.

3.3.4.5 Existing Condition

The Six Rivers NF currently manages and maintains 526 miles of NFTS roads and no NFTS motorized trails on the Lower Trinity Ranger District and maintains 871 miles of NFTS roads and 36 miles of NFTS motorized trails on the Mad River Ranger District. In addition, there are 1151 segments and 255 miles of inventoried, unauthorized routes on the forest.

Of all inventoried, unauthorized routes which currently exist within the project boundary, the following (Table 3.3-3) is a summary of miles of routes within areas of geologic concern:

Table 3.3-3: The Existing Condition of the Project Area within the Geoindicators

Indicator	Miles of route
On Earthflow Terrain	14.0
On Sensitive Terrain	77.3
On Bedrock Surface which *may* Contain Naturally Occurring Asbestos (NOA)	4.42
Number of Routes Within 500 ft. of Abandoned Mine Sites	None
Total Miles within Indicators	95.69
Total Miles of Unauthorized Routes	255
Percent of all existing unauthorized route miles within areas of geologic concern	**38%**

The indicators in the above table can be summarized into risk categories. Geologic risk ratings represent a combination of potential environmental impacts and hazard to human health. Surface erosion is assumed to cause less detrimental impacts than mass wasting or human health hazards. The results show that less than half of the existing unauthorized routes (in number and miles of route) present a high risk to geologic resources and human health hazard. See the Geology Data Tables within the project file for route by route data.

The risk categories are as follows:

- A low geologic risk route is not on earthflow or sensitive terrain. It is not on bedrock which may contain NOA, and it is not within 500 feet of an abandoned mine site.
- A moderate geologic risk route is located within earthflow terrain. It is not on sensitive terrain nor is it on bedrock which may contain NOA. It is not within 500 feet of an abandoned mine site.

- A high geologic risk route is located on sensitive terrain, on bedrock which may contain NOA or within 500 feet of an abandoned mine site.

Table 3.3-4: Geologic Risk of the Existing Condition

Low			Moderate			High		
Miles	Number	Percent	Miles	Number	Percent	Miles	Number	Percent
168.8	816	66%	14.0	65	6%	72.2	270	28%

*the Number field represents the number of routes (1151 total). The percent field represents the percent of all route miles (255 total).

The broader cumulative risk to watersheds was also assessed. The following table is a summary of unauthorized routes by watershed risk. The low, moderate and high ratings incorporate both field and GIS data. Mass wasting is the only part of geologic resources included within this rating.

- A low risk route will not degrade water quality.
- A moderate risk route will not likely degrade water quality.
- A high risk route will likely degrade water quality.

Please see the Physical Environment Overview Chapter 3.2 and Appendix C for a more extensive description of the rating criteria, methodology, route by route ratings, and a discussion of watershed implications.

Table 3.3-5: Watershed Risk

Low		Moderate		High	
Miles	Percent*	Miles	Percent*	Miles	Percent*
67.08	26%	27.54	11%	160.53	63%

*Percent of all existing, inventoried miles of unauthorized routes

Together, the three preceding tables show the existing condition of unauthorized routes within the project boundary is degrading soil and water quality. The existing condition also poses a hazard to human health.

3.3.4.6 The Lassics Geologic and Botanical Special Interest Area (SIA)

The complex geologic history of the Forest has produced an equally complex distribution of interesting lithology and topography. Some of these places have been set aside. They are managed for their unique ecological values, public use, education, and enjoyment.

The Lassics Geologic and Botanical SIA is located within the Mad River Ranger District. The SIA is composed of several “foreign” bedrock types or “outliers” which belong to the Coast Range Ophiolite, exposed 100 km to the east. Three closely situated peaks in the area are composed of different rock types. They include sheared serpentinite, blocky peridotite, mafic volcanic rocks (diabase, basalt, gabbro) and sedimentary rocks of the Great Valley Sequence, Franciscan metasandstone, schist, and chert (Kaplan, 1983 and Harper, 1980). Soils around the Lassics support wetlands which are habitat to California endemic fairy shrimp. The Lassics are

also habitat to several rare and endemic plants, some of which are Forest Service Sensitive species (see the Botany section, Chapter 3.8).

Table 3.3-6: The Existing Condition of Routes within the Lassics SIA

Number of Routes within the Lassics SIA	Miles of Routes within the Lassics SIA
22	3.87

Though there are many unauthorized routes currently located within the Lassics SIA, on average they are less than 1000 feet long. Most of the routes access dispersed camp sites and foot paths up the peaks. Some are short recreational riding loops.

3.3.5 Environmental Consequences

This section discloses the environmental effects of each of the alternatives on mass wasting and other geologic hazards. The three discreet actions common to every alternative are: (1) the prohibition of cross-country travel; (2) the addition of facilities (unauthorized routes) to the National Forest Transportation System (NFTS), including identifying seasons of use and vehicle class; and (3) changes to the existing NFTS vehicle class and season of use.

There are several geologic hazards which have the potential to adversely impact human health and/or the environment. They are naturally occurring asbestos (NOA), abandoned mine sites, and landslides. Landslides are also detrimental to water quality because they add fine sediment to rivers and streams (see the Hydrology/Water Resources and Aquatic Biota sections, Chapters 3.5 and 3.6 for more discussion).

When inhaled, asbestos fibers are considered to be a human carcinogen by the International Agency for Research on Cancer and by the U.S. Department of Health and Human Services (http://www.hhs.gov/news/press/2001pres/20010916a.html, 2001 and http://www.inchem.org/documents/iarc/suppl7/asbestos.html, 2009). Cancer is a life threatening malady which may develop many years after exposure to NOA. At this time, no testing for asbestos has been done on routes within the project area and the presence/absence of naturally occurring asbestos has not been determined. Therefore, all bedrock areas within the project boundary which *may* contain naturally occurring asbestos (primarily serpentine bedrock units) are assumed to be of equal hazard. The presence and extent of the areas which may contain NOA is not known to be all inclusive or accurate and there may be areas of unknown hazard within the project boundary. The effects analysis highlights potential areas of NOA only as an indicator of *potential* hazard. The indirect effects of NOA on human health are outside the scope of this project and are not further analyzed. See the Air Quality Section, Chapter 3.12 for more information.

There are 30 inventoried abandoned mine sites within the project boundary. Abandoned mine sites can be hazardous to humans both because of the deep, vertical shafts and caving adits as well as the byproducts of the mining activity. The mining process may use toxic chemicals to extract the metal from the ore. Also, tailing piles exposed to the atmosphere often oxidize and create toxic leach water or piles of sediments with concentrated metals. Metal and chemical related health effects can be life threatening and may develop many years after exposure.

Aside from hazards to humans, there are environmental consequences related to motorized travel on trails. Within the project boundary (and the greater Pacific Northwest area) water quality and anadramous fish habitat issues are paramount. Of particular concern is

erosion. Since many routes were not constructed, the route treads are often in loose surface soils rather than well compacted subsoil. Constructed routes on compacted soils support traffic better and resist mechanical erosion. See the Physical Environment Overview and Hydrology/Water Resources, Chapters 3.2 and 3.4 for more discussion on motorized travel ways and water quality.

Earthflows are characteristically composed of soft, high clay content sediments and are topographically rolling in nature. Because many of them move during the wet season, they do not typically support trees and are an accessible and favored place for motorized cross-country travel.

Though earthflow movement is not likely exacerbated by off highway vehicle use, the fine grained, clay rich soils are likely to concentrate water and generate gullies when imprinted with wheel tracks. In addition, earthflow terrain may seasonally shift its topography, making trail drainage difficult to construct or maintain. The erosion effects related to routes on earthflow terrain are chronic. Erosion will continue as long as the route is used and is not allowed to re-vegetate.

Most of the un-authorized routes within the project area were constructed by cutting into the hillslope and using the material to create a level travel-way (cut and fill method). Many of them traverse steep hillslopes (>40%) and unstable terrain. The mechanisms for road-related mass wasting failures include removing slope support in road-cuts, increasing the weight on fill-slopes, groundwater saturation of the road prism, intercepting subsurface flow, re-routing hillslope drainage, and initiating debris flows at failed stream crossings. Saturation of the soil increases pore pressures and therefore reduces the cohesion of hillslope materials (Selby, 1993).

Landslides are not only public hazards (especially when they alter the travel-way of trails and roads), but are detrimental to water quality. The effects of landsliding on water quality depend on the proximity of the slide to a riparian area. Once a shallow debris slide occurs, it may re-vegetate and stabilize itself (within 10-30 years) or chronically fail. Within the project boundary, shallow debris sliding has probably been the most significant mass wasting process in terms of frequency and amount of sediment delivered to streams.

3.3.5.1 The Lassics Geologic and Botanical Special Interest Area (SIA)

The Lassics SIA has been set aside to be managed for its unique geologic and botanical characteristics. The SIA is habitat to four Forest Service sensitive plants, some of which are endemic to the area (see effects discussions within Botanical Resources Chapter 3.8). The area also contains wetlands which are habitat to fairy shrimp (one of two known populations in the North Coast range). Every SIA is subject to specific standards and guides which are designed to protect the area and provide for public use, education and enjoyment (Six Rivers LRMP, IV-50). Please see the Analysis Framework section above for a complete list of applicable Standards and Guidelines.

The Lassics SIA is a popular destination for cross-country motorized travel because it lacks vegetation (due to the serpentine soils). Motorized recreation in the area may have several impacts. The serpentine soils may contain NOA. Also, sediment from trail erosion may be delivered to the wetlands. The following (Table 3.3-7) is a summary of the number and miles of routes per alternative:

Table 3.3-7: Miles of Route within the Lassics SIA per Alternative

Alternative 1 No Action (Existing Condition)		Alternative 2 Proposed Action		Alternative 3		Alternative 4	
Number of Routes	Miles of open route within the SIA	Number of Routes	Miles of open route within the SIA	Number of Routes	Miles of open route within the SIA	Number of Routes	Miles of open route within the SIA
22	3.9	8	0.8	8	0.8	0	0

Direct and Indirect Effects

This section describes the effects of each alternative by action. The short term timeframe is 1 year and the long term timeframe is 50 years. This is common to all 3 actions and the analysis of every alternative. See the Effects Methodology section above regarding how this analysis was conducted.

The analysis is specific to the project area boundary which is the extent of the Lower Trinity and Mad River Ranger Districts. There are however, two routes within the proposed action which straddle the Six Rivers and Shasta-Trinity NF boundary. They are TH1020 and MM839, and are included within this analysis.

The three discreet actions common to every alternative are: (1) the prohibition of cross-country travel; (2) the addition of facilities (unauthorized roads, trails, and/or areas) to the National Forest Transportation System (NFTS), including identifying seasons of use and vehicle class; and (3) changes to the existing NFTS vehicle class and season of use.

All three actions within every alternative were evaluated with the same four geologic indicators:

- Miles of route on earthflow terrain
- Miles of route on sensitive terrain
- Miles of route within potentially asbestos bearing bedrock
- Number of routes within 500 feet of an abandoned mine site

3.3.5.2 Alternative 1 (No Action)

As described in Chapter 2 of this EIS, under the No Action Alternative, current management plans would continue to guide management of the project area. No changes would be made to the current NFTS and no cross-country travel prohibition would be put into place. The Travel Management Rule would not be implemented and no MVUM would be produced. By action, this alternative would do the following:

1. Presently, there is no ban on cross-country travel within the project boundary. Therefore, the No Action Alternative would not prevent motorists from traveling cross-country (off of designated travel routes). The No Action Alternative is equivalent to the existing condition. However, without a cross-country ban the number of routes in the future will likely increase.
2. The No Action Alternative would not add any new facilities (unauthorized routes) to the National Forest Transportation System (NFTS). Existing Level 2 roads and trails (currently part of the NFTS), all unauthorized routes, as well as all terrain within the

project boundary would be open to motorized vehicles (cross-country). Only roads and trails which are currently part of the NFTS would receive maintenance.

3. The No Action Alternative would not make any changes to the existing NFTS vehicle class or season of use. The direct and indirect effects of the roads and routes have already occurred (the land surface was disturbed, the route was located in potentially sensitive terrain, etc…). The direct and indirect effects of this action are not analyzed because the *type* of use has an unpredictable and small effect on geologic resources and hazards. See the Effects Analysis Methodology section for a detailed explanation.

Direct/Indirect Effects

Under this Alternative approximately 255 miles of existing route would be open for travel by motor vehicles, however none of these routes would be added to the NFTS. Therefore, none of these routes would receive maintenance or mitigation measures to control the erosion associated with them. They will continue to erode over time and will be a sediment source degrading water quality beyond the long term time frame. They are not expected to re-vegetate because they will continue to be used.

Nearly 14 miles of route are on earthflows. Drainage structures on these routes would not be effective and they would chronically erode. They may also instigate shallow debris slides, especially if they are located on the toe-zone of the earthflow. Without constant maintenance they would likely be detrimental to water quality from sediment delivery.

This Alternative would also keep 77 miles open for motorized vehicle use on sensitive terrain. These routes may instigate shallow debris slides which can be potentially hazardous to humans, especially when they destroy the travel-way. Debris slides affect rivers and streams, by contributing sediment to their channels. They also remove soil resources from the hillslope.

4.4 miles of motorized route would be available for public use on bedrock which may contain NOA. Motorized recreators may inhale dust which contains asbestos fibers.

None of the existing routes pass within 500 feet of an abandoned mine site. Without a cross-country ban however, over time, this will likely change. Abandoned mine sites often become a recreation destination. They can be hazardous to humans, both physically and chemically, and may continue to effect people beyond the long term time frame.

The following table displays the results of the effects analysis of Alternative 1 by action:

Table 3.3-8: Alternative 1: Summary of Geoindicators

Alternative 1: No Action	
No Prohibition of Cross-country Travel	
Indicator	**Miles**
Prohibited miles on **Earthflow Terrain**	0
Prohibited miles on **Sensitive Terrain**	0
Prohibited miles on **Potentially Asbestos Bearing Bedrock**	0
Prohibited miles **Within 500 ft. of an Abandoned Mine Site**	None
Total Prohibited miles within Geoindicators	**0**
The Addition of Facilities to the NFTS	
Added miles on **Earthflow Terrain**	0
Added miles on **Sensitive Terrain**	0
Added miles on **Potentially Asbestos Bearing Bedrock**	0
Added miles **Within 500 ft. of abandoned Mine Site**	None
Total added miles within Geoindicators	**0**
Changes to the existing NFTS vehicle class and season of use	
Not analyzed. See the Affects Analysis Methodology Section.	

Cumulative Effects

The cumulative environmental effects of this project on geologic resources ultimately impact water quality. They are addressed within Hydrology/Water Resources, Chapter 3.5. Cumulative impacts on human health are specific to the individual and depend on their personal history. They are not analyzed here because they are beyond the scope of this analysis.

3.3.5.3 Alternative 2: Proposed Action

Under this alternative, changes would be made to the current NFTS through additions of selected motorized trails. A cross-country travel prohibition would be put into place for all areas not included in the NFTS. The Travel Management Rule would be implemented and a Motorized Vehicle Use Map (MVUM) would be produced.

1. The proposed action would prohibit cross-country motorized vehicle travel throughout the project area. 199 miles of unauthorized routes would be closed to motorized use. Only designated routes would be open for motorized recreational use.
2. The proposed action would add a total of 56 miles of route to the existing NFTS. They would be open to motorcycles, ATVs, a combination of these two vehicle types, or all vehicles. Some of these routes would be closed seasonally. Some of the routes would not be open to the public until mitigations are in place to prevent resource damage.
3. 53 miles of changes to the existing NFTS vehicle class and season of use would be implemented under the proposed action. These changes are not analyzed here

because: The direct and indirect effects of the roads and routes have already occurred (the land surface was disturbed, the route was located in potentially sensitive terrain, etc..) and the type of use has an unpredictable and small effect on geologic resources and hazards. See the Effects Analysis Methodology section for a detailed explanation.

Please see chapter 2 for a more detailed description of Alternative 2.

Direct/Indirect Effects

This alternative would add 56 miles of new motorized trails to the NFTS. This is 22% of the total miles of unauthorized routes which currently exist within the project boundary. Water quality and soil resources would be protected through mitigation (i.e.waterbars) and regular maintenance. Some routes would also be closed during the wet weather season to prevent rutting which exacerbates erosion.

After travel ceases on the unauthorized routes which would not be added (199 miles), they would be expected to re-vegetate naturally within the long term time frame. This would result in the reduction of surface erosion and negative impacts to water quality. Un-designated routes on sensitive terrain (located within the toe-zone of large deep seated landslides) however, may continue to jeopardize the stability of the ground. This is most likely where the route has been cut and filled from the hillslope, as opposed to a route on the native ground surface. Unauthorized cut and filled routes are the majority of existing routes within the project boundary.

A total of 12% of all route miles proposed in Alternative 2 are within geologic indicators. These routes may be currently effecting water quality or posing a potential hazard to human health. 1.9 miles of the added routes are located within earthflow terrain. Without frequent maintenance, routes on seasonally active earthflows would likely be detrimental to water quality. This is because drainage structures on active earthflows may not hold their shape and/or orientation to the hillslope. These routes may also instigate shallow debris slides, especially if they are located within the toe-zone of an active earthflow. Erosion from routes on inactive earthflows is easier to prevent because waterbars and other mitigation measures retain their shape for longer.

3.7 miles of route on sensitive terrain would be added. These routes may instigate shallow debris slides which can be hazardous to humans, especially when they destroy the travel-way. Debris slides affect rivers and streams by contributing sediment to their channels. They also remove soil resources from the hillslope. Because the actual risk is difficult to determine from GIS and limited field data, stability monitoring will be necessary.

1.2 miles of the added routes would be on bedrock which may contain NOA. Motorized recreators may inhale dust which contains asbestos fibers.

None of the routes proposed in Alternative 2 would be located within 500 feet of an abandoned mine site. The hazards associated with these sites would be avoided.

The following table displays the results of the effects analysis of Alternative 2 by action:

Table 3.3-9: Alternative 2: Summary of Geoindicators

Alternative 2: Proposed Action	
The Prohibition of Cross-country Travel	
Indicator	**Miles**
Prohibited miles on **Earthflow Terrain**	**12**
Prohibited miles in **Sensitive Terrain**	**73.6**
Miles of prohibited route in **Potentially Asbestos Bearing Bedrock**	**3.2**
Number of prohibited routes **Within 500 ft. of an Abandoned Mine Site**	**none**
Total prohibited miles within Geoindicators	**88.8**
The Addition of Facilities	
Proposed miles on **Earthflow Terrain**	1.9
Proposed miles in **Sensitive Terrain**	3.7
Miles of Proposed Route in **Potentially Asbestos Bearing Bedrock**	1.2
Number of Proposed Routes **Within 500 ft. of an Abandoned Mine Site**	N/A
Total Proposed within Geo Indicators	**6. 9**
Changes to the Existing NFTS Vehicle Class and Season of Use	
Not analyzed. See the Effects Analysis Methodology Section.	

Cumulative Effects

The cumulative environmental effects of this project on geologic resources ultimately impact water quality. They are addressed within Hydrology/Water Resources, Chapter 3.5. Cumulative impacts on human health are specific to the individual and depend on their personal history. They are not analyzed here because they are beyond the scope of this analysis.

3.3.5.4 Alternative 3: Expanded Motorized Recreation

This alternative responds to the issues of access and opportunities for motorized recreation. Under this alternative, changes would be made to the current NFTS through additions of selected motorized trails. A cross-country travel prohibition would be put into place for all areas not included in the NFTS. The Travel Management Rule would be implemented and a Motorized Vehicle Use Map (MVUM) would be produced.

1. The Expanded Motorized Recreation Alternative would prohibit motorized vehicle travel off of designated NFTS roads and trails, except as allowed by permit or other authorization. 190 miles of unauthorized existing routes would be closed to motorized vehicle use.
2. The Expanded Motorized Recreation Alternative would add a total of 64 miles as new NFTS motorized trails by vehicle type and season of use. Some of these routes would be closed seasonally. Some of the routes would not be open to the public until mitigations are in place to prevent resource damage. Eight of the added miles would be subject to additional field review and potential modification to meet Forest Plan Standards and Guidelines prior to finalizing the EIS.
3. 53 miles of changes to the existing NFTS roads and motorized trails would be made. These changes are not analyzed here because: The direct and indirect effects of the

roads and routes have already occurred (the land surface was disturbed, the route was located in potentially sensitive terrain, etc.) and the type of use has an unpredictable and small effect on geologic resources and hazards. See the Effects Analysis Methodology section for a detailed explanation.

Please see Chapter 2 for a more detailed description of Alternative 3.

Direct/Indirect Effects

This alternative would add 64 miles of new motorized trails to the NFTS. This is 25% of all the existing unauthorized routes within the project boundary. Water quality and soil resources would be protected through mitigation (i.e.waterbars) and regular maintenance. Some routes would also be closed during the wet weather season to prevent rutting which exacerbates erosion.

After travel ceases on the unauthorized routes which would not be added (191 miles), they would be expected to re-vegetate naturally within the long term time frame. This would result in the reduction of surface erosion and negative impacts to water quality. Un-designated routes on sensitive terrain (located within the toe-zones of large deep-seated landslides) however, may continue to jeopardize the stability of the ground. This is most likely where the route has been cut and filled from the hillslope, as opposed to a route on the native ground surface. Unauthorized cut and filled routes are the majority of existing routes within the project boundary.

A total of 11% of all route miles proposed in Alternative 3 are within geologic indicators. These routes may be currently effecting water quality or posing a potential hazard to human health. 2.3 miles of the added routes are located within earthflow terrain. Without frequent maintenance routes on seasonally active earthflows would likely be detrimental to water quality. This is because drainage structures on active earthflows may not hold their shape and/or orientation to the hillslope. These routes may also instigate shallow debris slides, especially if they are located within the toe-zone of an active earthflow. Erosion from routes on inactive earthflows is easier to prevent because waterbars and other mitigation measures retain their shape for longer.

3.8 miles of route on sensitive terrain would be added. These routes may instigate shallow debris slides which can be hazardous to humans, especially when they destroy the travel-way. Debris slides affect rivers and streams by contributing sediment to their channels. They also remove soil resources from the hillslope. Because the actual risk is difficult to determine from GIS and limited field data, stability monitoring will be necessary.

1.2 miles of the added routes are on bedrock which may contain NOA. Motorized recreators may inhale dust which contains asbestos fibers.

None of the added routes will be within 500 feet of an abandoned mine location.

The following table displays the results of the effects analysis of Alternative 3 by action:

Table 3.3-10: Alternative 3: Summary of Geoindicators

Alternative 3: Expanded Recreation	
The Prohibition of Cross-country Travel	
Indicator	**Miles**
Prohibited miles on **Earthflow Terrain**	11.6
Prohibited miles in **Sensitive Terrain**	73.5
Miles of Prohibited routes in **Potentially Asbestos Bearing Bedrock**	3.2
Number of prohibited routes **Within 500 ft. of an Abandoned Mine Site**	none
Total prohibited within Geoindicators	**88.4**
The Addition of Facilities	
Added miles on **Earthflow Terrain**	2.3
Added miles in **Sensitive Terrain**	3.8
Miles of added routes in Potentially **Asbestos Bearing Bedrock**	1.2
Number of added routes **Within 500 ft. of an Abandoned Mine Site**	N/A
Total added within Geoindicators	**7.3**
Changes to the Existing NFTS Vehicle Class and Season of Use	
Not analyzed. See the Effects Analysis Methodology Section.	

Cumulative Effects

The environmental effects of this project on geologic resources can be divided into two categories: impacts on human health and impacts on water quality. Cumulative impacts on human health are only relevant to the individual and therefore are not analyzed. Impacts on water quality are analyzed within the Hydrology/Water Resources section, Chapter 3.5.

3.3.5.5 Alternative 4: Prohibition of Cross-County Travel

This alternative was developed in response to the issues of a non-motorized recreation experience and the negative effects to Forest resources associated with motor vehicles. Under this alternative, no changes would be made to the current NFTS through additions of selected motorized trails. A cross-country travel prohibition would be put into place for all areas not included in the NFTS.

1. Public motor vehicle travel off designated NFTS roads and trails (cross-country travel) would not continue except as otherwise permitted (0 miles of existing unauthorized routes would be open for travel).
2. Neither inventoried unauthorized routes nor motorized trails co-located on closed NFTS roads would be added to the NFTS.
3. Neither changes to type of vehicle, nor season of use would be made to NFTS roads or motorized trails under this alternative except to the NFTS motorized trails accessed by NFTS roads with wet weather closures (11 miles). Route TH1062 at County Road 520 would be blocked to discourage/prevent vehicle access into the North Fork Wilderness.

These changes are not analyzed here because:

The direct and indirect effects of the roads and trails have already occurred (the land surface was disturbed, the route was located in potentially sensitive terrain, etc..). Changes in season of use to these trails would not have any effect on the ground because the trails are currently inaccessible during the winter months due to access by roads which are currently closed seasonally for wet weather.

Please see chapter 2 for a more detailed description of Alternative 4.

Direct/Indirect Effects

This alternative would prohibit cross-country travel within the project area which will stop the proliferation of new routes. This would help prevent routes from being located in environmentally detrimental areas, or places which are hazardous to human safety.

This alternative would not add any new motorized trails to the NFTS. After travel ceases on the unauthorized routes which were not added (255 miles), they would be expected to re-vegetate naturally within the long term time frame. This would result in the reduction of surface erosion and negative impacts to water quality. Un-designated routes on sensitive terrain (located within the toe-zone of large deep seated landslides) however, may continue to jeopardize the stability of the ground. This is most likely where the route has been cut and filled from the hillslope, as opposed to a route on the native ground surface. Unauthorized cut and filled routes are the majority of existing routes within the project boundary.

The following table displays the results of the effects analysis of Alternative 4 by action:

Table 3.3-11: Alternative 4: Summary of Geoindicators

Alternative 4: Prohibition of Cross-Country Travel	
The Prohibition of Cross-Country Travel	
Indicator	**Miles**
Prohibited miles on **Earthflow Terrain**	13.9
Prohibited miles in **Sensitive Terrain**	77.3
Miles of prohibited route in potentially **Asbestos Bearing Bedrock**	4.4
Number of prohibited routes **Within 500 ft. of an Abandoned Mine Site**	None
Total prohibited within Geoindicators	**95.7**
The Addition of Facilities	
Added miles on **Earthflow Terrain**	0
Added miles in **Sensitive Terrain**	0
Miles of added route in potentially **Asbestos Bearing Bedrock**	0
Number of added routes **Within 500 ft. of an Abandoned Mine Site**	None
Total added within Geoindicators	**0**
Changes to the Existing NFTS Vehicle Class and Season of Use	
Not analyzed. See the Effects Analysis Methodology Section.	

Cumulative Effects

The cumulative environmental effects of this project on geologic resources ultimately impact water quality. They are addressed within Hydrology/Water Resources, Chapter 3.5. Cumulative impacts on human health are specific to the individual and depend on their personal history. They are not analyzed here because they are beyond the scope of this analysis.

3.3.6 Summary of Effects Analysis Across All Alternatives

Table 3.3-12is a summary of every alternative by indicator. The alternative with the least number of cumulative miles within the indicators will have the smallest impact on the terrain and least hazard to human health. Based on this, the alternatives are ranked. Higher ranks (4) indicate more benefits and/or less adverse effects to geologic resources and hazards for that alternative and lower ranks (1) indicate the least benefits and/or most adverse effects to geologic resources. The scores are then averaged across all indicators to generate a final score for the alternative. This is displayed in Table 3.3-12.

Table 3.3-12: Alternatives Ranked by Indicator[1]

Indicators	Alternative 1 – No Action	Alternative 2 – Proposed Action	Alternative 3	Alternative 4
The Prohibition of Cross Country Travel (miles closed to motor-vehicles)				
Miles of routes on Earthflow Terrain	0 miles (1)	12 miles (3)	11.6 miles (2)	13.9 miles (4)
Miles of routes on Sensitive Terrain	0 miles (1)	73.6 miles (3)	73.5 miles (2)	77.3 miles (4)
Miles of routes on bedrock which may contain NOA	0 miles (1)	3.2 miles (3)	3.2 miles (3)	4.4 miles (4)
Number of routes within 500 feet of an abandoned mine site	None (1)	All (4)	All (4)	All (4)
The Addition of Facilities to the NFTS				
Miles of routes on Earthflow Terrain	0 miles (4)	1.9 miles (3)	2.3 miles (2)	0 miles (4)
Miles of routes on Sensitive Terrain	0 miles (4)	3.7 miles (3)	3.8 miles (2)	0 miles (4)
Miles of routes on bedrock which may contain NOA	0 miles (4)	1.2 miles (3)	1.2 miles (3)	0 miles (4)
Number of routes within 500 feet of an abandoned mine site	None (4)	None (4)	None (4)	None (4)
Changes to the Existing NFTS				
Not analyzed. See the Effects Analysis Methodology Section.				
Geology Cumulative Ranking				
AVERAGE RANKING FOR GEOLOGY	2.50	3.25	2.75	4.00

[1] A score of 4 indicates the Alternative is the best for geologic resources related to the indicator; A score of 1 indicates the Alternative is the worst for geologic resources related to the indicator.

When the rank of each alternative is compared with others it can be seen that Alternative 4 would have the least impact on the terrain and pose the least hazard to human health. Taking No Action, Alternative 1, poses the most adverse effects on the terrain and is potentially the most hazardous to human health.

The scores of Alternatives 2 and 3 are similar. Alternative 2 ranked higher (less impacts on resources and people) than Alternative 3 by 0.5 points. The number of miles on earthflow terrain is the main difference between the two. Routes on earthflows will require more frequent maintenance than other routes for two reasons. The terrain is prone to rutting and is also slowly moving, making hydrologic drainage structures ineffective. Therefore, though the difference in number of miles within the indicators is small, Alternative 2 has a much smaller impact on the geologic, soil and water resources, as well as the cost of maintaining those trails on earthflows.

3.3.7 Compliance with the Forest Plan and Other Direction

A list of Standards and Guidelines and Best Management Practices that apply to this project are included in Appendix B of the EIS. Also see the Riparian Reserves section for information on the Aquatic Conservation Strategy (Northwest Forest Plan). Mitigation measures such as waterbars and wet-weather closures (included in Alternatives 2 and 3 only) were proposed in order to comply with the Forest Plan and Clean Water Act. In addition, frequent monitoring and maintenance will be needed in order to meet Standards and Guidelines. See the Monitoring Section within Appendix H.

If implemented, Alternative 1 would not be in compliance with the Forest Plan and Clean Water Act. Alternative 1 is the No Action Alternative and allows the Forest to be open to cross-country travel. If No Action is selected then the existing routes that are currently in the project area and are not a part of the NFTS trails would not be mitigated, but would be used. They would not recover and would continue to affect water quality and soil resources. Mitigations are required by the Forest Plan and the Clean Water Act.

Alternatives 2 and 3 are consistent with the Forest management direction and Standards and Guidelines. Proposed routes would be mitigated to meet direction on erosion prevention and water quality protection.

Riparian Reserves are subject to the Aquatic Conservation Strategy (ACS) of the Northwest Forest Plan Record of Decision, 1994 (see the Riparian Reserves Section for more discussion). Earthflows, unstable lands, and potentially unstable lands are within the Riparian Reserve boundaries. Alternatives 2 and 3 propose adding routes within earthflow and sensitive terrain. These routes therefore, fall under the ACS Standards and Guides which mandate trails and roads within riparian reserves do not prevent the attainment of the ACS objectives. Drainage structures, maintenance, and monitoring for signs of instability will ensure these alternatives meet the ACS objectives.

Alternatives 2 and 3 include routes within the Special Interest Areas (Horse Mountain and the Lassics). SIA direction and Standards and Guidelines in section IV-52 through IV-53 of the Six Rivers Land Management Plan (LRMP) were followed during the creation of these alternatives. Existing routes would be designated which do not impact sensitive areas or encourage motorized access to areas with interpretive values. Portions of the SIAs would be managed as semi-primitive non-motorized. Also, routes to primitive camping sites would be designated where resource conflicts are absent. Soil and water quality will be protected with mitigations, monitoring and maintenance.

Alternative 4 is consistent with the Forest management direction and Standards and Guidelines. Alternative 4 only allows use on roads and trails that are existing parts of the NFTS. At the time these routes were constructed they were in compliance with the planning direction of that period. As reconstruction occurs on the NFTS, these routes through time would be reconstructed in compliance with the Forest Plan and Clean Water Act. If sedimentation is controlled through implementation of BMPs, the potential for off-site impacts to water quality would be small. Abnormally high intensity storm events may result in impacts to the facility and off-site soils impacts, regardless of implementation of BMPs.

Many of the unauthorized routes not added under Alternatives 2, 3, and 4 are likely to re-vegetate within the long-term time frame. Surface erosion will decrease or stop. However, without applied restoration efforts, some routes will not recover on their own and will continue to erode. Stability on many routes may or may not improve with re-vegetation.

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3.4 Soil Resource

The soil resource provides many essential functions for National Forest System (NFS) lands. It sustains plant growth that provides forage, fiber, wildlife habitat, and watershed protection. It absorbs precipitation, stores water for plant growth, and gradually releases surplus water which attenuates runoff rates. It sustains microorganisms which recycle nutrients for continued plant growth. The National Forest Management Act of 1976 and other acts recognized the fundamental need to protect, and where appropriate improve, the quality of soil. The proposed action could potentially impact soil productivity and its other ecosystem functions and is therefore addressed here.

3.4.1 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

Direction relevant to the proposed action as it affects the soil resource includes:

National Forest Management Act of 1976. Renewable Resource Program. "(C) recognize the fundamental need to protect and where appropriate, improve the quality of soil, water, and air resources."

National Soil Management Handbook. The Soil Management Handbook (USDA 1991) is a national soils handbook that defines soil productivity and components of soil productivity, establishes guidance for measuring soil productivity, and establishes thresholds to assist in forest planning.

Region 5 Soil Management Handbook Supplement. The Forest Service Region 5 Soil Management Handbook Supplement (R5 FSH Supplement 2509.18-95-1) establishes regional soil quality analysis standards. The analysis standards address three basic elements for the Soil Resource: (1) soil productivity (including soil loss, porosity, and organic matter), (2) soil hydrologic function, and (3) soil buffering capacity. The analysis standards are to be used for areas dedicated to growing vegetation. They are not applied to lands with other dedicated uses, such as developed campgrounds, administrative facilities or, in this case, the actual land surface authorized for travel by the public using various kinds of vehicles.

Regional Forester's Letter (dated Feb 5, 2007). This letter provided clarification to Forest Supervisors on the appropriate use of the R5 Soil Management Handbook Supplement (R5 FSH Supplement 2509.18-95-1). It states in part:

Analysis or evaluation of soil condition is the intended use of the thresholds and indicators in R5 FSH Supplement 2509.18-95-1. They are not a set of mandatory standards or requirements. They should not be referred to as binding or mandatory requirements in NEPA documents. Standards and guidelines in Forest Land and Resource Management Plans provide the relevant substantive standards to comply with NFMA.

The thresholds and indicators represent desired conditions for the soil resource. Utilization of the thresholds and indicators provides a consistent method to analyze, describe, and report on soil condition throughout the Region.

3.4.2 Six Rivers Land and Resources Management Plan (LRMP)

The Six Rivers Forest Plan provides for Standards and Guidelines for management areas that include:

1. Maintain soil productivity by applying guidelines to areas where management prescriptions are applied.
2. 85 percent of areas affected by soil disturbing activities will not exceed soil property thresholds.
3. Soil porosity is at least 90 percent of its natural conditions.
4. The organic matter in the upper 12 inches of soil should be at least 85 percent of its natural conditions.
5. Design management activities not to exceed an R5 Erosion Hazard Rating of moderate.
6. Alternative road/routes should be evaluated where proposed management would increase the potential for mass movement and soil erosion.
7. Where applicable and practical, restore the productive capacity of soils damaged by past events.

3.4.3 Effects Analysis Methodology and Assumptions

This section describes the methodology and assumptions used for the effects analysis of the proposed project for soils. This section establishes indicators chosen to measure potential effects, the analysis area, timeframe, methods used, and assumptions made for the effects analysis to soil resources for all action alternatives.

Based on a risk assessment conducted using GIS data, a subset of unauthorized routes located in areas sensitive to watershed resources (riparian areas) and providing the greatest risk to watershed resources (e.g. proximity to stream channels, slope steepness, length of route) were field visited. After this data was collected, a further refinement of the initial GIS risk assessment was made and a Watershed Risk Rating system was developed to evaluate all unauthorized motorized routes. A Watershed Risk Rating was given to each route based on a combination of field collected data and GIS data for those routes not field visited (see Water Resources (section 3.5) and Appendix C for more information on methods and route specific data and watershed risk ratings). A combination of field data that identified erosion and slope on individual routes was merged with GIS data to determine erosion hazard ratings, type of route (road vs trail), and potential for season long use based on elevation (wet weather use). The methods and assumptions used are described below.

3.4.3.1 Soil Resource Methodology by Action:

Direct effects are those effects which are caused by the project actions and which occur at the same time and place as the action. Indirect effects are those caused by the action, which are later in time or farther removed in distance from the location of the action. Direct and indirect effects of each project alternative will be analyzed together for three separate action components.

The three discreet actions common to all action alternatives are: (1) the prohibition of cross-country motor vehicle travel; (2) the addition of facilities (unauthorized roads, trails, and/or areas) to the National Forest Transportation System (NFTS), including identifying seasons of use and vehicle class; and (3) changes to the existing NFTS vehicle class and season of use. Thus, this Effects Analysis Methodology section describes the methodology used for the effects analysis and addresses impacts relevant to soil resources, resource-specific assumptions, resource indicators to be measured, sources of information used to support the analysis, timeframes (short term and long term), and spatial boundary of the effects analysis.

1. Direct/indirect effects of the prohibition of cross-country motor vehicle travel.

The prohibition of cross-country travel is focused on the effects from prohibiting continued motorized use. In other words, if cross-country travel is prohibited identify: 1) the miles of routes that have the potential to continue to erode and result in off-site watershed impacts and 2) the miles of routes that have the potential to passively recover over a given time.

Indicator(s): (1) Miles of unauthorized routes displayed by miles in each of the R-5 Erosion Hazard Ratings (EHR); (2) Miles of routes by potential to passively recover (high, low).

Short-term timeframe: The 1 year time frame looks at routes over the short-term. It does not provide time for passive recovery on closed routes.

Long-term timeframe: The 25 to 30 year time frame looks at routes over the longer term. It provides time for passive recovery on closed routes. Passive recovery is an assumed benefit. Factors such as soil type, slope, and precipitation affects rate of vegetative recovery. The same time frame is used for Cumulative Watershed Effects.

Spatial boundary: Lower Trinity and Mad River District

Methodology and Assumptions: A GIS data layer of the motorized trail system was created for this alternative. The route locations are based on information from the public and the GPS data from contractors and Forest Service employees. Miles of routes by EHR were calculated through GIS by querying the number of unauthorized routes by the Six Rivers Forest Soil Resource Inventory data (USDA Forest Service, 1993). Miles of unauthorized routes in Watershed Risk Ratings are based on combination of field inventory that rating existing and potential erosion and Forest soils data using GIS. The assumption was made that unauthorized routes in the High Watershed Risk Rating, High EHR, and steep slopes would continue to erode and result in off-site impacts. This assumption was corroborated by field data showing that soil erosion is closely related to steep slopes, and high EHR ratings. To assess the ability of motorized routes to passively recover over the long term, a combination of field identified erosion data combined with soils GIS analysis was used to develop a high or low potential for passive recovery. Table 3.4-1 outlines the assumptions and methods used to determine passive recovery rates assuming a cross-country prohibition. Any route that does not have a high or low potential for passive recovery based on the criteria listed in Table 3.4-1 is assumed to have a moderate potential for passive recovery.

Table 3.4-1: Assumptions and Methods for passive recovery - routes not added due to prohibition

Low recovery potential within 25-30 years	High recovery potential within 25-30 years
• Slope > 15 percent (field and GIS) • High EHR (Soils GIS) • Signs of Erosion (field) • Unauthorized route originally a road (field)	• Slope < 15 percent (field and GIS) • Low to Moderate EHR (Soils GIS) • Unauthorized route originally a trail (field) • No signs of erosion (field)

2. **Direct/Indirect effects of adding facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, including identifying seasons of use and vehicle class.**

The effects of adding trails are focused on presently unauthorized motorized routes that would be added to the NFTS. This is a change from unauthorized and unmaintained to NFTS status. This analysis examines which of these routes have a high or low risk associated with maintaining the facility (tread, drivability) based on inherent soil characteristics, location, and slope steepness and the high or low risk of off-site impacts to soil resources due to addition of the route to the NFTS.

Indicator(s): (1) Miles of unauthorized routes displayed by miles in each of the R-5 EHR ratings; (2) Miles of routes with high or low risk to route facility and off-site impacts.

Short-term timeframe: 1 year.

Long-term timeframe: 25-30 years

Spatial boundary: Forest. Lower Trinity and Mad River District

Methodology and Assumptions: Miles of routes to be added by EHR were calculated through GIS using the Six Rivers Forest Soil Resource Inventory data (Six River, 1993). To assess the effects on soils resources of adding motorized routes to the NFTS the condition of the routes was assessed (presence of erosion, slope gradient, EHR, and potential for year round season use based on elevation). The assumption was made that routes located below 3000 feet would have year round access including wet season, and not be restricted due to snow. Table 3.4-2 outlines the assumptions and methods used to determine risk to soils resource and trail facility of adding routes to the NFTS. Field inventory has shown that surface erosion of tread on motorized routes is correlated closely with high EHR and slopes greater than 15% slope.

Table 3.4-2: Assumptions and Methods for routes added to NFTS

High Risk – miles of routes that may have potential high risk of facility damage and offsite impacts	Low Risk – miles of routes that have moderate to low potential for facility damage and offsite soils impacts
• Slope > 15 percent (field and GIS) • High EHR (GIS) • Signs of Erosion (field) • route below 3000 - potential for year round use (GIS)	• Slope <15 percent (field and GIS) • Low and Moderate EHR (GIS) • No signs of erosion (field) • Route above 3000 feet – seasonal use based on no winter access (GIS)

3. **Changes to the existing NFTS [this can include deletions of facilities and changing the vehicle class and season of use].**

Changes to existing NFTS include motorized routes previously open to the public that are now closed to motorized use as well as changes in season of use or type of use.

Indicators, Methods, Assumptions: same as 2 above.

Cumulative Effects

Soil cumulative effects parallel cumulative watershed effects. 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 (Chapter 20, R5-FSH 2509.22) otherwise known as the Equivalent Roaded Acre (ERA) model (see hydrology section). There are various kinds of cumulative soils effects including additive effects and pulsed or chronic effects associated with off-site impacts associated with winter weather and large storm events. The addition of new unauthorized routes to the NFTS under this project expands the potential for cumulative effect of off-site soils impacts and is considered an additive cumulative effect.

Short-term timeframe: not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 25-30 years

Spatial boundary: Lower Trinity and Mad River Districts

Indicator(s): (1) total additive miles of routes available to public having potential for off-site soils impacts.

Methodology: GIS analysis of total miles of motorized trail routes (existing NFTS motorized trails and newly added NFTS routes) available to the public and ability of soils to recover over time as well as limit off-site impacts. Table 3.4-3 shows the additive soils cumulative effects for off-site impacts.

Table 3.4-3: Cumulative or Additive miles of routes/trails available for public use (existing + proposed)

High Risk – miles of routes that may have potential high risk of facility damage and offsite impacts	Low Risk – miles of routes that have moderate to low potential for facility damage and offsite soils impacts
• Slope > 15 percent (field and GIS) • High EHR (GIS) • Signs of Erosion (field) • route below 3000 - potential for year round use (GIS)	• Slope <15 percent (field and GIS) • Low and Moderate EHR (GIS) • No signs of erosion • Route above 3000 feet – seasonal use based on no winter access (GIS)

3.4.4 Affected Environment

Soil resource information for the Lower Trinity and Mad River Ranger Districts was obtained from the Six River National Forest Soil Resource Inventory, California (USDA 1993).

Soils with in the Lower Trinity and Mad River Districts are influenced by complicated geology resulting in the formation of many rock types and differentiating topography which has created a wide range of soil characteristics. Medasedimentary rock including schist, chert and quartzite dominates much of Lower Trinity District and is widely abundant in the Mad River District. Diorite is found primarily in the north as outcrops in Lower Trinity. Sheared shaley sediments are inherent throughout Mad River with concentrations in the northern region of the district. Sedimentary and metaigneous rock such as serpentine are irregularly found throughout the landscape in both districts. All rock types are commonly exposed as outcrops. Many soils are lithic in which the soil depth is shallow to underlying bedrock. Bedrock type and slope gradients have strongly influenced soil development and depth. The soils range in depth from shallow (less than 20 inches) to very deep (greater than 60 inches) throughout the area and soils of different depths are often associated. Slope ranges from 20-90 percent with all aspects. Elevation ranges from 400ft to 6,000 feet.

The most common soils are classified in the Great Groups Xerochrepts and Haploxeralfs. The major difference between these two groups is a greater clay composition in the subsoil of Haploxeralfs. Common soil properties include gravelly loam and clay loam texture, good drainage, moderate to moderately slow surface water permeability, very low to moderate water holding capacity (high in a very few soils with very high clay content), and varying soil depth from 10 to more than 60 inches. Soil Erosion Hazard Rating (EHR) is moderate to high for most soils, however low ratings are very common. On disturbed soils run-off potential is low to moderate depending on slope gradient. The dominate vegetation community is Douglas Fir – Tan Oak – Madrone Forest. Many of the soils located under the forest canopy have an organic layer of decomposing needle duff. Canyon Live Oak groves and annual grasslands constitute the majority of other common vegetation communities.

The soil types and common soil families of the Lower Trinity and Mad River Districts are very similar. Common soil families of the Lower Trinity District include Clallam, Deadwood, Holland, Hugo, Maymen, and Skaland. Common soil families of the Mad River District include Clallam, Deadwood, Doty, Holland, Nancy, Oxalis, and Skaland. The Oxalis family soil is unique to the Mad River District. Oxalis soils are derived from sheared shaley sediments and the dominant secondary clay is montimorillonite. Lower Trinity does not have montimorillonitic clay soils. These soils are very easily compacted and when compacted extensively can become extremely hard and impermeable to water when the soil is dry. In general, soils of the Mad River District are deeper with sections developing over shale that generally contain very high clay content. Soils high in clay are characteristic of poor drainage, reduced surface water permeability, higher water holding capacity, and a slightly greater average Erosion Hazard Rating.

Watershed Risks Related to Roads and Trails

Roads are considered the principal cause of accelerated erosion in forests throughout the western United States (Reid and Dunne 1984, Furniss and others 1991, Grace and Clinton, 2007, Trombulak, and. Frissell. 2000.). The use of roads, trails and other areas on national forest for public operation of motor vehicles also has potential to affect the soil resource through interception of runoff, compaction of soils, and detachment of sediment (Foltz, 2006). The locations of roads determine the degree of potential impacts, making some roads more environmentally sensitive than others. The presence of roads can increase the frequency of slope failures compared with the rate for undisturbed forest by hundreds of times (Furniss and others 1991). A single, poorly designed trail on a highly erosive soil could cause unacceptable soil loss, but result in no impact to water quality if not delivered to a stream. A very high density of trails on a moderately erosive soil in an area with a high stream density could be unacceptable for water quality (the likelihood of delivery is high), but not necessarily a major impact to the soil resource.

There are two types of soil loss on roads and trails. First is the loss of soil from the tread itself. Because the road or trail surface is a dedicated use of the land, this is really not so much a soil productivity issue as it is a loss of facility function. Loss of soil productivity occurred when the road or trail was constructed as part of the transportation system. In the case of user created trails, the loss of soil productivity occurred as the trail became more compacted and established over time. The second type of erosion is the loss of soil that occurs when concentrated water from the road or trail surface creates a gully or some other erosion features down slope. This reduces soil productivity, vegetative growth and water quality when sediment is delivered to a watercourse. Concentrated runoff is the primary agent of erosion on native surfaced roads and motorized trails. Mechanical displacement of soil by traffic is also important, although most mechanically displaced soil is ultimately transported by concentrated runoff. Mechanical displacement becomes more significant as road or trail gradients become steeper.

Unauthorized Motorized trails

Unauthorized motorized trails fall into two general categories, user created motorized trails and temporary roads that the Forest Service attempted to close to motorized use and which have continued to be used by the public. Many user-created motorized trails originated as wheel tracks make by users seeking access to a destination with no route-design input. User-created motorized trails have usually no drainage and often include unsustainably steep gradients. User-

create motorized trails were not constructed, so their treads are in loose surface soils rather than well-compacted subsoil which better supports traffic and resists mechanical erosion. As topsoil is eroded, user-created motorized trails become entrenched. This concentrates runoff, causing additional entrenchment and erosion. Most user-created trails either are eroded, or will be eroded if not drained.

Most temporary roads were originally constructed for hauling timber. Some of these roads have a cut slope, a road prism and a fill slope. Temporary roads may have been engineered and may have a cut and fill slope, a road prism, and have compacted prisms and constructed watercourse crossings with culverts and fills. Maintaining drainage structures is the key to minimizing erosion on these roads. Temporary roads with native surfaces are particularly susceptible to damage by wet season use. These roads are generally less of a risk for causing soil erosion than true user created motorized trails because initially they were engineered and they have had drainage control installed.

In the Lower Trinity and Mad River Districts, approximately 69% of the unauthorized motorized routes are associated with temporary or abandoned roads and approximately 31% are associated with user-created trails. Roughly 66 miles (26%) of the inventoried motorized trails had signs of erosion (e.g. rilling or rutting) somewhere along the trail. The majority of the unauthorized routes have native (unsurfaced) road prisms that are potentially susceptible to tread wear and erosion.

Season of Use

The condition of native surface roads and motorized trails can quickly decline during winter or wet weather use due to rutting. Rutting is the process where soils are displaced and deform to the shape of the tire tracks that make their way through saturated soils. Rutting can occur if traffic enters the area before the soils have sufficient drying time to recover soil strength or bearing capacity to resist mechanical force. To some extent wet season damage can be influenced by soil type, but all soil types are susceptible to wet season use. “Higher risk routes” are most susceptible to damage by motor vehicles when wet. As noted above, 26% of these routes inventoried had signs of erosion due to presence of rutting or rilling. One of the primary causes of rutting was use of the trail when soils were saturated. Approximately 52 miles (20%) of unauthorized motorized routes are accessible year round and are limited to routes under 3000 ft in elevation. Year round access, especially during the wet season increases the likelihood of rutting and erosion. Generally speaking, access above 3000 feet for all Six Rivers NFTS roads and trails is seasonally restricted due to snow which prohibits access.

Existing Cross Country Travel

As discussed above, many user-created motorized trails were not constructed to NFTS standards. These trails do not have erosion control structures to control runoff water, are not maintained and are at higher risk routes in terms of erosion and water quality risks. Generally, the more un-maintained unauthorized motorized trail use there is in a watershed, the higher the risk to soil and watershed resources. Cross-country travel has resulted in 255 miles of unauthorized motorized trail use in the Lower Trinity and Mad River Ranger Districts. Approximately 66 miles (26%) of unauthorized motorized routes have erosion concerns based on field data collected and 4 miles (2%) of unauthorized motorized routes have potential erosion concerns based on high EHR and steep slopes based on GIS data.

3.4.5 Environmental Consequences

This analysis is focused on the effects of three actions: (1) the prohibition of cross country travel, (2) additions of travel routes to the National Forest Transportation System (NFTS), (3) changes to the class of vehicle and/or season of use on the NFTS.

Cross-country motorized vehicle travel increases the amount of native surface motorized trails. The motorized trails being considered for addition to the Six Rivers NFTS are native surface routes that currently exist on the ground, so the hydrologic footprint of the trails already exists. The primary changes considered in this analysis are the prohibition of cross country travel, changes in miles of motorized use on existing trails and season of use. The focus of the analysis is on native surfaced routes where effects on soils and watershed resources are most likely to occur.

See the effects methodology section above regarding how this analysis was conducted.

Direct and Indirect Effects to Soil Resources Common to all Alternatives

Direct impacts to soils and adjacent watersheds that result from this project are limited. There are no new ground disturbing activities proposed with this project. The unauthorized motorized trails being evaluated in this analysis already exist on the ground, but may require upgrading to NFTS standards as well as maintenance. They are compacted and generally lack vegetation. Runoff from the surface is collected and discharge as potentially erosive flows at points below the road. Some are eroded or causing erosion, other are stable and are not causing any negative resource impacts.

From the standpoint of soil productivity and growing vegetation, these routes are already non-productive and the direct effects to soil productivity have already occurred. Therefore, on these unauthorized motorized trails, the potential effects on soil and watershed resource are related to sustaining motorized trail function, protecting adjacent soils from runoff and gully erosion, protection water quality, or restoring the routes to a productive state. It should be noted that most motorized roads and trails within the Lower Trinity and Mad River Districts have some site specific risk to soil and water resources. Many of these risks can be mitigated.

Prohibiting motorized use on native surface trails may result in less erosion to the extent the recurrent disturbance of the soil surface by users is the primary cause of erosion. In many circumstances however, erosion and subsequent sediment delivery to water bodies is the result of a combination of factors including motorized use, season of use, a lack of drainage and maintenance, and poor trail design or location.

The primary concern or effect of this project on soil resources are indirect effects associated with the potential for soil erosion and subsequent effects on-off trail soil productivity or the ability of the soils to produce vegetation. Secondary effects from erosion are the loss of soil depth, infiltration capacity and permeability or in other words, a reduction in soil hydrologic function, which can in turn affect aquatic resources (see Water Resources and Aquatic Biota sections). Because this analysis covers existing wheel tracks, the direct impacts to soil productivity, hydrologic function and soil buffering capacity have already taken place.

The erosion that may occur from the unauthorized motorized routes proposed for addition to the NFTS is a concern regarding loss or degradation of the facility, but not a particular concern for the soil resource, because the roads and trails are dedicated to the NFTS and are no longer dedicated to growing vegetation. The effects analysis for the soil resource will therefore focus on the secondary (indirect) risk of soil erosion from trail runoff water to the soil adjacent to or down slope from the route. Erosion and sediment generated by the trail or road surface may be

a concern to water quality if there is the potential for its delivery to a stream course (see hydrology section).

All alternatives would have indirect effects on soils resources but they vary by alternative. Route designation would indirectly affect soil erosion and subsequent sediment delivery to streams to the extent that activities resulting from designation or closure (1) affect the season of use, (2) designation of routes in areas with highly erosive soils (e.g. High or Very High Erosion Hazard Rating) and (3) affect the potential for passive recovery and restoration.

The alternatives assess only passive restoration and do not include decommissioning or restoration for motorized trails not designated for motorized use and not added to the NFTS. A recent study (Poff, 2004) suggests that providing adequate drainage along with effective closure is a critical element in effectively restoring OHV-damaged areas. Without adequate drainage, many trails would continue to erode even if they could be effectively closed. Some unauthorized motorized trails not designated for use would most likely start to recover by slowly narrowing and regaining soil cover through either leaf litter or vegetative re-growth. Others would be used by other uses (mountain bikes, equestrian and hikers) and would probably remain on the ground in some form.

If use of the route ceases, in the short-term (five years or less), some native vegetation may establish on routes that have little soil compaction. It is likely that routes with moderate to heavy soil compaction will take more than five years to recover vegetation and some stable and moderately used trails will recover within twenty years. The most severely disturbed sites are not likely to recover without some type of active restoration.

The type of route affects the potential for passive recovery (e.g. no active restoration measures implemented). Forest Service temporary roads used as motorized trails would recover very slowly (25-30 years). Most fill slopes and cut slopes would re-vegetate in time, but compacted road prisms recover very slowly (decades) unless the surface is mechanically ripped. Most temporary roads would need to be fully decommissioned to restore site productivity in the short term.

In contrast, user created trails have the potential to recover faster because the trail is generally narrower than a constructed road, the compaction is not as deep, and the soils profiles have not been disturbed. Recovery of user created trails is quite variable and mostly depends on slope gradients. Generally, all temporary roads and motorized trails can be assumed to be compacted to the point where natural recovery would take decades. However, actively eroding user created motorized trails will continue to erode without adequate drainage. User created trails that occur on shallow soils and lack forest or brush cover would be more difficult to close effectively and would recover very slowly.

3.4.5.1 Alternative 1 – No action.

As described in Chapter 2 of this EIS, under the No-Action Alternative, current management plans would continue to guide management of the project area. No changes would be made to the current NFTS and no cross-country travel prohibition would be put into place. The Travel Management Rule would not be implemented and no MVUM would be produced.

1. **Cross Country Travel:** For Alternative 1, no prohibition would be established for motorized vehicle travel off designated NFS roads, NFS trails and areas by the public. Motor vehicle travel would not be limited to designated routes.

2. **Routes Added to the Existing NFTS:** No new NFTS facilities would be added. The agency would take no affirmative action on any unauthorized routes and they would continue to have no status or authorization as NFTS facilities.
3. **Changes to the existing NFTS:** There will be no changes to the existing NFTS including changing the vehicle class and season of use for existing facilities.

Direct/Indirect Effects

Indicators: Miles of unauthorized routes displayed by miles in each of the R-5 Erosion Hazard Ratings (EHR)

1. **Cross-Country Travel**

Under Alternative 1, cross country motorized travel would be permitted on the Six Rivers National Forest areas beyond the authorized motorized NFTS. Approximately 36 miles of existing motorized trails on the Mad River NFTS and 255 miles of unauthorized motorized trails on the Lower Trinity and Mad River Districts would be available for public use. Direct effects to loss in soil productivity have already occurred. Past cross-country motorized travel on unauthorized routes has resulted in soil compaction and erosion of the A-horizon portion of soil profiles to the point where vegetation productivity in the disturbed areas is significantly reduced. Indirect effects such as existing and potential for erosion occur under this alternative. There are approximately 66 miles of unauthorized motorized routes that have signs of erosion (e.g. rilling or rutting) on some portion(s) of the route. Erosion is expected to continue associated with continued motorized use.

Depending upon the inherent characteristics of the soils, each route will have differing susceptibility to soil erosion. Table 3.4-5 shows 125 miles of unauthorized motorized trails have high erosion hazard rating (EHR), and 129 miles have a moderate to low EHR. Effects to soils resources include likely continued direct loss in soil productivity associated with continued proliferation of user created routes resulting in soil compaction and continued indirect effects associated with off site soil erosion and impacts to watershed resources.

In the short-term (considered to be a 1-year timeframe for the purposes of this analysis), the unauthorized motorized routes would not change because these routes would still be open to motorized traffic. Long-term recovery (25-30 years) of soil vegetation productivity would be unlikely to occur in the absence of a cross-country travel prohibition. In a few areas where motorized use is limited and if motorized use declined over the long-term, there is the likelihood that some trails would recover over time. However, without a defined prohibition, it is difficult to predict how many routes would recover over the long-term.

Routes Added to the Existing National Forest System

There are no direct and indirect effects of adding motorized routes to the existing NFTS because under this alternative no motorized trails would be added to the NFTS.

2. **Changes to the Existing NFTS**

There are no direct and indirect effects of changing the existing NFTS because under this alternative no changes are proposed to the existing NFTS.

Cumulative Effects

When compared with the Action Alternatives, no long-term (25-30 year) benefit to soil resources would occur under the No Action Alternative because motorized use would be allowed on all unauthorized routes and there would be no prohibition of cross country travel. There is a high likelihood of added cumulative effects on soils associated with the likely proliferation of unauthorized user-created trails and the inability to adequately maintain these routes to reduce off-site impacts associated with soil erosion. Under this alternative, there are a total or cumulative of 2 miles of routes (existing motorized routes in NFTS and unauthorized motorized routes) that have a high risk of having potential damage to the motorized facility (erosion and/or rutting of tread surface) and off-site impacts. There are a total or cumulative 71 miles of routes that are a low risk of having facility damage and off-site impacts.

3.4.5.2 Alternative 2 – Proposed Action.

Under this alternative, changes would be made to the current NFTS through additions and changes to vehicle class and season of use of selected motorized trails and a cross-country travel prohibition would be put into place which would prohibit use on unauthorized motorized routes not added to the NFTS. The Travel Management Rule would be implemented and a Motorized Vehicle Use Map (MVUM) would be produced.

1. **Cross Country Travel:** For Alternative 2, motorized vehicle travel off designated NFTS roads and trails by the public except as allowed by permit or other authorization will be prohibited on 198 miles of routes.
2. **Routes Added to the Existing National Forest System:** For Alternative 2, a total of 57 miles of existing, unauthorized routes are proposed to be added to the NFTS as open to motorcycles, ATVs, a combination of these two vehicle types, or all vehicles.
3. **Class of Vehicle/Season of Use:** For Alternative 2, approximately 6 miles of existing NFTS motorized trails would no longer be accessible to motorized users. Wet weather seasonal restriction between November 1 and May 30 will occur on selected motorized routes added to the NFTS that had evidence of erosion and risk of erosion. Additional changes to existing NFTS regarding seasonal restrictions for wildlife values, dual and/or mixed use for selected designated trails and existing NFTS roads will not be assessed as they do not affect soils resources.

Direct/Indirect Effects

Indicators: (1) miles of unauthorized routes displayed by miles in each of the R-5 EHR ratings; (2) miles of routes by potential to passively recover (high, low) and (3) miles of motorized trail facility routes with high or low risk to trail tread and off-site impacts associated with additions to NFTS.

1. **Cross-Country Travel**

Under Alternative 2, unauthorized motorized cross-country travel would be prohibited including the prohibition of motorized use on unauthorized motorized routes. The effect of the prohibition on cross-country travel would be to end motorized traffic on Lower Trinity and Mad River Districts beyond the authorized NFTS. Under Alternative 2, approximately 198 miles of unauthorized motorized routes on the Lower Trinity and Mad River Districts would be prohibited.

General direct and indirect affects of unauthorized motorized routes were previously discussed in the soil resources section common to all alternatives and include loss of soil site

productivity through soil compaction (past effect during creation of unauthorized motorized routes) and offsite soil productivity through erosion (current indirect effect). Table 3.4-5 shows the range of high and moderate erosion hazard rating for the 198 miles of unauthorized trails that will not be added to the Lower Trinity and Mad River District NFTS. Routes that have a high EHR and Watershed Risk Rating have a greater potential for continued indirect, off-site impacts to soils and watershed resources even with a cross country prohibition. Specific to this alternative, approximately 97 miles (out of the 198 miles of these unauthorized routes not to be added to the NFTS) are in soils types having a high inherent erosion hazard rating.

Passive recovery is expected to be variable on the unauthorized motorized trails not added to the NFTS as determined by past field surveys of abandoned roads and trails. Previous road inventories on abandoned system and non-system roads on the Six Rivers National Forest indicate that depending on the location and steepness of the road, indirect effects of soil erosion are quite variable. Despite compaction of the A horizon, vegetation regrowth is typically not limited due to the high level of winter precipitation and moderate to high water holding capacity of many of the soil families within the analysis area. However, field evidence indicates that on-site and offsite soil erosion will continue to occur, particularly on steep routes that have not been winterized (waterbarred). Active restoration or obliteration of unauthorized routes (e.g. waterbarring, out-sloping and recontouring routes) is not part of this alternative. Much of the on-site and off-site erosion and impacts to soils resources that has occurred to date as a result of these unauthorized routes will remain over the long term.

There are approximately 41 miles of unauthorized motorized routes that have some signs of erosion on portions of the routes that will not be mitigated or actively restored. Passive recovery of portions of these routes could take decades due to ongoing untreated erosion. Approximately 11 miles of unauthorized motorized routes have a low likelihood of passively recovering in the long term (25-30 years) due to a combination of inherent soil characteristics (e.g. inherently erosive soils, steep slope, trail width, and existing erosion or rutting). Approximately 17 miles of unauthorized motorized routes have a high likelihood of passively recovering in 25-30 years based on their location in gentle terrain and lack of evidence of existing erosion. Vegetation regrowth on these routes is anticipated to accelerate over time and further reduce the risk of soil erosion. Stems that grow on the route surface will intercept surface runoff, slowing and shortening the flow path to reduce the occurrence of concentrated runoff that leads to on-site and off-site erosion and impacts to watershed resources.

2. **Routes Added to the Existing National Forest System**

Under Alternative 2, approximately 57 miles of existing unauthorized routes will be added to the Lower Trinity and Mad River NFTS. Under this alternative, varying degrees of rilling and rutting erosion occur on 52 (25 miles) of the unauthorized motorized routes proposed to be added. These routes are shown in Table 3.4-4. All routes with signs of erosion as indicated by rilling or rutting will have water bars installed to disperse water and reduce risk of erosion and offsite impacts.

Table 3.4-4: Unauthorized motorized routes to be added to NFTS that have rilling or rutting

JM-2027	0.19	MM791	0.83	MM845	0.14
JM-2028	0.05	MM792	0.93	MM848	0.40
JM-2079	3.14	MM800	0.85	MM849	0.50
JM-2085	0.89	MM813	0.52	MM850	0.32

JM-2087	1.18	MM815	0.22	MM852	0.28
JM-2098	0.33	MM817	0.82	MM853	0.30
JM714	0.07	MM826	0.49	PK813	0.04
JM913	0.48	MM828	0.47	PK820	0.07
JM914	0.09	MM830	0.35	Pk889	0.21
JM915	0.61	MM832	0.17	SS85	0.75
JM918	0.07	MM833	0.13	SS87	0.54
JM919	0.06	MM835	1.29	TH108	0.18
JM947	1.83	MM836	0.19	TH214	0.23
JM952	0.40	MM838	0.54	TH267	0.20
JM955	0.42	MM839	0.93	TH288	0.15
JM982	0.22	MM842	0.48	TH349	0.23
M811	0.2	MM843	0.17		
MM790	0.64	MM844	0.14		
Grand Total		24.97 miles			

Table 3.4-5 shows the range of erosion hazard ratings associated with trails proposed to be added to the NFTS. Approximately 28 miles of routes to be added have a high erosion hazard risk rating which indicates that there is the potential for tread wear of the facility. The remaining 29 miles of routes to be added to the NFTS have a moderate to low erosion hazard rating. While there is the risk of off-site impacts to soils and aquatic resources associated with erosion of the motorized trail, the potential for impacts to watershed resources has been significantly lowered when compared to Alternative 1. Many routes have the potential to erode but are not located near a stream channel. Nevertheless, even if there is not a risk to water quality, then there is risk to off-site soil resources associate gullying and loss in off-site soil productivity.

When adding an unauthorized motorized route to the NFTS as a motorized trail it is important to understand what risks those routes will have regarding tread wear and loss of usability of the facility (e.g. erosion, rilling, gullying etc) and the off-site effects of the tread wear. To examine these risks, each route to be added to the NFTS was assessed relative to gradient, erosion hazard rating, signs of erosion, and whether or not the route had the potential for year round (wet season) access. When these factors were assessed together (see Table 3-4 – assumptions/methods), none of the routes to be added had a high risk to the facility or off-site resources and 6 miles of routes had a low risk to the facility. When this modeled data was compared to field data, approximately 25 miles of motorized routes proposed to be added had signs of erosion or tread wear (rilling or rutting). Approximately 14 miles of these routes to be added have the potential to deliver to water course (some portion of the routes are located within riparian reserves) and all of these routes have mitigations proposed to reduce facility tread-ware and off-site erosion through either maintenance of existing waterbars or installation of new waterbars. Only 14 routes (6 miles) have the potential for year round access because they are below the winter snow line (below 3000 ft elevation).

In summary, generally speaking, approximately half of unauthorized routes to be added to the NFTS have signs of erosion (rilling or rutting). Nevertheless, when erosion is combined with gradient, EHR, and potential for year round access, the majority of routes have a moderate risk of facility damage (onsite and offsite) and future maintenance, which has the potential to be reduced to a low risk with mitigations and maintenance.

3. **Changes to the Existing NFTS**

Under Alternative 2, there are two motorized trails proposed to be changed from motorized use to non-motorized use: trail 6E27 (Devils Backbone 1.55 mi) and trail 7E04 (Bradburn 4.56 mi). By changing this use, a total of 6.11 miles of existing motorized trail would be converted to horse/foot trails. The effects of this change in use would not measurably change the effects to soils resources since the trails would still exist for horse back and mountain bike use. The trails would still need to be maintained and still have potential for off-site impacts to soil resources if erosion were to occur on these trails. Currently neither trail has signs of erosion or off-site soil resource impacts.

Cumulative Effects

Under Alternative 2, there is a long-term (25-30 year) benefit to soil resources because motorized use would be prohibited on 198 miles of existing unauthorized routes. With a cross-country prohibition, there is much less likelihood of added cumulative effects on soils associated with proliferation of unauthorized user-created trails and associated impacts to soil resources. Under this alternative there are no routes (existing motorized trails in NFTS and unauthorized motorized routes) that have a high risk of having potential damage to the motorized facility (erosion and/or rutting of tread surface) and off-site impacts. There is a total or cumulative 13 miles of routes that are a low risk of having facility damage and off-site impacts.

3.4.5.3 Alternative 3 – Expanded Recreation.

Under this alternative, changes would be made to the current NFTS through additions and deletions of selected motorized trails and a cross-country travel prohibition would be put into place for those unauthorized motorized routes not added to the NFTS. The Travel Management Rule would be implemented and a Motorized Vehicle Use Map (MVUM) would be produced.

1. **Cross Country Travel:** For Alternative 3, motorized vehicle travel off designated NFTS roads and trails by the public except as allowed by permit or other authorization will be prohibited on 190 miles of routes.
2. **Routes Added to the Existing National Forest System:** For Alternative 3, a total of 64 miles of existing, unauthorized routes are proposed to be added to the NFTS as open to motorcycles, ATVs, a combination of these two vehicle types, or all vehicles.
3. **Class of Vehicle/Season of Use:** For Alternative 3, approximately 6 miles of existing NFTS motorized trails would no longer be accessible to motorized users. Wet weather seasonal restriction between November 1 and May 30 will occur on selected motorized routes added to the NFTS that had evidence of erosion and risk of erosion. Additional changes to existing NFTS regarding dual and/or licensed use for selected designated routes will not be assessed as they do not affect soils resources.

Direct/Indirect Effects

Under Alternative 3, the direct and indirect affects to soil resources would be very similar to Alternative 2. Roughly 8 additional miles of unauthorized motorized trails will be added to the NFTS as compared to Alternative 2 to facilitate additional motorized recreational opportunities on the Lower Trinity and Mad River Districts. Under Alternative 3, the miles of routes with high EHR that will be prohibited from motorized travel will drop from 97 to 91 (see table 3.4-5). The

miles of routes that have a low and high potential to passively recover under the prohibition does not change between alternative 2 and 3. Of the 8 additional miles of unauthorized routes to be added to the NFTS as motorized trails, 4 of the routes have existing erosion on some portion of the route that will require installation of waterbars (routes JM722, PK751, MM821, MM825). The installation and maintenance of waterbars should provide for sufficient water dispersal to avoid future erosion. The majority of additional routes to be added to the NFTS under alternative 3 do not have existing erosion.

Approximately 7 miles of additional miles of motorized trail will be added to the NFTS having a high EHR. Nevertheless, these miles of trails have only a moderate risk of tread wear (facility damage) and off-site soil risk based on presence of erosion and slope steepness. Changes to the existing NFTS are the same under this alternative as in Alternative 2 and will not influence soil resources.

Cumulative Effects

Under Alternative 3, there is a long-term (25-30 year) benefit to soil resources because motorized use would be prohibited on 191 miles of existing unauthorized routes. With a cross-country prohibition, there is much less likelihood of added cumulative effects on soils associated with proliferation of unauthorized user-created routes and associated impacts to soil resources. Under this alternative there are no routes (existing motorized trails in NFTS and unauthorized motorized routes) that have a high risk of having potential damage to the motorized facility (erosion and/or rutting of tread surface) and off-site impacts. There are a total or cumulative 7 miles of routes that are a low risk of having facility damage and off-site impacts.

3.4.5.4 Alternative 4 – Prohibition of Cross Country Travel.

Under Alternative 4, current management plans would continue to guide management of the project area. No changes would be made to the current NFTS and a complete cross-country travel prohibition would be put into place. The Travel Management Rule would be implemented and a MVUM would be produced showing no additions to the NFTS.

1. **Cross Country Travel:** For Alternative 4, a prohibition would be established for all motorized vehicle travel off designated NFS roads, NFS trails and areas by the public. Motor vehicle travel would be limited to designated trails currently on the NFTS.
2. **Routes Added to the Existing NFTS:** No new NFTS facilities would be added. None of the 255 miles of inventoried, unauthorized motorized trails would be placed on the NFTS.
3. **Changes to the existing NFTS: Class of Vehicle/Season of Use:** Wet weather seasonal restriction between November 1 and May 30 will occur on selected motorized routes added to the NFTS that had evidence of erosion and risk of erosion. Additional changes to existing NFTS regarding dual and/or licensed use for selected designated routes will not be assessed as they do not affect soils resources.

Direct/Indirect Effects

Under this alternative, the direct and indirect effects to soils due to a cross country travel prohibition would be the same as describe in Alternatives 2 and 3 except that the prohibition would apply to 255 miles as opposed to 198 and 191miles under Alternatives 2 and 3 respectively. Under this alternative, a greater number of miles of routes would have the potential

to passively recover in the long term. The miles of routes that have a high or low potential to passively recover does not vary significantly between the Action Alternatives as is shown in Table 3.4-5. The ability to passively recover is based largely on inherent site characteristics such as soil erosion hazard rating and slope steepness as well as presence of active erosion. Routes that have existing erosion will take longer to passively recover than routes that do not have existing erosion. Approximately 66 miles of unauthorized motorized routes have existing erosion on some portion of the route and under this alternative mitigation measures will not be included in the prohibition to reduce off-site impacts to soil resources.

Cumulative Effects

Under Alternative 4, there is a long-term (25-30 year) benefit to soil resources because motorized use would be prohibited on 255 miles of existing unauthorized routes. With a cross-country prohibition, there is much less likelihood of added cumulative effects on soils associated with proliferation of unauthorized user-created routes and associated impacts to soil resources. Under this alternative there are no routes (existing motorized trails in NFTS and unauthorized motorized routes) that have a high risk of having potential damage to the motorized facility (erosion and/or rutting of tread surface) and off-site impacts. There is a total or cumulative 6 miles of routes that are a low risk of having facility damage and off-site impacts.

3.4.6 Summary of Soils Effects Analysis Across All Alternatives

Effects to soil resources are summarized by ranking each indicator for each alternative. Table 3.4-5 provides the numeric value of the indicator and the relative ranking among alternatives in parenthesis. Higher ranks (4) indicate more benefits and/or less adverse effects to soil resource for that alternative and lower ranks (1) indicate least benefits and/or most adverse effects to soil resources). Rankings are average for each alternative.

Table 3.4-5: Comparison of Effects to the Soil Resource by Miles

Indicators - Soil Resource	**Rankings of Alternatives for each Indicator**			
	Alternative 1 – No Action	**Alternative 2 – Proposed Action**	**Alternative 3**	**Alternative 4**
Unauthorized Use – Prohibition of Cross Country Travel				
Miles of routes prohibited to public by EHR (high, mod, low)	0 miles (1)	High EHR – 97 Mod EHR – 81 Low EHR - 20 (3)	High EHR – 90 Mod EHR – 81 Low EHR - 19 (2)	High EHR – 125 Mod EHR – 104 Low EHR - 26 (4)
Miles of routes prohibited to public with passive recovery potential (high vs low)	0 miles (1)	Low recovery potential –9 High recovery potential – 21 (2)	Low recovery potential – 9 High recovery potential – 21 (2)	Low recovery potential – 17 High recovery potential – 19 (4)
Adding Routes to NFTS				
Miles of routes open to public by EHR (high, mod, low)	High EHR – 125 Mod EHR – 103 Low EHR - 26 (1)	High EHR – 28 Mod EHR – 22 Low EHR - 6 (3)	High EHR – 35 Mod EHR – 23 Low EHR - 7 (2)	0 miles (4)
Miles of unauthorized routes open to public having potential of facility damage and offsite impacts (high vs. low)	High Risk – 2 Low Risk - 56 (1)	High Risk – 0 Low Risk -6 (3)	High Risk – 0 Low Risk - 6 (3)	0 miles (4)
Changes to existing NFTS				
Miles of motorized trails open to public by EHR (high, mod, low)	Mod EHR – 4.6 Low EHR - 1.4 (1)	0 miles **(2)**	0 miles **(2)**	Mod EHR – 4.6 Low EHR - 1.4 **(1)**
Miles of motorized trails open to public having potential of facility damage and offsite impacts (high vs low)	High Risk – 0 Low Risk – 6 (1)	0 miles (2)	0 miles (2)	High Risk – 0 Low Risk – 6 (1)
Soils Cumulative Effects				

Soils Cumulative Effects –Total miles of routes and trails with potential for facility damage and offsite impacts	High risk – 2 Low risk – 71 (1)	High Risk – 0 Low Risk – 13 (3)	High Risk – 0 Low Risk – 7 (2)	High Risk – 0 Low Risk – 6 (4)
AVERAGE RANKING FOR SOIL RESOURCE	**1**	**2.6**	**2.4**	**3.1**

3.4.6.1 Comparison of Alternatives:

Comparing the soil resource indicators in Table 3-7 shows that there is not a significant difference to soil resources among the action alternatives. While Alternative 4 shows the least impacts to soils resources due to the complete prohibition of motorized trails on all 255 miles of unauthorized routes, the effects to soils resources are not that substantially different to those in Alternatives 2 and 3. The direct affect to the soils resources has already occurred and is similar under all alternatives. The main difference between the action alternatives is the ability of the unauthorized routes to passively recover under the prohibition of cross country travel, because the extent of the prohibition varies by action alternative. Because the ability to passively recover is based on existing erosion and inherent site characteristics (e.g. slope steepness, erosion hazard rating) and due to the fact that there is no active restoration proposed in the action alternatives, there is not a large difference between the action alternatives.

When considering the full array of prohibition, additions and changes to the NFTS, Alternative 4 has the least impact to soil resources and Alternative 1 the greatest. Under Alternative 4, there would be the least likelihood of indirect and off-site impacts due to the prohibition and associated lack of increased motorized tread wear and off-site impacts from these trails. There are only slight differences to soils resources between Alternative 2 and 3.

3.4.7 Compliance with the Forest Plan and Other Direction

A list of Standards and Guidelines and Best Management Practices that apply to this project are included in Appendix B of the DEIS. All Standards and Guidelines and BMPs apply to Alternatives 2 and 3. Mitigation measures were proposed to have compliance with the Forest Plan and Clean Water Act. Alternative 1 would not be in compliance with the Forest Plan and Clean Water Act. Alternative 1 is the No-Action alternative and would not prohibit cross-country travel. If No-Action is performed then the existing routes that are currently in the project area and are not a part of the NFTS then these routes would not be mitigated. Alternative 4 is only using roads and trails that are already a part of the NFTS. Similar to Alternative 1, the existing routes that are not a part of the NFTS would not be mitigated. At the time the existing NFTS trails were constructed they were in compliance with the planning direction at the time. As reconstruction occurs on the NFTS, these routes through time would be reconstructed in compliance with the Forest Plan and Clean Water Act. Sedimentation is controlled through

implementation of BMPs and the potential for off-site impacts to soil resources is significantly reduced. Abnormally high intensity, magnitude and duration storm events may result in impacts to the facility and off-site soils impacts, regardless of implementation of BMPs.

3.5 Water Resources

Protection of water quantity and quality is an important part of the mission of the Forest Service (Forest Service Strategic Plan for 2007 to 2012, July 2007). Management activities on National Forest System (NFS) lands must be planned and implemented to protect the hydrologic functions of forest watersheds, including the volume, timing, and quality of streamflow. The use of roads, trails, and other areas on national forests for public operation of motor vehicles has potential to affect these hydrologic functions through interception of runoff, compaction of soils, and detachment of sediment (e.g., Foltz, 2006). Management decisions to eliminate cross-county motor vehicle travel, add new routes and areas to the National Forest Transportation System (NFTS), and make changes to the existing NFTS must consider effects on watershed functions. The important water quality parameter that most influence the beneficial uses for the affected watersheds is sediment.

This section describes the areas potentially affected by the alternatives and existing resource conditions. This analysis includes all 6th field watersheds located within the Lower Trinity and Mad River Ranger Districts of the Six Rivers National Forest that contain unauthorized routes. Mainstem Rivers within the analysis area include Trinity and South Fork Trinity, Mad, North Fork Eel, and Upper Van Duzen Rivers.

3.5.1 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

Direction relevant to the proposed action as it affects water resources includes:

Clean Water Act of 1948 (as amended in 1972 and 1987) establishes as federal policy the control of point and non-point pollution and assigns the States the primary responsibility for control of water pollution. Compliance with the Clean Water Act by national forests in California is achieved under state law (see below).

Non-point source pollution on national forests is managed through the Regional Water Quality Management Plan (USDA Forest Service, Pacific Southwest Region, 2000), which relies on implementation of prescribed Best Management Practices (BMPs). The Water Quality Management Plan includes one BMP for OHV use (4-7) and 28 BMPs related to road construction and maintenance (2-1 to 2-28) (See Appendix F). All NFS roads and trails open to OHV use are required to comply with these BMPs.

Of particular relevance for motor vehicle travel management, BMP 4-7 requires each forest to: (1) identify areas or routes where OHV use could cause degradation of water quality, (2) identify appropriate mitigation and controls, and (3) restrict OHV use to designated routes. This BMP further requires forests to take immediate corrective actions if considerable adverse effects are occurring or are likely to occur.

The California Water Code consists of a comprehensive body of law that incorporates all state laws related to water, including water rights, water developments, and water quality. The laws related to water quality (sections 13000 to 13485) apply to waters on the national forests and are directed at protecting the beneficial uses of water. Of particular relevance for the proposed

action is section 13369, which deals with nonpoint-source pollution and best management practices.

The Porter-Cologne Water-Quality Act, as amended in 2006, is included in the California Water Code. This act provides for the protection of water quality by the State Water Resources Control Board and the Regional Water Quality Control Boards, which are authorized by the U.S. Environmental Protection Agency to enforce the Clean Water Act in California.

The Northwest Forest Plan (NWFP) Aquatic Conservation Strategy (ACS) includes standards and guidelines that apply to the 6 forests included entirely or partially within the NWFP. Components of the ACS include Riparian Reserves, Key Watersheds, Watershed Analysis and Watershed Restoration. Watershed analysis is required in Key Watersheds, for roadless areas in non-Key Watersheds and Riparian Reserves before determining how the proposed action meets the ACS objectives. The ACS standards and guidelines require that a watershed analysis be completed that determines the influence of each road on ACS objectives, and that roads be designed to minimize impacts on riparian and aquatic resources. Construction of new roads in wetlands is prohibited. No net increase in the amount of roads is permitted in Key Watersheds. Adding unauthorized routes to the NFTS in meadows or wetlands constitutes road construction, and should be avoided. Stream crossings are required to be designed to pass a 100-year flood and allow for passage of aquatic fauna.

USFS REGION 5 Best Management Practices for OHV use and road construction and maintenance (from Regional Water Quality Management Plan, 2000). Water Quality Monitoring of Off-Highway Vehicle (OHV) Use According To a Developed Plan (PRACTICE: 4-7 pg 101)

1. Objective: To provide a systematic process to determine when and to what extent OHV use will cause, or is causing adverse effects on water quality.
2. Explanation: Each Forest's OHV plan will:

    a) Identify areas, or routes where OHV use could cause degradation of water quality.
    b) Establish baseline water quality data for normal conditions as a basis from which to measure change.
    c) Identify water quality standards and the amount of change acceptable.
    d) Establish monitoring methods and frequency.
    e) Identify controls and mitigation appropriate in management of OHV's.
    f) Restrict OHV use to designated routes.

3. Implementation: Monitoring results are evaluated against the OHV plan objectives for water quality and the LRMP objectives for the area. These results are documented, along with the actions necessary to correct identified problems.

If considerable adverse effects are occurring, or are likely to occur, immediate corrective action will be taken. Corrective actions may include, but are not limited to, reduction in the amount of ORV use, signing, or barriers to redistribute use, partial closure of areas, rotation of

use on areas, closure to causative vehicle type(s), or total closure, and structural solutions, such as culverts and bridges. Closure is accomplished through authority of the Forest supervisor.

3.5.2 Effects Analysis Methodology

3.5.2.1 Water Resources Methodology by Action:

1. **Direct/indirect effects of the prohibition of cross-country motor vehicle travel**

The major effects of cross-country motorized travel and route proliferation on water resources include increase of peak flows and sediment loads due to compacted and unvegetated route surfaces and detachment of sediment by vehicles. The effect of the prohibition on cross-country motor vehicle travel would be to end traffic on routes and areas beyond the authorized NFTS. In the short term, the unauthorized routes and areas disturbed by motor-vehicle use would not change much because removal of vegetation, compaction of soils, and alteration of drainage patterns require time to heal without active restoration. Elimination of traffic on unauthorized routes and areas will reduce erosion, but the routes will still intercept and concentrate surface flows and produce sediment with the potential to impact water quality. In the long term, some or all unauthorized routes and areas would probably revegetate and regain some of their hydrologic and geomorphic functions, although use of these routes by non-motorized vehicles could delay or prevent recovery.

Short-term timeframe: 1 year.

Long-term timeframe: 25-30 years

Spatial boundary: Lower Trinity and Mad River Ranger Districts.

Indicator(s): (1) Miles of routes by Watershed Risk Rating (high, moderate, low) (2) Number of route-stream crossings (3) Miles of unauthorized routes located in Riparian Reserves.

Methodology and Assumptions: Almost all of the unauthorized route locations were tracked in the field using global positioning system (GPS). The protocol for collection of data for the unauthorized routes used GPS technology to determine the locations of most routes not currently on the NFTS for which evidence of recent use by motor vehicles was apparent. All existing unauthorized routes that were proposed to the ID Team for evaluation as potential opportunities to expand the motorized trail facilities on the Forest and that are located within sensitive hydrologic areas (approximately 39 miles) were reviewed on the ground by Forest Service Earth Scientists. The review of unauthorized routes documented existing erosion, delivery potential, diversion potential and hydrologic connection to stream channels. A Watershed Risk Ratings (high, moderate, low) system was developed to summarize the route specific data collected in the field. GIS analysis completed the data gaps when field inventories were not conducted. Miles of routes located within Riparian Reserves were calculated by using GIS to overlay the National Forest coverage of Riparian Reserve polygons and the unauthorized routes. Numbers of route-stream crossings were estimated using GIS to overlay the mapped crenulated stream network with the unauthorized routes inventory to determine when the route crossed a stream channel. The assumption was made that unauthorized routes in the High Watershed Risk Rating, or

located within Riparian Reserves and that crossed stream channels would continue to erode and result in off-site impacts. The table below outlines the assumptions and methods used to determine risk to water resources of imposing or not imposing a prohibition of cross-country travel to the NFTS.

Rationale: Published studies (see Reference section) have documented that erosion of native-surface roads is increased by traffic.

2. **Direct/Indirect effects of adding facilities**
(currently unauthorized roads, trails, and/or areas) to the NFTS, including identifying seasons of use and vehicle class.

Short-term timeframe: 1 year.

Long-term timeframe: 25-30 years

Spatial boundary: Lower Trinity and Mad River Ranger Districts.

Indicators: (1) Miles of routes added by Watershed Risk Rating (high, moderate, low) (2) Number of added route-stream crossings (3) Miles of unauthorized routes added in Riparian Reserves

Methodology and Assumptions: Unauthorized routes located within sensitive hydrologic areas (approximately 38 miles) were investigated on the ground by Forest Service Hydrologists and Geologists. The review of unauthorized routes documented existing erosion, delivery potential and hydrologic connection to stream channels. A Watershed Risk Ratings (high, moderate, low) system was developed to summarize the route-specific data collected in the field. GIS analyses were used to evaluate route conditions for route segments that were not visited in the field (approximately 19 miles). Miles of routes located within Riparian Reserves were calculated using GIS to overlay the National Forest coverage of Riparian Reserve polygons on the routes. Numbers of route-stream crossings were estimated using GIS to overlay the mapped crenulated stream network with the unauthorized routes inventory to determine locations where routes cross stream channels. The assumption was made that unauthorized routes in the High Watershed Risk Rating, or located within Riparian Reserves and with stream channel crossings would continue to erode and result in off-site impacts. The table below outlines the assumptions and methods used to determine risk to water resources of adding unauthorized routes to the NFTS.

Table 3.5-1: Watershed risk rating - assumptions and methods used to determine rating of all unauthorized routes.

High Risk Characteristics	Moderate Risk Characteristics	Low Risk Characteristics
Lower Valley to Middle Hillslope Position (field and GIS). Within Riparian Reserve (field and GIS). Actively eroding (evidence of	Middle Hillslope Position (field and GIS). Not in Riparian Reserve (GIS) or Less than 3 stream crossings (field and GIS). No erosion (no evidence of soil	Upper, (near ridgetop) Hillslope Position (field and GIS). Not in Riparian Reserve (field and GIS). No active erosion (No evidence of soil movement) (field).

soil movement) (field). Sediment delivers to streamcourse (field). More than 3 stream crossings (field and GIS). Crosses unstable terrain (earthflow) but not in toe zone (field and GIS).	movement) (Field). Potential for sediment delivery to streamcourse (field). Crosses unstable terrain (earthflow) but not in toe zone (field and GIS).	No sediment delivery potential to streamcourse (field). No stream crossings (field and GIS). Not on unstable terrain (field and GIS).

Rationale: Published studies (see Reference section) have documented that routes located in riparian reserves or cross stream channels can negatively impact water quality.

3. **Changes to the existing NFTS [this can include deletions of facilities and changing the vehicle class and season of use]**

Indicators: (1) Miles of motorized routes changed to non-motorized use (2) Miles of unauthorized routes co-located on existing NFTS roads.

Methodology and Assumptions: It is assumed that changes to the existing NFTS will not have additional impacts to water resources because no additional ground disturbance is expected to occur as a result of the changes to the existing NFTS. Changes to the NFTS include authorizing use on roads currently closed to public use (maintenance level 1 roads). Miles of routes changed to non-motorized use would still permit horse and foot traffic but impacts to water resources would be less, primarily because trail wear and width are less when compared to motorized use .

Cumulative Effects

Short-term timeframe: not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 25-30 years.

Spatial boundary: All 6th field watersheds that contain unauthorized routes on the Lower Trinity and Mad River Ranger Districts. There are 27 6th field watersheds that contain unauthorized routes. To date, 7th field watersheds (which are nested in 6th watersheds) have not been completely delineated across the Forest. Analyzing at the smaller 7th field scale may give a more refined measure of cumulative effects as it relates to the threshold of concern, however, preliminary results suggest that the cumulative effects at the 6th field watershed scale are well below the threshold of concern.

Indicator(s): Equivalent roaded areas in acres.

Methodology: The Forest Service in Region 5 has adopted the Equivalent Roaded Acres (ERA) model as a method of addressing cumulative watershed effects. This model is designed as a preliminary indicator for managers to determine whether or not past and present land

management disturbances in a given watershed approach or exceed a threshold of concern (TOC). Acres of management disturbances such as; harvesting, road construction, grazing, wildfires on public and private lands were tallied for the past 30 years and assigned an ERA. 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 land management activities would adversely add to those effects and result in detrimental impacts to beneficial uses. See Appendix D, *Cumulative Watershed Effects Analysis Using R-5 ERA Model: Assumptions and ERA coefficients used in the Travel Management Assessment*, for a more information concerning the ERA model.

Rationale: The ERA cumulative effects model is the standard for Region 5, allows for an evaluation of all land-management activities on NFS lands, and provides for inclusion of reasonably foreseeable future activities.

3.5.3 Affected Environment

The Lower Trinity and Mad River Ranger Districts encompass 30 6th field watersheds, of which 27 contain unauthorized routes (See table below). All 27 watersheds are listed as water quality impaired under section 303(d) of the Clean Water Act for sediment and/or temperature. Key Watersheds in the analysis area include: Horse Linto Creek, Pilot Creek, South Fork Trinity River and North Fork Eel River. There are over 1,160 miles of intermittent and perennial streams, many of which support anadromous salmonids. Major rivers include: Trinity and South Fork Trinity, Mad, North Fork Eel, and Van Duzen Rivers. The Mad River is impounded by Matthews Dam (Ruth Lake) and is a barrier to anadromous fish. Threatened, endangered and Forest Service sensitive anadromous fish species are found in all watersheds.

The climate of these watersheds is hot and dry summers, with temperatures commonly above 100^{0} F, followed by cold and wet winters. The hydrology is rain dominated, with snow frequently accumulating above 3,000 feet elevation from November to June. Major winter storms (1964, 1972, 1977, 1982, 1997 and 2005) resulted in many road and culvert failures and subsequent sedimentation of important anadromous stream channels across the Forest. Occasional short duration, high intensity thunderstorms occur in the summer months. Mean annual precipitation ranges from 40 to 90 inches per year, most of it falling from October through April. Primary beneficial uses of water are municipal water use, fisheries and maintaining riparian systems, domestic supply, and recreation.

Table 3.5-2: Watershed Cumulative Effects analysis area

Watershed Name[1]	Watershed Acres
Grouse Creek	36,252
Hawkins-Sharber	6,693
Headwaters North Fork Eel River	32,982
Horse Linto and Cedar	42,088
Kekawaka Creek	21,179
Little Van Duzen	26,400

Lower Dobbyn Creek	22,451
Lower Middle Mad River	31,023
Lower Tributaries Lower South Fork Trinity	28,805
Lower Tributaries Upper Mad River	27,981
Lower Tributaries Upper Van Duzen River	16,506
Madden Creek	14,876
Middle Tributaries Upper Van Duzen River	22,963
Mill Creek	47,522
Pilot Creek	25,405
Ruth Reservoir	20,250
Salt Creek	15,596
South Dobbyn Creek	25,426
Tish Tang Creek	27,523
Upper North Fork Eel River	22,003
Upper Tributaries Lower Mad River	32,588
Upper Tributaries Lower Trinity River	31,144
Upper Tributaries Upper Mad River	28,980
Upper Tributaries Upper Van Duzen River	15,242
Willow Creek	27,746

[1] Watersheds that are almost exclusively privately owned or have very little acreage within the Six Rivers NF are not sensitive to differences in alternatives proposed in this EIS and are not included in this table. These include Headwaters Redwood Creek and Hyampom watersheds only.

Water Resources Risks of Forest Roads and Unauthorized Routes

Road networks in the Pacific Northwest are the most significant source of management-accelerated delivery of sediment to anadromous fish habitats (FEMAT 1993). Roads can intercept rainfall directly on the surface and intercept subsurface water moving down the hillslope; they concentrate flow, either on the surface or in adjacent ditch; and they divert or reroute water from flow paths that it would take were the road not present (Gucinski, et al., 2001). Where forest roads traverse steep terrain, mass soil movement is a common mechanism of erosion and sediment delivery. Most road-related erosion and sediment delivery on the Six Rivers are associated with large storm events that trigger culvert failures, stream diversions, and debris slides. The locations of roads determine the degree of potential impacts, making some more environmentally sensitive than others. The closer a route is to a stream channel, the higher the risk of negative effects to that stream. The greatest risk of sediment moving into streams occurs where routes cross streams. There are approximately 1600 miles of existing NFTS roads (including County, State and privately owned roads) in the project area (see Table 3). Efforts to correct the potential for stream crossing failure and subsequent diversion have improved over the years. The Six Rivers National Forest has improved culvert capacity or corrected diversion

potential on approximately 146 miles of system road in the project area. The table below displays the current road system (included NFTS, County, State and privately owned roads) and miles previously decommissioned by the Forest. Some of the roads (about 25 miles) claimed as decommissioned in watersheds on the Lower Trinity Ranger District are actually on the NFTS as maintenance level 1 roads but are effectively decommissioned on the ground. All drainage structures and ditches were removed, the roadbed was left in a free draining condition, and vehicle barriers were constructed. All of the changes to the NFTS described above were informed by site specific roads analyses, followed by a NEPA decision and Finding of No Significant Impact. These documents are; *Transportation Strategy for Lands Northeast of the Trinity River Including Horse Linto, Mill Creek and Tish Tang Watersheds, Environmental Assessment (1997), Road Upgrading and Decommissioning on the Lower Trinity Ranger District South and West of the Trinity River, exclusive of Grouse Creek, Environmental Assessment (1998),* and *Grouse Creek Travel Management EA (1996).*

Table 3.5-3: Existing and Decommissioned Roads by Watershed

Watershed Name	Approximate Unauthorized Route Miles	Approximate Road Miles	Miles Decommissioned by Six Rivers NF
*Grouse Creek	21	76	30.5
Hawkins-Sharber	9	82	0
*Headwaters North Fork Eel River	8.5	117	18
Headwaters Redwood Creek	2	6	1.5
*Horse Linto and Cedar Creeks	10.5	99	32.5
Hyampom	2	2	3.5
Kekawaka Creek	0.5	2	0
Little Van Duzen River	7.5	18	0
Lower Dobbyn Creek	4.5	24	3.5
Lower Middle Mad River	17.5	84	0
*Lower Tributaries Lower South Fork Trinity	11.5	100	19.5
Lower Tributaries Upper Mad River	20	136	0
Lower Tributaries Upper Van Duzen River	14	59	0
*Madden Creek	3.5	42	14
Middle Tributaries Upper Van Duzen River	29.5	86	0
Mill Creek-Trinity River	2	3	12.5
*Pilot Creek	11.5	75	15
Red Mountain Creek	0	2	0
Ruth Reservoir	10	84	0
Salt Creek	1.5	32	0
South Dobbyn Creek	3.5	35	0
Tish Tang a Tang Creek	4.5	8	1
*Upper North Fork Eel River	10	37	0
Upper Tributaries Lower Mad River	15	12	0
Upper Tributaries Lower Trinity River	12	86	2
Upper Tributaries Upper Mad River	8	142	0
Upper Tributaries Upper Van Duzen River	5	60	0
Willow Creek	10	67	14
Summary of Miles	**255**	**1576**	**168**

* Indicates Key Watershed.

Unauthorized routes mapped in the project area are a combination of abandoned Forest Service road, usually roads intended for temporary use related to timber harvesting or fire suppression activities and user-created cross-country routes. About 60% of the total route mileage has some segment that is located within Riparian Reserves, and approximately 519 stream crossings were tallied. Most of these unauthorized routes are native surfaced roads that have no drainage structures other than water bars. These unsurfaced routes that cross streams or within riparian areas generally have a higher risk of delivering sediment to stream channels. About 80% of these routes are located at elevations above 3000 feet and most probably are not accessible from November through May, which may lower the risk of sedimentation because the route would not be used when soils are saturated. The combined Watershed Risk Rating system developed for this project reveals that 75% (192 miles) of unauthorized routes pose a high risk to water quality primarily through sedimentation from travel ways to stream channels.

3.5.4 Environmental Consequences

This analysis is focused on the effects of three actions: (1) the prohibition of cross country travel, (2) additions of travel routes to the National Forest Transportation System (NFTS), (3) changes to the class of vehicle and/or season of use on the NFTS. See the Water Resource effects methodology section above regarding how this analysis was conducted. The alternatives presented below differ in terms of miles of unauthorized routes added to the NFTS, however, there is no difference to the amount of routes that currently exist on the ground.

Adverse effects of unauthorized use by vehicles include long-term damage to water resources due to alteration of drainage patterns, stream crossing diversions, and soil compaction. Without active restoration, these effects will persist for years or decades following any prohibition of motor vehicle use.

3.5.4.1 Alternative 1 – No action.

This alternative poses the greatest risk of impacts to water resources due to the continued use of the unauthorized routes. No changes would be made to the current NFTS and no cross-country travel prohibition would be put into place. This alternative will have the most routes available for motorized use (approximately 255 miles), of which 192 miles were rated as a high watershed risk.

Direct/Indirect Effects Indicators

(1) Miles of routes by Watershed Risk Rating (high, moderate, low) (2) Number of route-stream crossings (3) Miles of unauthorized routes located in Riparian Reserves.

1. Cross-Country Travel:

Under Alternative 1 (no action), cross-country motorized travel would not be prohibited on unauthorized routes. Approximately 255 miles of unauthorized routes would continue to be used by motorized vehicles. 192 miles (75%) of these routes were rated as high risk to water resources, 19.5 miles (7%) as a moderate risk, and 43.7 miles (17%) as low risk. Approximately 519 route-stream crossings and 49.3 miles of routes in riparian reserves would continue to be impacted by vehicle use. Sediment production from vehicle use of native surfaced routes will likely continue and hydrologically sensitive areas (riparian reserves) will continue to be

impacted. Continued use is not likely to alter peak or low stream flows because the density of these unauthorized routes is low and spread across 27 6th field watersheds. It is difficult to predict where cross-country travel may occur in the future, any attempts to measure effects associated with future proliferation of routes is very speculative. Most forest visitors will stay on existing routes. However, there will be no treatment or mechanism to deter the further proliferation of routes or use in hydrologically sensitive areas.

In the short term (1 year), there would be little recovery, as the unauthorized routes would still be accessible. Long term recovery of hydrologically sensitive areas would be unlikely as use would still not be prohibited.

2. **Routes added to the NFTS:**

There are no direct or indirect effects of adding motorized routes to the existing NFTS because with this alternative, no motorized routes would be added to the NFTS.

3. **Changes to existing NFTS:**

There are no direct or indirect effects of changing the existing NFTS because with this alternative, no changes are proposed to the NFTS.

3.5.4.2 Alternative 2 – Proposed Action.

This alternative proposes adding currently unauthorized routes to the NFTS and placing a prohibition on cross-country travel in the project area. The prohibition would include all unauthorized routes not added to the NFTS and any newly created or unmapped routes.

Direct/Indirect Effects

Indicators: (1) Miles of routes by Watershed Risk Rating (high, moderate, low) (2) Number of route-stream crossings (3) Miles of unauthorized routes located in Riparian Reserves.

1. **Cross-Country Travel:**

Alternative 2 would prohibit motorized cross-country travel on 198 miles of unauthorized routes and any unmapped or newly created routes. Of the 198 miles included in the prohibition, about 152 miles (76%) of these routes were rated as a high watershed risk, 12 miles (6%) as moderate and 34 miles (17%) as low risks.

The prohibition of 198 miles avoids about 43 total miles of route segments located within Riparian Reserves and approximately 475 route-stream crossings. The direct/indirect effects of not adding these 198 miles are not entirely beneficial to water resources because 74% of these routes were rated as a high watershed risk and no restorative treatments are include in this alternative. While it is reasonable to assume that the prohibition will result is less traffic on these 198 miles and therefore less sediment production from motor vehicle use on native surfaced routes, the existing erosional features will continue to deliver sediment to streams unless some rehabilitation activities are implemented.

In the short term (1 year), there would be little recovery, as only passive recovery of these routes is anticipated. Long term recovery (25-30 years) of routes not added but located in hydrologically sensitive areas is expected to be slow based on field investigations and studies conducted on abandoned roads within the Six Rivers National Forest. Without active restoration (for example; decompaction of travelway, outsloping, water bars or drainage dips installed to direct water off the travelway and placement of vehicle barriers) it may take 2 or 3 decades

before the drainage patterns on these routes are returned to a more undisturbed condition. It is expected that passive recovery would occur on low risk routes (about 34 miles) prohibited from use 25-30 years.

2. **Routes added to the NFTS:**

Alternative 2 will add about 56 miles of unauthorized routes to the NFTS, of which about 28 miles will have seasonal wet weather closures from approximately October 31 to June 1. More than 82% of all roads added are located above 3000 feet in elevation and may not be accessible during the winter months due to snow levels. Of the 56 miles added, approximately 40 miles (71%) were rated as high watershed risks, 7 miles (13%) as moderate and 9 miles (17%) were rated as low watershed risks. Other impacts to water resources under this alternative include 47 route-stream crossings and segments of routes totaling about 6 miles that are located within Riparian Reserves.

Mitigation measures to lessen the impacts to water resources would occur on all high risk routes in the proposed action route additions. Mitigations include: annual wet-weather use restrictions, waterbar placement, stream diversion correction and route definition (signage or physical barriers to restrict use to designated routes). All mitigation measures would be completed prior to use by the public. Implementation of these mitigation measures is expected to lower these higher risk routes to moderate or low watershed risk. The proposed route additions avoid many more sensitive hydrologic areas as compared to Alternative 1 (no action). Direct and indirect affects in the short term (1 year) are limited. No new ground disturbance would occur as the routes already exist. The only new ground disturbance would be the installation of water bars and that work would occur on the travel way, which is already a disturbed site. In the long term (25-30 years) sedimentation is expected to decrease from existing levels because mitigation measures and routine maintenance are expected to promote or enhance hydrologic function in sensitive areas.

3. **Changes to existing NFTS:**

Alternative 2 also proposes to change the class of vehicle use of three motorized system trails to non motorized use only (5.8 miles), change one trail class of vehicle use from motorcycle only to vehicles less than 50 inches in width (3.9 miles) and permit mixed use (highway legal and non highway legal vehicles) on existing NFTS roads (25.4 miles). Direct and indirect effects in the short term (1 year) are limited. No new ground disturbance would occur as the routes already exist. Routine road and trail maintenance is presumed. The change in class of vehicle use from motorcycle to include vehicles less than 50 inches in width is not expected have any impact to water resources as the current width of this motorize trail is already wide enough to accommodate larger vehicles. No additional ground disturbance is expected.

In the long term (25-30 years) sedimentation is expected to decrease from existing levels because mitigation measures and routine maintenance are expected to promote or enhance hydrologic function in sensitive areas.

3.5.4.3 Alternative 3 – Expanded Recreation

This alternative will add approximately 64 miles of unauthorized routes to the NFTS and prohibit use on approximately 190 miles. These routes include all of the routes proposed for addition in Alternative 2, plus 7.15 additional miles of unauthorized routes.

Direct/Indirect Effects

Indicators: (1) Miles of routes by Watershed Risk Rating (high, moderate, low) (2) Number of route-stream crossings (3) Miles of unauthorized routes located in Riparian Reserves.

1. **Cross-Country Travel Prohibition:**

Alternative 3 would prohibit motorized cross-country travel on 190 miles of unauthorized routes and any unmapped or newly created routes. Of the 190 miles included in the prohibition, about 140 miles (74%) of these routes were rated as a high watershed risk, 13 miles (6%) as moderate and 37 miles (20%) as low risks.

The prohibition of 190 miles avoids about 45 total miles of route segments located within Riparian Reserves and approximately 459 route-stream crossings. 45 miles (77%) of these routes were rated as a high watershed risk, 11 miles (6%) as moderate and 33 miles (17%) as low risks. The direct/indirect effects of prohibiting travel on these 190 miles would not be realized in the short term (1 year) as passive restoration is presumed. The prohibition is likely to result in less traffic on these 190 miles and therefore less sediment production from motor vehicle use on native surfaced routes, but existing erosional features on routes would continue to deliver sediment to streams. Long term recovery (25-30 years) of routes located in hydrologically sensitive areas and where motorized use is prohibited is expected to be slow based on field investigations and studies conducted on abandoned roads within the Six Rivers National Forest. Without active restoration (for example; decompaction of travelway, outsloping, water bars or drainage dips installed to direct water off the travelway and placement of vehicle barriers) it may take 2 or 3 decades before the drainage patterns on these routes are returned to a more undisturbed condition. It is expected that passive recovery would occur on low risk routes (about 33 miles) prohibited from use 25-30 years.

2. **Routes added to the NFTS:**

Alternative 3 will add about 64 miles of unauthorized routes to the NFTS, of which about 25 miles will have seasonal wet weather closures from approximately October 31 to June 1. More than 80% of all roads proposed for addition are located above 3000 feet in elevation and may not be accessible during the winter months due to snow levels. Of the 64 miles added, approximately 45 miles (71%) were rated as high watershed risks, 8 miles (13%) as moderate and 11 miles (17%) were rated as low watershed risks. Other impacts to water resources under this alternative include 60 route-stream crossings and segments of routes totaling about 7.8 miles that are located within Riparian Reserves.

Mitigation measures to lessen the impacts to water resources would occur on all high risk routes in the proposed action route additions. Mitigations include: annual wet weather use restrictions, waterbar placement, stream diversion correction and route definition (signage or physical barriers to restrict use to designated routes). All mitigations measures would be completed prior to use by the public. It is reasonable to suggest that implementation of these mitigation measures would lower these higher risk routes to moderate or low watershed risk. The proposed route additions avoid many more sensitive hydrologic areas as compared to Alternative 1 (no action). Direct and indirect affects in the short term (1 year) are limited. No new ground disturbance would occur as the routes already exist. The only new ground disturbance would be the installation of water bars and that work would occur on the travel way,

which is already a disturbed site. In the long term (25-30 years) sedimentation is expected to decrease from existing levels because mitigation measures and routine maintenance are expected to promote or enhance hydrologic function in sensitive areas.

3. **Changes to existing NFTS:**

Alternative 3 would include all changes to the existing NFTS as described above in Alternative 2. No new ground disturbance would occur as the routes already exist. Routine road and trail maintenance is presumed. The change in class of vehicle use from motorcycle to vehicles less than 50 inches in width is not expected to have any impact to water resources as the current width of this motorize trail is already wide enough to accommodate larger vehicles. No additional ground disturbance is expected.

In the long term (25-30 years) sedimentation is expected to decrease from existing levels because mitigation measures and routine maintenance are expected to promote or enhance hydrologic function in sensitive areas.

3.5.4.4 Alternative 4 – Prohibit Cross-Country Travel.

This alternative will add not any unauthorized routes to the NFTS and would prohibit use on approximately 255 miles. Also, vehicle access to the North Fork Eel Wilderness would be eliminated.

Direct/Indirect Effects

Indicators: (1) Miles of routes by Watershed Risk Rating (high, moderate, low) (2) Number of route-stream crossings (3) Miles of unauthorized routes located in Riparian Reserves.

1. Cross-Country Travel Prohibition:

Under Alternative 4, cross-country motorized travel would be prohibited on all currently unauthorized routes (approximately 255 miles). 192 miles (75%) of these routes were rated as high risk to water resources, 19.5 miles (8%) as a moderate risk, and 44 miles (17%) as low risk. 49.3 miles of these routes intersect riparian reserves and about 519 route-stream crossings were tallied. Sediment production from vehicle use of native surfaced routes will likely continue in hydrologically sensitive areas because passive restoration is presumed; only the route to the North Fork Eel Wilderness would be physically blocked. These routes are not likely to alter peak or low stream flows because the density of these unauthorized routes is low and spread across 27 6th field watersheds. While it is reasonable to assume that the prohibition will result in less traffic on these 255 miles and therefore less sediment production from motor vehicle use on native surfaced routes, existing erosional features on route travelways would continue to deliver sediment to streams.

In the short term (1 year), there would be little recovery, as only passive recovery of these routes is anticipated. Long term recovery (25-30 years) of unauthorized routes not included in the NFTS and located in hydrologically sensitive areas is expected to be limited based on field investigations and studies conducted on abandoned roads within the Six Rivers National Forest. Without active restoration (for example; decompaction of travelway, outsloping, water bars or drainage dips installed to direct water off the travelway and placement of vehicle barriers) it may take 2 or 3 decades before the drainage patterns on these routes are returned to a more undisturbed condition. It is expected that passive recovery would occur on low risk routes (about 44 miles) prohibited from use 25-30 years.

2. **Routes added to the NFTS:**

There are no direct or indirect effects of adding unauthorized motorized routes to the existing NFTS because with this alternative, no motorized routes would be added to the NFTS.

3. **Changes to existing NFTS:**

There are no proposed changes to the NFTS that would affect water resources under this alternative. The 11 miles of existing motorized trails with seasonal closures imposed have been in effect for many years because the system road leading to these trails are equipped with gates and are closed seasonally.

3.5.4.5 Cumulative Watershed Effects for All Alternatives

In assessing cumulative watershed effects for this project, all past, current and reasonably foreseeable actions on both private and public lands were assessed within all affected watersheds and related to beneficial uses and sensitivities within these watersheds (LRMP p. Iv-71, 1-10 and 11). The ERA model was used as a method of addressing cumulative watershed effects. This model is designed as a preliminary indicator for managers to determine whether or not past and present land management disturbances in a given watershed approach or exceed a threshold of concern (TOC). The TOC is an estimated upper limit of total disturbance that a watershed can tolerate without adverse impacts to beneficial uses. Anadromous fisheries are the primary beneficial use in the project area and increased sediment delivery to streams may impact anadromous fish habitat. More information about the ERA model can be found in Appendix D (*Cumulative Watershed Effects Analysis Using R-5 ERA Model: Assumptions and ERA coefficients used in the Travel Management Assessment*).

Activities that contribute ERAs are grazing, harvesting, wildfires, and road construction. Watersheds where grazing occurs have the highest current percent ERA's, followed by watersheds were extensive logging and road construction has occurred. Wildfires in 2008 burned over 18,500 acres in the Lower South Fork Trinity River, Upper North Fork Eel and Upper Mad watersheds and are included in the ERA calculations. Burned Area Emergency Response reports (Hells Half Complex and Mad River Complex) documented that approximately 84% of the area burned at a low intensity, and less than 2% of these watersheds burned at a high intensity. Because so much of the area was burned at a low intensity (canopy closure generally not altered from pre-fire condition, only light ground fuels are consumed and duff layer is predominately intact) they did not add significantly to the affected watersheds existing ERA totals.

The table below summarizes the existing %ERA's for the project area and compares it to each watershed's TOC. None of the watersheds are approaching the TOC. Based on watershed assessments of past and current conditions, Grouse Creek and Mill Creek are still experiencing cumulative watershed effects, but riparian and aquatic habitats appear to be recovering slowly (Grouse Creek WA, 1995, HLMTT WA, 2000). These adverse cumulative effects are a function of both the 1964 flood and extensive past land management activities on geomorphically sensitive terrain. These impacts are still reflected in stream channel conditions despite substantial recovery of the surrounding hillslopes. The ERA methodology does not account for the lag time involved in sediment routing, so it doesn't represent the continued impact of sediment from past events on aquatic health and beneficial uses in these watersheds.

Furthermore, the extent to which riparian areas on other lands were harvested, has significantly altered riparian process and function relative to long-term LWD recruitment, and those functions are not expected to recover for perhaps a hundred years until conifers reach maturity. Riparian shade has recovered to some degree with the growth of a deciduous tree canopy, but this cover is not of the same quality as was provided historically by a dense conifer cover. For these reasons, increased sediment loads, elevated temperatures, and reduced LWD are all significant legacies from which these watersheds are still gradually recovering. Currently, there are 20.9 miles of unauthorized routes in Grouse Creek, of which 93% have a high watershed risk rating and Mill Creek (2.3 miles) all of which were rated as high watershed risk.

As shown in table 0-4, the total % ERA's projected to be added as a result of this project are the same regardless of which alternative is implemented because these routes currently exist on the ground and passive restoration is presumed for low risk routes not added to the NFTS. Experience and professional judgment concerning passive recovery rates of roads and trails on the Six Rivers NF conclude that it may take up to 25-30 years for hydrologic functions to be restored. While all the ERA's are the same for each alternative today, in the long term (25-30 years) all alternatives vary with respect to the potential for passive recovery (of low risk rated routes) to occur (see Table 0-5). Alternative 4 would have the least amount of ERA's added in the long term, followed by Alternatives 2 and 3. The no action alternative accumulates, in the long term, more ERAs when compared to all other alternatives.

None of the alternatives would move any analysis watershed to the TOC because the routes are spread over such a large area (about 617,000 acres). The magnitude of observed effects are small as are the geographic extent of the impacts. The duration and frequency of motorized use are annual in nature and repetitive. Because the magnitude and spatial extent of the effects are small, the repeated nature of motorized use impacts do not translate into significant cumulative watershed effects that put the affected watersheds over the TOC.

Table 3.5-4: Existing percent Equivalent Roaded Acres (ERAs) compared to the Thresholds of Concern (TOC) by Watershed

Watershed Name	Existing % ERA's	Project All Alternatives %ERA's	Future Planned Action %ERA's	2009 Current and Future Action % ERA's	TOC
Grouse Creek	6.18	0.24		6.42	11.0
Hawkins-Sharber	2.73	0.58		3.32	12.0
Headwaters North Fork Eel River	7.96	0.11	0.009	8.08	13.8
Horse Linto and Cedar	2.37	0.11		2.48	9.0
Kekawaka Creek	7.40	0.01		7.41	13.0
Little Van Duzen	3.49	0.12		3.61	14.3
Lower Dobbyn Creek	4.56	0.09		4.65	12.0
Lower Middle Mad River	3.63	0.24		3.87	14.3
Lower Tribs Lower South Fork Trinity	2.65	0.17		2.82	11.0
Lower Tributaries Upper Mad River	7.86	0.30	2.754	10.91	12.8
Lower Tributaries Upper Van Duzen	3.43	0.36	0.001	3.79	14.3
Madden Creek	1.86	0.10		1.95	11.5
Middle Tributaries Upper VanDuzen	2.56	0.55		3.10	12.2
Mill Creek	4.38	0.02		4.40	11.0
Pilot Creek	3.54	0.20		3.74	10.0
Ruth Resevoir	3.02	0.21	0.001	3.23	13.4
Salt Creek	8.71	0.04		8.75	14.0
South Dobbyn Creek	7.22	0.06		7.28	12.0
Tish Tang Creek	3.67	0.07		3.74	14.3
Upper North Fork Eel River	8.43	0.20		8.63	12.8
Upper Tributaries Lower Mad River	5.53	0.15		5.68	13.8
Upper Tributaries Lower Trinity River	2.19	0.20		2.39	12.0
Upper Tributaries Upper Mad River	8.42	0.17	0.149	8.74	14.3
Upper Tributaries Upper Van Duzen	7.55	0.22		7.77	11.7
Willow Creek	2.57	0.08		2.65	12.0

Table 3.5-5: Long Term Equivelent Roaded Acres Compared to the Threshold of Concern (TOC) by Watershed

Watershed Name	Long Term % ERAs Alternative 1	Long Term % ERAs Alternatives 2 and 3	Long Term % ERA's Alternative 4	TOC
Grouse Creek	6.42	6.18	6.17	11.0
Hawkins-Sharber	3.32	2.80	2.63	12.0
Headwaters North Fork Eel River	8.08	7.96	7.93	13.8
Horse Linto and Cedar	7.47	2.71	2.36	9.0
Kekawaka Creek	7.41	7.40	7.40	13.0
Little Van Duzen	3.61	3.49	3.47	14.3
Lower Dobbyn Creek	4.65	4.53	4.53	12.0
Lower Middle Mad River	3.87	3.59	3.58	14.3
Lower Tribs Lower South Fork Trinity	2.82	2.67	2.64	11.0
Lower Tributaries Upper Mad River	10.91	7.82	7.81	12.8
Lower Tributaries Upper Van Duzen	3.79	3.39	3.38	14.3
Madden Creek	1.95	1.98	1.84	11.5
Middle Tributaries Upper VanDuzen	3.10	2.47	2.45	12.2
Mill Creek	8.62	4.38	4.38	11.0
Pilot Creek	3.74	3.50	3.50	10.0
Ruth Resevoir	3.23	3.03	2.96	13.4
Salt Creek	8.75	9.04	8.66	14.0
South Dobbyn Creek	7.28	7.21	7.21	12.0
Tish Tang Creek	7.92	3.70	3.67	14.3
Upper North Fork Eel River	8.63	8.43	8.42	12.8
Upper Tributaries Lower Mad River	5.68	5.51	5.51	13.8
Upper Tributaries Lower Trinity River	2.39	2.30	2.16	12.0
Upper Tributaries Upper Mad River	8.74	8.42	8.37	14.3
Upper Tributaries Upper Van Duzen	7.77	7.50	7.48	11.7
Willow Creek	2.65	2.70	2.56	12.0

3.5.5 Summary of Effects Analysis Across All Alternatives

Comparison of water resources indicators in the table below shows that there is not a significant difference to water resources among the action alternatives. While Alternative 4

shows the least impacts to water resources because it includes prohibition of unauthorized motorized trails (about 255 miles), the effects to water resources are not that dramatically different to those in Alternatives 2 and 3. Direct effects to water resources have already occurred and continued effects are similar under all action alternatives. The main difference between the action alternatives is the ability of the unauthorized routes to passively recover under the prohibition of cross country travel, because the extent of the prohibition varies by action alternative. Because passive recovery is relatively slow and no active restoration is proposed in the action alternatives, there is not a large difference between the action alternatives.

When considering the full array of prohibition, additions and changes to the NFTS, Alternative 4 has the least impact to water resources and Alternative 1 the most impact. Under Alternative 4, there would be the least likelihood of indirect and off-site impacts because no routes would be added to the NFTS and future use would be prohibited. There are only slight differences of impacts to water resources between Alternatives 2 and 3.

Table 3.5-6: Comparison of Effects to Water Resources

Indicators – Water Resources	Rankings of Alternatives for Each Indicator[1]			
	Alt. 1	**Alt. 2**	**Alt. 3**	**Alt. 4**
Miles of routes by Watershed Risk Rating (high, moderate, low) available for public use	1-(192 High, 20 Mod, 44 low)	3-(40 High, 7 Mod, 9 low)	2-(45 High, 8 Mod, 11 low)	4-(0)
Number of route-stream crossings available for public use	1-(519)	3- (47)	2- (60)	4-(0)
Miles of unauthorized routes located in Riparian Reserves and available for public use.	1-(49.3)	3-(6.1)	2-(7.8)	4-(0)
Average for Water Resources	**1**	**3**	**2**	**4**

[1] A score of 4 indicates the alternative has the least impact for water resources related to the indicator; A score of 1 indicates the alternative has the most impact for water resources related to the indicator.

3.5.6 Compliance with the Forest Plan and Other Direction

All 27 watersheds are listed as water quality impaired under section 303(d) of the Clean Water Act for sediment and/or temperature. Implementation and annual evaluation of Best Management Practices (BMPs) at the project level serve to keep from further degrading these listed waters and insure compliance with TMDL allocations set by the Water Board. A complete listing of BMPs that apply to this project can be found in Appendix B. Also, mitigation measures (i.e. waterbars, stream diversion correction) for routes proposed for addition to the NFTS were included to insure compliance with the Forest Plan direction for water quality protection and Clean Water Act. Alternative 1 (no action) would not be in compliance with the Forest Plan and Clean Water Act because many of these routes are currently eroding, resulting in sedimentation of some streams and there would be no mechanism to restore or mitigate these impacts. Alternative 2 would only add routes that currently meet our Forest Plan direction for

water quality protection and Clean Water Act and proposes site specific mitigations to reduce impacts from moderate and high risk routes. Passive restoration is presumed to occur on approximately 35 of low risk routes not added to the NFTS under Alternative 2. Alternative 3 also would only add routes that currently meet our Forest Plan direction for water quality protection and Clean Water Act and proposes site specific mitigations to reduce impacts from moderate and high risk routes. Passive restoration is presumed to occur on approximately 33 of low risk routes not added to the NFTS under Alternative 3. Alternative 4 would comply with the Forest Plan and Clean Water Act because this alternative does not add any unauthorized routes to the NFTS and passive restoration is expected on approximately 44 miles of low risk routes. Similar to Alternative 1, unauthorized routes are not a part of the NFTS would not have mitigations imposed.

3.6 Aquatic Biota

Management of aquatic dependent species and habitat, and maintenance of a diversity of animal communities, is an important part of the mission of the Forest Service (Resource Planning Act of 1974, National Forest Management Act of 1976). Management activities on National Forest System (NFS) lands must be planned and implemented so that they do not jeopardize the continued existence of threatened or endangered species or lead to a trend toward listing or loss of viability of Forest Service Sensitive species. In addition, management activities should be designed to maintain or improve habitat for Management Indicator Species to the degree consistent with multiple-use objectives established in each Forest LRMP. Management decisions related to motor vehicle travel can affect aquatic species by increasing human-caused mortality, causing changes in behavior due to disturbance, and habitat modification (Gaines et al. 2003, Trombulek and Frissell 2000). It is Forest Service policy to minimize damage to vegetation, avoid harassment to wildlife, and avoid significant disruption of wildlife habitat while providing for public motor vehicle use on NFS lands (FSM 2353.03(2)). Therefore, management decisions related to motor vehicle travel on NFS lands must consider effects to aquatic biota and their habitat.

3.6.1 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

This section summarizes the direction relevant to the proposed action as it affects aquatic biota includes:

Endangered Species Act (ESA). The Endangered Species Act of 1973 (16 USC 1531 et seq.) requires that any action authorized by a federal agency not jeopardize the continued existence of a threatened or endangered (TE) species, or result in the destruction or adverse modification of habitat of such species that is determined to be critical. Section 7 of the ESA, as amended, requires the responsible federal agency to consult the USFWS and the National Marine Fisheries Service concerning TE species under their jurisdiction. It is Forest Service policy to analyze impacts to TE species to ensure management activities are not be likely to jeopardize the continued existence of a TE species, or result in the destruction or adverse modification of critical habitat. The purpose of the Endangered Species Act (ESA) (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. Species may be listed as “endangered” if it is in danger of extinction throughout all or a significant portion of its range, or as “threatened” if it is likely to become endangered within the foreseeable future. NOAA Fisheries is responsible for anadromous fish species. Critical Habitat is defined as the specific areas within and outside the geographical area occupied by the species at time of listing on which are found those physical or biological features that are essential to the conservation of this species and which may require special management considerations or protection. (ESA Sec 4(a)(2)). This assessment is documented in a Biological Assessment/Biological Evaluation (draft) and summarized in this Chapter.

Essential Fish Habitat: The Magnuson-Stevens Act (MSA) - as amended by the Sustainable Fishery Act of 1996 and its implementing regulations [50 CFR part 600.920(a)] require that before a Federal agency may authorize, fund, or carry out any action that may adversely affect Essential Fish Habitat (EFH), it must consult with the National Marine Fisheries Service. Chinook salmon (*Oncorhynchus tshawytscha*) and coho salmon (*Oncorhynchus kisutch*) have designated EFH within the project areas for Region 5 National Forest with these species. The 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. The species that the MSA covers include coho and Chinook salmon. All reaches accessible by coho and Chinook are identified as EFH. This analysis is documented in the Fisheries Biological Assessment/ Biological Evaluation and will not be discussed further in this document.

Forest Service Manual and Handbooks (FSM/H 2670). Forest Service Sensitive (FSS) species are species identified by the Regional Forester for which population viability is a concern. The Forest Service develops and implements management practices to ensure that rare plants and animals do not become threatened or endangered and ensure their continued viability on national forests. It is forest service policy to analyze impacts to FSS species to ensure management activities do not create a significant trend toward federal listing or loss of viability. This assessment is documented in the Biological Evaluation (BE) [included in the Fisheries Biological Assessment – see above] and summarized below in this Chapter.

Management Indicator Species: The role of management indicator species (MIS) in National Forest planning is described in the 1982 implementing regulations for the National Forest Management Act (NFMA) of 1976. These regulations require that certain vertebrate and/or invertebrate species present in the area be identified as MIS and that they be selected because "their population changes are believed to indicate the effects of management activities" (36 CFR 219.19(a)(1).

Northwest Forest Plan Aquatic Conservation Strategy (ACS): The Northwest Forest Plan is to adopt coordinated management direction for the lands administered by the USDA Forest Service and the USDI Bureau of Land Management and to adopt complimentary approaches by other Federal agencies within the range of the northern spotted owl. The management of these public lands must meet dual needs: the need for forest habitat and the need for forest products.

The Aquatic Conservation Strategy uses Riparian Reserves, Key Watersheds, Watershed Analysis and watershed restoration. Riparian Reserves maintain riparian-dependent aquatic and terrestrial processes around running and still waters, and could function as corridors for movement of upland species. Key Watersheds are the existing refugia for at-risk species, or are areas with high water quality. Key Watersheds can have a mix of reserve, riparian buffer, and matrix allocations. Watershed Analysis evaluates geomorphic and ecologic processes and enables planning to achieve ACS objectives.

The following are the key watersheds found on Six Rivers National Forest:

Table 3.6-1: Key watersheds found on Six Rivers National Forest

River/Stream	Area (ac)	Watershed Analysis (WA)
Lower South Fork Trinity River	55,510	Lower South Fork Trinity River WA, 1999
		Grouse Creek WA, 1994
Horse Linto Creek	43,750	Horse Linto, Tish Tang and Mill Creek WA, 2000
Pilot Creek	25,440	Pilot Creek WA, 1995
North Fork Eel River	110,310	North Fork Eel River WA, 1996

Watershed Analyses were also completed for the following non-key watersheds:

Mainstem Trinity Watershed Analysis, 2003
Van Duzen Watershed Analysis, 1998
Upper Mad River Watershed Analysis, 1999

The Mad River below Matthews Dam and the portions of the Forest that cross the ridge into the mainstem Eel River watershed (Dobbyn Creek and Kekawaka Creek) do not have a watershed analysis to date.

The fourth component to the Aquatic Conservation Strategy is Watershed Restoration: A long-term program to restore watershed health and aquatic ecosystems. See the Hydrology section for a description of the restoration efforts to date in the watersheds under consideration in this document.

3.6.2 Six Rivers Land and Resource Management Plan (LRMP)

As a general rule, standards and guidelines for Riparian Reserves prohibit or regulate activities in Riparian Reserves that retard or prevent attainment of the Aquatic Conservation Strategy objectives. Watershed analysis and appropriate NEPA compliance is required to change Riparian Reserve boundaries in all watersheds. Riparian Reserve widths do not change for this project. The riparian reserve widths are used as an indicator to assess impacts of routes on aquatic biota.

LRMP IV-48 New recreational facilities within Riparian Reserves, including trails and dispersed sites, should be designed to not prevent meeting Aquatic Conservation Strategy objectives. Construction of these facilities should not prevent future attainment of these objectives. For existing recreation facilities within Riparian Reserves, evaluate and mitigate impact to ensure that these do not prevent, and to the extent practicable contribute to, attainment of Aquatic Conservation Strategy objectives.

LRMP IV-49 Adjust dispersed and developed recreation practices that retard or prevent attainment of Aquatic Conservation Strategy objectives. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective, eliminate the practice or occupancy.

LRMP IV-49 For each existing or planned road, meet Aquatic Conservation Strategy objectives by: a) minimizing road and landing locations in Riparian Reserves; b) completing watershed analyses (including appropriate geotechnical analyses) prior to construction of new roads or landings in Riparian Reserves; c) preparing road design criteria, elements, and standards that govern construction and reconstruction; d) preparing operation and maintenance criteria that

govern road operation, maintenance, and management; e) minimizing disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow; f) restricting sidecasting as necessary to prevent the introduction of sediment to streams; g) avoiding wetlands entirely when constructing new roads.

LRMP IV-111 Outside roadless areas - Reduce existing system and nonsystem road mileage. If funding is insufficient to implement reductions, there will be no net increase in the amount of roads in Key Watersheds. Watershed analysis is required prior to management activities, except minor activities such as those categorically excluded under NEPA and not including timber harvest or salvage). Watershed analysis is required in all remaining roadless areas prior to resource management activities, except minor activities such as those categorically excluded under NEPA. Watershed analysis is recommended in non-key watersheds. Watershed analysis is required to change Riparian Reserve widths in all watersheds.

3.6.3 Analysis Area

The analysis area includes all NFS administered lands within the administrative boundaries of the Lower Trinity and Mad River ranger districts. The geographic extent of the direct, indirect, and cumulative effects analysis is generally confined to aquatic features within this analysis boundary, however, downstream effects off Forest were considered for anadromous fish species listed under the ESA. The analysis area was chosen based on the potential for unauthorized motorized routes on NFS administered lands to affect aquatic systems. Analysis within this area was broken down at the 6th field watershed.

3.6.4 Effects Analysis Methodology

This section begins with general definitions of how effects were characterized, followed by the following:

- assumptions that were used in analyzing impacts to aquatic biota,
- a description of the data sources,
- description of indicators, and
- effects common to all aquatic biota,

It is followed by the types of impacts identified in available literature as being associated with motor vehicle use of roads (Section 3.14.5) and the affected environment (Section 3.14.6). Direct, indirect and cumulative effects to aquatic biota that are common to all alternatives are included in this discussion. More specific information about existing conditions and impacts are then addressed for each of the special status animal species considered in the analysis, as well as habitat for Management Indicator Species.

Potential impacts were categorized by route as described below. The results of the Watershed Risk Criteria rating (see Watershed Section) of the unauthorized routes provided information relative to probability and magnitude. Routes within riparian reserves were considered to have a higher probability or a greater magnitude of impact. The following definitions are used to describe the level of impacts associated with each route. The route by route ratings for aquatic biota can be found in the project record.

- Proximity ~ if the species or habitat is not in proximity to the route, then the route has a neutral effect. These would be considered low risk routes. A route in riparian reserves is considered to be in close proximity to aquatic biota habitat.

- Probability ~ if the outcome is extremely unlikely to occur. A route with a stream crossing has a higher probability of delivering sediment into the stream system than a route with no crossings.
- Magnitude ~ if the outcome of the Probability analysis indicates an impact could occur, assess for Magnitude (effects are rated at the following levels if they appear to meet one or more of the criteria in the threshold description for that level):
    - Low Risk Routes: no connectivity to aquatic systems, outside of riparian reserves, not in valley bottoms (for western pond turtle), therefore, direct or indirect impacts highly unlikely to occur to aquatic species, their habitat, or the natural processes sustaining them based on proximity and probability.
    - Moderate Risk Routes: connectivity to aquatic systems exists and possible effects could occur, but not expected to be outside the natural range of variability for aquatic species, their habitats, or the natural processes sustaining them. Occasional responses to disturbance by vehicles by some individuals are expected, but without measurable interference with survival, reproduction, or other factors affecting population levels. Sufficient habitat remains to maintain viability of all species.
    - High Risk Routes: Portion of route located in riparian reserves with or without stream crossings. Sediment delivery potential to aquatic biota habitat exists. Effects on species, their habitats, or the natural processes sustaining them are detectable, and expected to be outside the natural range of variability for short periods of time. Frequent responses to disturbance by some individuals are expected, with some local effects to survival, reproduction, or other factors affecting population levels. Sufficient habitat remains to maintain viability of all species. Some effects may occur during critical periods of reproduction or in key habitat for sensitive native species.

3.6.4.1 Assumptions Specific to the Aquatic Biota Analysis:

A listing of general assumptions is provided at the beginning of Chapter 3. The following lists assumptions specific to aquatic wildlife:

1. All vehicle types result in the same amount of disturbance effect on aquatic dependent species.
2. Aquatic species spend all or significant portions of their life cycles either in streams or moving through riparian habitats.
3. Habitats for species being analyzed were assumed to be occupied if they contained the necessary life history elements.
4. Habitat is already impacted in the short-term. In the long-term, habitat will increase to some degree due to passive restoration in areas where cross-country travel is prohibited and unauthorized routes are not added to the NFTS (see Soils section for further assumptions).
5. The overall effect of routes to aquatic habitats is related to the amount of sediment movement from route surfaces and is highly variable within and among surface types and is related to levels of maintenance and road drainage and type of use of the road (Clinton and Vose 2003; Gucinski et al. 2004).
6. The reduction or elimination of vehicle traffic on a road near a stream will result in less sediment delivered from the route to the stream.

7. The elimination of vehicle traffic on a road near a stream during periods of wet road conditions will result in less sediment being delivered from the road to the stream. Vehicle use on wet roads has the potential to cause ruts and damage to the road with a resultant increase in erosion of sediment from the road during rainfall events.

3.6.4.2 Data Sources

1. Route inventories collected in Step 1 of Travel Management and associated tabular data sets. This data set included all unauthorized routes. Information collected during this phase included presence of stream crossings, route slope and evidence of erodability, route surface type, including existing presence of waterbars, and current vehicle usage.
2. All existing unauthorized routes brought forward to the interdisciplinary team for evaluation and, that were located within sensitive hydrologic areas, were reviewed on the ground by Forest Service Hydrologists and Geologists. Each route was rated for risk to aquatic systems via a combination of field surveys and GIS analysis. Those proposed unauthorized routes deemed to have any potential to be a risk to aquatic ecosystems were field verified. The review of unauthorized routes documented existing erosion, delivery potential and hydrologic connection to stream channels (see watershed section)
3. GIS layers of the following information: routes and 'designated' or important aquatic areas (e.g., riparian reserves). These layers were overlapped to identify any locations where routes intersect with aquatic resources, such as riparian areas of streams and springs, and/or known or potential habitat for special status aquatic species.

3.6.4.3 Aquatic Biota Indicator Measures:

Indicators were developed to assess the potential of motorized route designation to adversely affect aquatic and aquatic-dependent species as well as their associated habitats. Vehicle use on and off established routes has affected or has the potential to affect aquatic species, including threatened, endangered, and sensitive species, by increasing human-caused mortality, causing changes in behavior due to disturbance, and habitat modification. These are discussed in more detail further in this section.

The following indicators are used to assess the above impacts of prohibiting cross-country motorized vehicle travel, adding facilities to the NFTS and changing use on the exiting NFTS on threatened and sensitive aquatic species and their habitat.

Indicator 1: Miles of unauthorized routes within or adjacent to Threatened, Endangered, or Sensitive (TES) aquatic biota habitat.

Indicator 2: Number of stream crossings at the Lower Trinity/Mad River Ranger District scale and within aquatic biota habitat.

Indicator 3: Acres of species habitat affected. Interim riparian reserve widths were used to determine acres of riparian and stream habitat. This demonstrates the proportion of a species habitat that is affected by motor vehicle routes (including the routes plus a biologically meaningful 'zone of influence').

These first three indicators have three tiers of habitat analysis:

a. Miles/acres at the crenulated stream layer representing the maximum habitat impacted.
b. Miles/acres adjacent to fish bearing distribution (aquatic biota at lower gradient, higher order stream channels)
c. Miles adjacent to anadromous habitat (no other aquatic species are current listed under the ESA).

The following next two indicators are used to assess the effects of prohibiting cross-country motorized vehicle travel, adding facilities to the NFTS and changing use on exiting NFTS roads on habitat for aquatic management indicator species as well on the Aquatic Conservation Strategy objectives.

Indicator 4: Density of motor vehicle routes as a measure of habitat effectiveness at the 6th field watershed level. This indicator measures the density of routes throughout all habitats, aquatic and upland combined.

Indicator 5: This indicator assesses the miles of unauthorized routes (both in riparian reserves and outside) and the number of stream crossings within key watersheds. This measure will be discussed under each alternative as an indicator of meeting the Aquatic Conservation Strategy.

Two additional indicators are used to assess the differences between alternatives for the impacts of the placement of a motorized trail on a closed Level 1 as well as change in use on existing NFTS trails from motorized to non-motorized.

3.6.5 Aquatic Biota Analysis by Action

This section (3.14.5) describes the direct and indirect effects of the three components of the proposed action:

- Effects of the prohibition of cross-country motor vehicle travel,
- Effects of adding routes to the NFTS
- Changes to the existing NFTS

Prior to the description of the effects of the proposed action, the following describes the general effects common to all aquatic biota.

3.6.5.1 General Effects Common to all Aquatic Biota

Due to their limited distribution on the landscape and life history requirements, most species of aquatic wildlife are similarly affected by motorized travel. Although Gaines et al. (2003) described the effects of recreation routes on “riparian species”; the effects to aquatic species are very similar and can be categorized in much of the same way. Literature indicates that placement of routes in relation to habitat can affect aquatic species through mortality, disturbance, and habitat modification (Moyle and Randall 1996; Trombulek and Frissell 2000; USDA Forest Service 2000). Routes located in riparian areas could also affect species that move out of the water whether for dispersal or, in the case of western pond turtles, breeding on land (Trombulek). Routes that access larger streams and rivers could lead to added fishing pressure or collection (Gaines et al. 2003). Therefore, the effects of motorized travel on aquatic species may be categorized by human-caused mortality, changes in behavior (disturbance), and habitat

modification. Additional information on the effects to the aquatic environment is presented in Watershed Resources.

Human-Caused Mortality: Direct effects to aquatic species from roads and motorized vehicles include direct crushing from tires during all life stages. Allowing cross-country travel or adding routes to the NFTS may result in human-caused mortality to aquatic species in the following additional variety of ways including: fishing/trapping, collection, and introduction of non-native species, parasites, or disease vectors. Collisions with vehicles have not only been documented in numerous different herpetofaunal species, they may even be particularly vulnerable to it (Trombulak and Frissell 2000). Mass mortalities of other species of frogs have been documented during dispersal where roads intersect natal/breeding habitat and non-breeding foraging habitat (Hine et al. 1981, Fahrig et al. 1995). Mortality from vehicles can reduce population size and reduce movement between resources and conspecific populations (Carr and Fahrig 2001).Stream crossings are areas of particular concern for collisions. Although most stream crossings associated with system roads have culverts or bridges, fords or low-water crossings are very typical along trails. Locations of fords vary widely, but often occur along a relatively low gradient stretch of stream. When a ford is created in these areas, it often creates a small pool where different life history stages (fingerling fish or tadpoles) of some species may congregate. Increased densities of these species may result in higher rates of collisions. Although some species may be more prone to crushing at crossings, numerous herpetofaunal species migrate from aquatic to terrestrial environments to complete their life histories. These species are even more vulnerable to motorized travel where routes parallel water bodies. Since herpetofaunal species tend to be slow-moving and may migrate across a motorized route that is near a water body, they may have a relatively higher risk of being crushed by vehicles.

Collection, trapping, and fishing are some of the remaining ways by which motorized routes may indirectly result in human-caused mortality. By allowing cross-country use or by adding routes to the NFTS, access may be improved to various aquatic species habitat. Since bodies of water (lakes, rivers, or streams) are often destinations for numerous trails, allowing motorized access along these routes may result in increased amounts of fishing and/or collection of numerous different herpetofaunal species.

Introduction of toxins, non-native organisms, parasites, and disease vectors are the final ways which motorized travel may result in human-caused mortality. Most surface water contaminants enter streams at stream crossing by roads, or places where other disturbances are close to streams (Gucinski et al. 2001). The effects are heightened if the sediments contain toxic materials (Maxell and Hokit 1999). At least five different general classes of chemicals are transferred into the environment from maintenance and use of roads: heavy metals, salt, organic molecules, ozone, and nutrients (Trombulak and Frissell 2000). Although there is a low risk that individuals will be exposed to lethal levels of any of these toxins, small exposures may elicit immune responses within individuals.

The movement and introduction of non-native organisms, parasites, and disease vectors between water bodies has been recognized as a significant threat to numerous different aquatic species. When traveling roads or trails throughout the course of a day, a vehicle may cross numerous streams. When a vehicle crosses a stream through a low-water crossing or a ford it may capture soil/debris in the tread of the tires or on the body of the vehicle. Non-native organisms, parasites, and disease vectors may be captured in the soil/debris on the vehicle. When crossing subsequent streams, soil/debris may then be deposited potentially spreading non-native

organisms, parasites, and disease vectors between water bodies. The risk of adverse effects to individuals and populations is highly variable among species and will be discussed further below.

Changes in Behavior: Although it is not well documented in the literature, it is reasonable to assume that aquatic species may be affected by motorized vehicles through changes in behavior. Adding routes result in increased access of vehicles and human visitors to aquatic species habitat. As with individuals of terrestrial species, individuals of aquatic species are likely to exhibit a predator avoidance response when they become disturbed by humans. Direct effects of disturbance to an individual's fitness are commonly measured through increases in stress hormone levels. Significant increases in stress hormone levels have been found to reduce reproductive success of individuals of some species.

Indirect affects of disturbance are commonly displayed through changes in an individual's time and energy budget. As a vehicle or human approaches an individual, the most obvious and common disturbance response is for that individual to avoid the threat and seek cover. After an individual exhibits the disturbance response, a period of time will elapse until that individual resumes pre-disturbance behavior. Since this change in an individual's time budget may result in less time feeding or resting, the disturbance may result in changes to the individual's energy budget. If an individual is repeatedly disturbed in an area, they may avoid the area, essentially being displaced from the habitat. Significant changes to an individual's energy budget or displacement from its habitat may result in impacts to the individual's fitness.

Habitat Modification: Motorized travel may result in numerous different impacts to aquatic species habitat quality and quantity. Since many of these species are amphibians, they are acutely prone to changes in aquatic and adjacent terrestrial habitats. Alterations to terrestrial habitat may include, but are not limited to: direct reductions in cover (vegetative and underground), introductions of non-native plant species, and impacts to meadow hydrology. Alterations to aquatic habitat may include, but are not limited to: reductions in shade, increased water temperatures, increased sedimentation, altered hydrology and geomorphology.

The primary impact to stream and lake ecosystems, and consequentially the species that inhabit them, from impacts of unsurfaced roads is the effect of increased sedimentation into the water. Several studies have demonstrated that sediment delivery to stream channels in a forested environment is correlated to road surface type, physical characteristics of the adjacent areas, soils (erodibility) the steepness of slope below the road and vehicle usage (Soils Resource, Clinton and Vose 2003). Therefore the risk of impacts to aquatic ecosystems is highest when there is a direct hydrologic connection to aquatic systems.

Input may be limited in areas where road-use is light, however, the orientation of the road, soil type, steepness, length can all affect the amount of sediment that enters the stream during rain or snow-melt events. As indicated in the Soils Resource area, the unauthorized motorized trails fall into two general categories, user created motorized trails and NFTS temporary roads that the Forest Service attempted to close to motorized use and which have continued to be used by the public. The old Forest Service roads are generally less of a risk for causing soil erosion than true user created motorized trails because initially they were engineered and they have had drainage control installed (see Soils).

The surfaces of unpaved roads can route fine sediments to streams, lakes, and wetlands, increasing turbidity of the water (Reid and Dunne 1984). The knowledge of the impact of increased sediment load on amphibians is limited (Gillespie 2002). However, the negative

impacts of increased sediments on aquatic species, including fish, macroinvertebrates, and periphyton, are well known (Power 1990, Newcombe and MacDonald 1991, Waters 1995). High concentrations of suspended sediment may directly kill aquatic organisms and impair aquatic productivity (Newcombe and Jensen 1996). Egg survival may be impacted by roads and trails through increases in fine sediments. Increased sedimentation may also reduce availability of important food resources for tadpoles such as algae (Power 1990). Fine sediment deposits also tend to fill pools and smooth gravel beds, degrading habitats (Forman and Alexander 1998) and possibly the availability of breeding sites or larval refugia (Welsh and Ollivier 1998).

Road density can be used to help understand the potential for impacts from road surface erosion, drainage, and sediment delivery to streams and aquatic biota. Understanding road density and location can help to gage the impact of roads on natural watershed processes. NOAA Fisheries has defined road densities of less than 2 miles / square mile with no valley bottom roads as "properly functioning". Densities between 2 and 3 miles / square mile with some valley bottom roads are designated as "at risk" and densities over 3 miles / square mile with many valley bottom roads are considered "not properly functioning" (see Biological Assessment – in progress). Other research indicates sediment in spawning gravel increased by 2.6 – 4.3 times in watersheds with more than 4.1 miles of road per square mile (Cedarholm et al. 1980).

Gucinski also notes that trails for bicycling, walking or horseback riding erode at rates similar to roads, but the total sediment delivered from these trails is generally lower because the total surface area of a narrow trail is less than that of most roads. Roads can also influence both peak flows (floods) and debris flows (rapid movements of soil, sediment, and large wood stream channels) two processes which have major influences on riparian vegetation (Jones et al. 2000) as well as aquatic and riparian patch dynamics critical to stream ecosystems (Pringle et al. 1988). Numerous frog species breed in streams which can be adversely affected by fluctuations in the frequency or magnitude of peak flows, thereby, adversely affecting recruitment.

3.6.5.2 Direct/indirect effects of the prohibition of cross-country motor vehicle travel.

The effect of the prohibition on cross-country motor vehicle travel would be to end traffic on routes and areas beyond the authorized NFTS. Human caused mortality would cease, as would behavioral changes due to disturbances. On going habitat modification would be slower to end as in the short term, the unauthorized routes and areas disturbed by motor-vehicle use would not change much because removal of vegetation, compaction of soils, and alteration of drainage patterns require time to heal without active restoration. Elimination of traffic on unauthorized routes and areas will reduce erosion, but the routes will still intercept and concentrate surface flows and produce sediment until such time that recovery occurred to prevent sediment from entering the stream network. In the long term, some or all unauthorized routes and areas would revegetate and regain some of their hydrologic and geomorphic functions, although use of these routes by non-motorized vehicle traffic could delay or prevent recovery. See Soils and Hydrology for more information regarding rate of recovery of routes not added to the system.

Short-term timeframe: 1 year.
Long-term timeframe: 20 years.
Spatial boundary: dependent on indicator.

Indicator(s): (**1)** Miles of unauthorized routes within or adjacent to TES aquatic biota habitat, (**2)** Number of stream crossings within aquatic biota habitat, (**3)** Acres of species habitat affected, (**4)** Density of motor vehicle routes at the 6th field watershed level and, (**5)** Miles of unauthorized routes and the number of stream crossings within key watersheds.

Methodology: GIS analysis of added routes in relation to habitat and important/sensitive aquatic areas.

3.6.5.3 Direct/Indirect effects of adding routes to the NFTS, including identifying seasons of use and vehicle class

The direct and indirect effects of adding routes to the NFTS are discussed above in Section 3.14.5.1. As stated in the assumptions, all vehicle types result in the same amount of disturbance effect on aquatic dependent species, therefore type of vehicle class will not be analyzed in this aquatic biota section. Mitigations such as identifying the season of use or addition of water bars on added routes can reduce impacts to aquatic ecosystems. Limiting the seasons of use may provide beneficial effects to wildlife species and their habitat based on their life history. The condition of native surface roads and motorized trails can quickly decline during winter or wet weather use due to rutting. This effect is analyzed in the hydrology and soils sections.

Short-term timeframe: 1 year.
Long-term timeframe: 20 years.
Spatial boundary: dependent on indicator.

Indicator(s): (**1)** Miles of unauthorized routes within or adjacent to TES aquatic biota habitat, (**2)** Number of stream crossings within aquatic biota habitat, (**3)** Acres of species habitat affected, (**4)** Density of motor vehicle routes at the 6th field watershed level and, (**5)** Miles of unauthorized routes and the number of stream crossings within key watersheds.

Methodology: GIS analysis of added routes in relation to habitat and important/sensitive aquatic areas

3.6.5.4 Changes to the existing NFTS

As stated above in the assumptions, changes to the existing NFTS will not have additional impacts to water resources and associated aquatic biota habitat because no additional ground disturbance will occur as a result of the changes (i.e., mixed use, trails co-located). However, when routes that have historically been managed as Maintenance Level 1 (ML1) roads are changed to trails they then become open to public use. Opening these roads for public use would result in the same direct effects (mortality and behavior changes) to wildlife as adding a route to the system. Literature indicates that placement of routes in relation to habitat can affect terrestrial species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulek and Frissell 2000, USDA 2000).

Miles of routes changed to non-motorized use would still permit horse and foot traffic but impacts to water resources would be less, however, direct and indirect impacts to aquatic biota at stream crossings would vary based on type of use.

The changes in season of use to existing NFTS trails were a result of the need to match the trails season of use to the connecting roads. The identified connecting roads had seasonal restrictions; therefore, the associated trails also need a seasonal restriction for purposes of MVUM development.

Short-term timeframe: 1 year.
Long-term timeframe: 20 years.
Spatial boundary: dependent on indicator.

Indicators: (6) Miles and location of Level 1 roads with co-located trails, (7) Miles and location of motorized routes changed to non-motorized use.

Methodology: GIS analysis of changes to existing NFTS in relation to habitat and important/sensitive aquatic areas.

3.6.5.5 Cumulative Effects

For aquatic dependent species, the direct, indirect, and cumulative effects of each alternative are analyzed. Direct and Indirect effects can be assessed together and should be assessed in both the short term (within 1 year) and the long term (approximately 20 years). Cumulative effects are assessed only in the long term (approximately 20 years) and incorporate past/present (the current situation), as well as a qualitative discussion of other past/present and reasonably foreseeable future actions potentially affecting these species (eg., timber sales, grazing, other recreational uses, etc.).

Short-term timeframe: not applicable; cumulative effects analysis will be done only for the long-term time frame.
Long-term timeframe: 20 years.
Spatial boundary: Lower Trinity and Mad River ranger districts.

Methodology: GIS analysis of past/current, added, and future routes in relation to habitat and important/sensitive aquatic areas and in context of other past/current and future management actions affecting aquatic habitat.

3.6.6 Aquatic Affected Environment

This section briefly describes the existing condition of the aquatic biota and their habitat within the Mad River and Lower Trinity ranger districts. Refer to Chapter 3 for travel management specifics (state of the routes). Information regarding the unauthorized routes is displayed by 6th field watershed.

At present, the Six Rivers National Forest provides habitat for three aquatic species listed as Endangered or Threatened under the ESA, all anadromous salmonids, and five species considered as Forest Service Sensitive, including salmonids and amphibians. These species and their habitats on the Six Rivers National Forest are described in detail in the Lower Trinity and Mad River Ranger District Motorized Travel Management EIS Biological Evaluation / Biological Assessment (BE/BA), (in progress).

The table below indicates the aquatic endangered, threatened, proposed, and Forest Service sensitive species are known to or are suspected to occur on Six Rivers National Forest or are species that may be affected by actions occurring on Six Rivers NF (i.e. downstream effects to anadromous salmonid populations). The Endangered Species Act (ESA), as amended, defines a "species" to include any distinct population segment of any species of vertebrate fish or wildlife. For Pacific salmon, the National Marine Fisheries Service (NMFS) considers an evolutionarily significant unit, or "ESU," a "species" under the ESA. For Pacific steelhead, NOAA has delineated distinct population segments (DPSs) for consideration as "species" under the ESA. As is indicated in the table, both Chinook and steelhead have an ESA-listed population in the project area, as well as a Forest Service Sensitive population based in which ESU or DPS they belong. Therefore, distribution of these species is broken down by watershed or river basin.

The following table displays the status of the aquatic species under consideration in this document. Given the species under consideration in this document, aquatic habitat for these species is being considered at three levels which are carried through to the indicators:

- Crenulated stream layer: This includes well over 1,100 miles of perennial and intermittent stream networks using a riparian buffer width (150 to 300'feet based on stream type) to incorporate habitat for aquatic species. It is the most conservative measurement of impacts to aquatic habitat.
- Fish Bearing Distribution: this includes anadromous habitat in addition to resident fish habitat that occurs above salmon habitat as well as fish habitat above Matthews Dam and reaches above anadromous habitat. This is approximately 370 miles of stream habitat (both intermittent and perennial stream habitat) and associated 300 foot riparian buffer (total of 600 feet)
- Anadromous Distribution: this represents all major streams and tributaries containing listed anadromous salmonids within the Forest boundary. This is approximately 171 miles of stream habitat and associated 300 foot riparian buffer (total of 600 feet)

Table 3.6-2: List of Six Rivers National Forest special status species by habitat indicator and distribution over analysis area.

Species	Federally Listed Threatened	Forest Service Sensitive	Management Indicator Species	Habitat	Distribution – River Basin
Coho Salmon and Designated Critical Habitat And EFH	X	-	-	Anadromous Distribution *downstream effects to be considered	Trinity, Mad River*, Van Duzen*, NF Eel River*
Chinook Salmon and Designated Critical Habitat And EFH	X	-	-	N/A – downstream effects to be considered	Mad River*, Van Duzen*, NF Eel River*
Chinook Salmon And EFH	-	X	-	Anadromous Distribution	Trinity
Steelhead and Designated Critical Habitat	X	-	River/Stream/ Creek Assemblage	Anadromous Distribution	Mad River, Van Duzen, NF Eel River
Steelhead	-	X	River/Stream/ Creek Assemblage	Anadromous Distribution	Trinity
Resident rainbow trout	-	-	River/Stream/ Creek Assemblage	Fish Bearing Distribution	Trinity, Mad River, Van Duzen, NF Eel River
Foothill yellow-legged frog	-	X	River/Stream/ Creek Assemblage	Crenulated stream layer Below 6,345 feet elevation	Trinity, Mad River, Van Duzen, NF Eel River
Tailed Frog	-	X	River/Stream/ Creek Assemblage	Crenulated stream layer High elevation	Trinity, Mad River, Van Duzen, NF Eel River
Western pond turtle	-	X	Marsh/ Lake/ Pond/Assemblage	Fish Bearing Distribution Below 4,500 feet elevation	Trinity, Mad River, Van Duzen, NF Eel River
Southern torrent salamander	-	X	Bog/Seep/Spring/Wet Meadow Assemblage	Crenulated stream layer Below 4,820 feet elevation	Trinity, Not common on Mad River, Van Duzen, NF Eel River
* Population found in the watershed downstream of Forest Boundary for these species					

3.6.6.1 Threatened Species

Coho salmon (*Oncorhynchus kisutch*)

Status: Federal Threatened for Southern Oregon/Northern California Coasts (SONCC) ESU, Designated Critical Habitat

The most productive coho streams are small, rather than large, because small streams have the highest proportion of marginal slack water to midstream area. Insect drift in midstream of large streams is generally unavailable to juvenile coho and is lost from production, therefore, the wider the stream, the greater the loss of food.

In contrast to the life history patterns of other anadromous salmonids, coho salmon in the region generally exhibit a relatively simple, 3-year cycle. Southern Oregon and northern California coho adults typically enter rivers in September or October. River entry south of the Klamath Basin, occurring in November and December. Spawning occurs typically in December. Depending on temperature, eggs incubate in redds for 1.5 to 4 months before hatching as alevins. Following yolk sac absorption, alevins emerge from the gravel as young juveniles or fry and begin actively feeding. They require cold water (10-15 degrees Celsius), deep pools, and abundant instream cover, especially fallen trees. Fry rear in fresh water for up to 15 months, then migrate to the ocean as smolts in the spring. Coho salmon typically spend two growing seasons in the ocean before returning to their natal stream to spawn as three-year-olds. Coho salmon die after spawning. See Weitkamp et al. (1995) "Status review of coho salmon from Washington, Oregon and California" for complete life history information and current status review.

Critical habitat is defined in Section 3(5)(A) of the ESA as " the specific areas within the geographical area occupied by the species..." on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection". Critical habitat was designated (64 FR 24049 May 5) to include all river reaches accessible to listed coho salmon between Cape Blanco, Oregon, and Punta Gorda, California. Critical habitat consists of the water, substrate, and adjacent riparian zone of estuarine and riverine reaches (including off-channel habitats) Accessible reaches are those within the historical range of the ESU that can still be occupied by any life stage of coho salmon. Inaccessible reaches are those above specific dams or above long-standing, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years).

Remnant populations of coho are present on the Six Rivers National Forests in the watersheds of the Smith, Klamath and Trinity Rivers. Coho are also found downstream of the Forest boundary on the Mad River, Redwood Creek and the Eel River. These populations are very low and are found only incidental to other salmon and steelhead in streams on the Forest.

Project specifics: Within the project area, coho are located only in the Trinity River watershed and main tributaries though complete survey information is lacking. Information from existing surveys indicate that Sharber Creek (part of the Hawkins/Sharber 6th field HUC) is a critical spawning area. Less than one mile (0.7) of unauthorized routes spread over three watersheds is located within the riparian reserves adjacent to coho habitat within the Trinity basin. No unauthorized routes are located within the Sharber Creek watershed with the exception of ridgetop routes. One ML1 road would have a trail co-located on it on the ridgetop.

Chinook Salmon (*Oncorhynchus tshawytscha*)

Status: Threatened - California Coastal ESU (Redwood Creek south)
Forest Service Sensitive – Upper Klamath and Trinity Rivers ESU

Adult spawning runs begins in August and continues into January. Chinook salmon require cool water, diverse and complex habitat and clean gravels to successfully reproduce. Depending on temperature, eggs incubate in redds for 1.5 to 4 months before hatching as alevins. Following yolk-sac absorption, alevins emerge from the gravel as fry and begin feeding. Habitat needs of Chinook salmon fry change rapidly from the time of emergence to time of smolting, but generally require cool water and instream cover. Fry grow quickly and will emigrate from freshwater between 60 and 120 days after emergence. For a complete life history description and

status review see Meyers et al (1998) "Status Review of Chinook Salmon from Washington, Idaho, Oregon and California".

Project specifics: Horse Linto and Cedar Creek are important spawning and rearing streams for Chinook salmon and have had significant restoration projects, both instream and upslope. Other watersheds in the Trinity basin provide additional spawning and rearing habitat as well. The North Fork Eel has historical records of Chinook salmon populations although currently the falls at Split Rock prevent access to NFS lands. Chinook habitat is anywhere from approximately 3 miles (Bug Creek) to 13 miles (Pilot Creek) downstream of Forest Service lands on the Mad River, and approximately 8 miles downstream on the Van Duzen.

The project area does not overlap ESA listed Chinook (California Coastal ESU) habitat. Less than one mile (0.7) of unauthorized routes spread over three watersheds are located within the riparian reserves adjacent to Forest Service Sensitive Chinook habitat. Within Horse Linto and Cedar creeks there are 0.16 miles out of 10.7 existing unauthorized routes located in the riparian area: no crossings are associated with the 0.16 miles.

Steelhead (*Oncorhynchus mykiss*)

Status: Threatened - Northern California DPS w/ Critical Habitat
Forest Service Sensitive – Klamath River DPS
Management Indicator Species – Resident and Anadromous life stages

Steelhead exhibit a wide variety of life history strategies. In general, steelhead migrate to the sea after spending two years in fresh water and then spend two to three years in the ocean prior to returning to fresh water to spawn. Spawning ranges from December through April, with peak spawning in January in the larger basins and late February and March in the smaller coastal basins (Busby et. al. 1996).Variation of this pattern is common. Some spawners survive and return to the ocean for one or more years between spawning migrations.

The Northern California DPS includes steelhead in California coastal river basins from Redwood Creek south to the Gualala River, inclusive. Steelhead require cool water, diverse and complex habitat, and clean gravels to reproduce successfully. Habitat needs of steelhead vary with season of year and life cycle stage. Substrate composition, water quality, and water quantity are important habitat elements for steelhead before and during spawning. Critical Habitat was not designated in the North Fork Eel River and only designated up to County Line Creek on the Mad River.

Project specifics: Steelhead, both the anadromous and resident life forms are found throughout the project area. The threatened population (NC steelhead) includes both winter and summer steelhead, but not the resident trout life form. NC steelhead are found in the project area within the Mad River, Van Duzen and North Fork Eel watersheds.

A total of 2.11 miles of unauthorized routes, distributed between six watersheds are located within the riparian reserves adjacent to steelhead habitat. Two routes provide access to the Mad River (no crossings) however this occurs above County Line Creek. A total of three unauthorized routes provide access to NC steelhead habitat in the North Fork Eel River watershed with two crossings occurring on a route from private lands. One existing Forest Service motorized trail crosses potential spawning habitat for NC steelhead (Bradburn Trail). Unauthorized routes in riparian reserves adjacent to resident trout habitat total 16 miles (inclusive of the 2.11 for steelhead) and 17 stream crossings.

3.6.6.2 Forest Service Aquatic Wildlife Sensitive Species

Foothill Yellow-legged Frog (*Rana boylii*)

The foothill yellow-legged frog is found in or near rocky streams or rivers in a variety of habitats. Populations may be found from sea level to as high as 6365 ft (1940 m). This species is most common in streams that have a rocky or gravelly substrate, but they may be found in other riparian habitats including moderately vegetated backwaters, isolated pools, and slow moving rivers with mud substrates (Nussbaum et al. 1983). Pebble/cobble river bars along both riffles and pools, with at least 20% shading, seems to be preferred habitat by sub-adults and adults. Breeding habitats occur in shallow, slow flowing water with at least some pebble and cobble substrate.

The yellow-legged frog usually breeds in the streams and pools they inhabit (Nussbaum et al. 1983). In California, breeding and egg-laying usually wait until the end of spring flooding, and may commence anytime from Mid-March to May, depending on local water conditions. The breeding season at any locality is usually two weeks. The eggs are laid in round, softball-sized clumps where they are attached to rocks or gravel in the margins of streams and pools. The eggs hatch in 5 days and the larvae are from 7.3 to 7.7 mm in total length. Metamorphosis takes 3 to 4 months (ibid).

Good water quality is an important habitat component because frogs spend a majority of their life cycle in water and absorb contaminants through their skin. Gravel and cobble substrates and lush aquatic and riparian vegetation provide cover and shade. When frightened, this species dives to the bottom and takes refuge among the camouflaging stones and vegetation. If any or all of these habitat components are disturbed by management activities, foothill yellow-legged frogs may be negatively affected. Unlike most other ranid frogs in California, this species is rarely encountered (even on rainy nights) far from permanent water.

Project specifics: A total of approximately 53 miles of unauthorized routes, distributed between 27 watersheds are located within the riparian reserves. In addition 519 stream crossings occur based on the crenulated stream layer. The foothill yellow-legged frog is common across the Six Rivers National Forest.

Tailed Frog (*Ascaphus truei*)

The tailed frog is a uniquely adapted species associated with aquatic and riparian habitats in northern California. Locally, this species is seen most commonly in and adjacent to cold, rocky, fast-flowing permanent mountain streams and rivers in humid forests. Components of suitable tailed frog habitat include clean, cold water, gravel and cobble substrates and lush riparian vegetation. Similar to the foothill yellow-legged frog, good water quality is an important habitat component because of the absorbent nature of frogs skin. Tailed frog tadpoles have adapted a unique ability to survive in a fast flowing stream environment by clinging to rocks with its large sucker like mouth, making the presence of gravel and cobble essential. Rocky substrates and lush aquatic and riparian vegetation provide cover and shade. Adults seek cover primarily under submerged rocks, logs and vegetation within the stream or under similar objects close to the stream. If any or all of these habitat components are disturbed by management activities, tailed frogs may be negatively affected.

Project specifics: A total of approximately 53 miles of unauthorized routes, distributed between 27 watersheds are located within the riparian reserves. The majority of the 519 stream crossings do not occur in suitable habitat across the project area as tailed frogs are more likely to be found in steeper channels that routes tend not to cross.

Western Pond Turtle (*Clemmys marmorata*)

The western pond turtle is the only freshwater turtle native to the west coast of North America. It is primarily associated with aquatic and riparian habitats from sea level to about 4500 feet. During the spring and summer (the active season) turtles often concentrate in low gradient and low velocity sections of creeks and rivers, especially in sloughs, side channels, and backwater areas. They prefer rivers and creeks that have sunny banks, basking substrates and deep still water with underwater debris for escape cover.

Western pond turtles are habitat generalists, occurring in a wide variety of permanent and intermittent aquatic habitats and by using terrestrial habitats extensively. Individual western pond turtles (usually males) may have large home ranges and may wander within a given watercourse for several kilometers on a regular basis (Holland 1994, Reese and Welsh 1997). In streams, Reese (1996) found that all turtles in the study used terrestrial habitats during the course of the year. Terrestrial habitats are needed for nesting, overwintering, and for seasonal uses. Western pond turtle nests have been found as far as 435 yards from the stream (Reese and Welsh 1997) in open sunny areas on hillslopes, generally with a south to southwest facing aspect. Nest sites typically occur in open areas dominated by grasses or herbaceous annuals on dry, well-drained soils with high clay/silt content and low (less than 15 degree) slope (Holland 1994). There is some indication that most nesting excursions occur at night (Rathbun et al. 2002).

Before the fall rains begin and water levels rise western pond turtles migrate upslope from the rivers to overwinter on the slopes above the high water zone. In spring, the turtles migrate back downslope toward the rivers. Female turtles migrate to alluvial nesting benches to lay eggs. Western pond turtles exhibit nest site fidelity, which means once they reach sexual maturity, females return to the nesting bench they hatched from to lay their eggs. Nesting benches are usually located on flat benches on the banks of rivers in close proximity to rearing habitat (shallow water and riparian vegetation). Once the turtles arrive at the nesting benches they dig holes in the loose friable soil, lay their eggs in the holes and cover them up with the displaced soil.

When the juvenile turtles hatch, they are about the size of a quarter and are very susceptible to predation. Many migrate to the nearest rearing habitat. Rearing habitat consists of shallow edge water areas with minimal current and lush vegetation including ponds, springs and vernal pools. Once able, the turtles leave the rearing habitat and migrate to the mainstem rivers.

Project specifics: A total of approximately 16 miles of unauthorized routes and 17 crossings are located within the riparian reserves along fish bearing streams. These 16 miles are spread across 14 watersheds. On the Six Rivers National Forest, the western pond turtle is most commonly seen basking on the banks of main stem rivers. The fish bearing streams are made up of the mainstem rivers and larger tributaries where western pond turtles are found. Many of these fish bearing streams are found with little associated floodplains.

Southern Torrent Salamander (*Rhyacotriton variegatus*)

This species is found from near sea level to 4820 feet in elevation. Preferred habitat is described as cold, permanent seeps and small streams with a rocky substrate. Welsh and Lind (1996) found that this species is associated with cold, clear headwater to low-order streams with loose, coarse substrates in humid forest habitats with large conifers, abundant moss, and greater than 80% canopy cover. These conditions are mostly found within late seral stage forests. According to Welsh and Lind (1996) suitable habitat has the following characteristics: 1) conifer dominated forests associated with mature to old growth structural attributes; with 15-130 conifers per acre greater than 21 inches dbh, 72-100% canopy closure, and low numbers of cut

stumps, low % cover of grass, and high % cover of moss; 2) seep or other shallow, slow flowing habitats with cold, clear water in first to third order streams; with 15-46% of the substrate in cobble, a mix of coarse substrates (cobble, pebble, and gravel), 3-47% substrate cementedness, and sand and fine organic particles present; and 3) water temperature from 43.7-59.0 ° F.

Adult southern torrent salamanders are active at night at air and water temperatures between 41 and 50° F (Jennings and Hayes 1994). This salamander is desiccation intolerant (ibid.). This species eats primarily amphipods, springtails, and insect larvae found in moist habitat (Jennings and Hayes 1994). Courtship and mating occur throughout the active season (Nussbaum et al. 1983). Eggs may be laid at almost anytime, although it appears that most are laid in May. Eggs are laid deep within narrow rock cracks with cold water flowing over them. Adults are not known to attend the nests. The combined embryonic and larval stages of this species are from 4 to 4.5 years (Jennings and Hayes 1994). Individuals may require six to seven or more years to reach sexual maturity (ibid.).

Project Specifics: Southern torrent salamander is not known to occur within the southern portion of the project (Mad River, Van Duzen, North Fork Eel River) as optimal habitat is severely limited by high temperatures and dry habitats. The southern torrent salamander is also known as the southern seep salamander. An unknown amount of seeps and springs are located within the project area, however, they would be included in the crenulated layer for analysis purposes. The Six Rivers National Forest is identified as having yearlong habitat.

3.6.7 Environmental Consequences

The following is the direct, indirect and cumulative effects of each alternative using the Effects Analysis Methodology discussed above. Each Alternative displays the direct and indirect effects using identified indicators of implementing the alternative as a whole and includes the following three actions:

- Prohibition of cross-country motor vehicle travel;
- Adding facilities to NFTS, including season of use and mitigations
- Changes to the existing NFTS

Direct/Indirect Effects

Indicator(s): (**1)** Miles of unauthorized routes within or adjacent to TE habitat, and Forest Service sensitive and MIS habitat represented by a) crenulated stream layer, b) fish bearing, and c) anadromous habitat (TE species); (**2)** Number of stream crossings within aquatic biota habitat (a, b and c), (**3)** Acres of species habitat affected (a, b), (**4)** Density of motor vehicle routes at the 6th field watershed level and, (**5)** Miles of unauthorized routes and the number of stream crossings within key watersheds, **(6)** Miles and location of Level 1 roads with co-located trails, **(7)** Miles and location of motorized routes changed to non-motorized use.

3.6.7.1 Alternative 1 = No Action

This alternative poses the greatest risk of impacts to water resources and associated aquatic biota due to the continued concentrated use of the unauthorized routes. No changes would be made to the current NFTS and no cross-country travel prohibition would be put into place. The table below shows Alternative 1 by watersheds organized north to south.

Direct/Indirect Effects of No Prohibition of Cross Country Travel

Indicators: (1) Miles of unauthorized routes within or adjacent to TE habitat, and Forest Service sensitive and MIS habitat represented by a) crenulated stream layer, b) fish bearing, and c) anadromous habitat (TE species); (2) Number of stream crossings within aquatic biota habitat (a, b and c).

Table 3.6-3: No Action Alternative - Riparian Reserves (Indicator 1) and Stream Crossings (Indicator 2) by Watershed

		Indicator 1 – a, b, c			Indicator 2 – a, b& c	
Key Watersheds are Bolded	**Miles UA Routes**	**Miles w/in RRs**	**Miles in Fish Hab RRs**	**Miles in Anad RRs**	**# of xings**	**# of xings fish/anad habitat**
Mill Creek	2.34	0.27	0	0	0	0
Tish Tang a Tang Creek	4.58	1.86	0.95	0	17	0
Upper Tribs Lower Trinity River	11.88	2.37	0.23	0.23	20	0
Willow Creek	9.19	1.75	0	0	20	0
Hawkins-Sharber	9.17	1.62	0.58	0	9	1
Cedar Creek	**5.18**	**0.32**	**0**	**0**	**1**	**0**
Horse Linto Creek	**5.51**	**0.23**	**0.16**	**0.16**	**3**	**0**
Grouse Creek	**20.93**	**5.39**	**1.85**	**0**	**76**	**2**
Lower Tribs Lower SF Trinity	**11.60**	**2.67**	**0.34**	**0.34**	**18**	**0**
Madden Creek	**3.35**	**1.22**	**0**	**0**	**5**	**0**
Hyampom	1.93	0.65	0.09	0	4	0
Redwood Creek	2.02	0.23	0	0	0	0
Pilot Creek	**11.79**	**1.24**	**0.03**	**0**	**24**	**0**
Upper Tribs Lower Mad River	4.87	3.03	0.03	0	35	0
Lower Middle Mad River	17.70	2.61	0.61	0.61	32	0
Ruth Reservoir	9.98	1.16	0	0	21	8
Lower Tribs Upper Mad River	19.89	7.54	3.57	0	54	0
Upper Tribs Upper Mad River	7.86	1.66	1.19	0	18	2
Headwaters North Fork Eel River	**8.53**	**2.05**	**0.60**	**0.60**	**23**	**2 - Anad**
Salt Creek	**1.62**	**0.14**	**0.14**	**0.14**	**1**	**0**
Upper North Fork Eel River	**10.30**	**2.23**	**0**	**0**	**37**	**0**
Little Van Duzen River	7.51	0.68	0	0	2	0
Lower Tribs Upper Van Duzen R	13.91	2.72	0.46	0	23	0
Middle Tribs Upper Van Duzen R	29.56	7.70	5.31	0	58	2
Upper Tribs Upper Van Duzen River	5.36	0.15	0	0	1	0
Lower Dobbyn Creek	4.88	0.76	0	0	6	0
South Dobbyn Creek	3.46	0.71	0	0	11	0
Kekawaka Creek	0.28	0.00	0	0	0	0
Sum Key Watersheds (Ind 5)	**80.73**	**16.14**	**2.94**	**1.24**	**188**	**4**

		Indicator 1 – a, b, c			Indicator 2 – a, b& c	
Key Watersheds are Bolded	**Miles UA Routes**	**Miles w/in RRs**	**Miles in Fish Hab RRs**	**Miles in Anad RRs**	**# of xings**	**# of xings fish/anad habitat**
Grand Total (approximate)	**255**	**53**[1]	**16**	**2.11**	**519**	**17**

Under Alternative 1 (no action/existing condition), cross-country motorized travel would not be prohibited on unauthorized routes. Approximately 255 miles of unauthorized routes would continue to be used by motorized vehicles. Of this, 53 miles of riparian reserves (225 acres) would be continued to be impacted spread out over 27 6th field watersheds. The longest route section in a riparian area is 0.81 miles (with two stream crossings) in Grouse Creek. The majority of these miles are short portions of longer routes that bisect riparian areas or cross stream channels.

Sediment production from vehicle use of native surfaced routes will likely continue and hydrologically sensitive areas (riparian reserves) will continue to be impacted. It is difficult to predict where cross-country travel may occur in the future, any attempts to measure effects associated with future proliferation of routes is very speculative. Most forest visitors will stay on existing routes. However, there will be no treatment or mechanism to deter the further proliferation of routes or use in hydrologically sensitive areas. In the short term (1 year), there would be little recovery, as the unauthorized routes would still be accessible. Long term recovery of hydrologically sensitive areas would be unlikely as use would still not be prohibited.

Many factors affect the degree of impact to aquatic resources from roads, and there can be a greater possibility of adverse impacts as road density in a watershed increases. However, research indicates the relationship between the degree of impacts to aquatic resources and road density is not simple and linear. It is suggested that separation of roads from streams appears to be a more effective means of reducing sediment delivery than road elimination. The majority of the miles of unauthorized routes are located outside of riparian areas as only 53 miles out of 255 miles are within riparian reserves as measured at the crenulated layer.

Table 3.6-4: Alternative 1 No Action and Alternative 2 – By Species – Indicator 1, 2, and 3

		Alternative 1 – No Action			Alternative 2 – Proposed Action		
Species	**Distribution River Basin**	**Ind 1 Adj Routes**	**Ind 2 # of Xings**	**Ind 3 Acres**	**Ind 1 Adj Routes**	**Ind 2 # of Xings**	**Ind 3 Acres**
Total Project Wide		**255**	**519**	**n/a**	**57**	**47**	**0**
Coho Salmon ESA listed	Trinity, Mad River*, Van Duzen*, NF Eel River*	0.71	0	3	0	0	
Chinook Salmon ESA listed	Mad River*, Van Duzen*, NF Eel River*	0	0	0	0	0	0
Chinook Salmon	Trinity	0.71	0	3	0	0	0

[1] This number is slightly higher than the 49.3 from the Hydrology section as it relied on an older version of the GIS data prior to corrections. It accurately reflects the distribution of the miles across the watersheds.

		Alternative 1 – No Action			Alternative 2 – Proposed Action		
Species	**Distribution River Basin**	**Ind 1 Adj Routes**	**Ind 2 # of Xings**	**Ind 3 Acres**	**Ind 1 Adj Routes**	**Ind 2 # of Xings**	**Ind 3 Acres**
Steelhead	Mad River, Van Duzen, NF Eel River	1.4	2	6	0.53	0	2.3
Steelhead	Trinity	0.71	0	3	0	0	0
Resident rainbow trout	Trinity, Mad River, Van Duzen, NF Eel River	16	17	9	3.25	1	14
Foothill yellow-legged frog	Trinity, Mad River, Van Duzen, NF Eel River	53	519	225	6.1	47	26
Tailed Frog	Trinity, Mad River, Van Duzen, NF Eel River	53	519	225	6.1	47	26
Western pond turtle	Trinity, Mad River, Van Duzen, NF Eel River	16	17	9	3.25	1	14
Southern torrent salamander	Trinity, Not common on Mad River, Van Duzen, NF Eel River	17.9 in Trinity 34.6 rest of watersheds	173 in Trinity 346 unlikely	76 in Trinity 149 unlikely	1.2 in Trinity 2.05 unlikely	0 in Trinity 1 unlikely	5 in the Trinity 9 unlikely

Vehicles accessing the approximately 519 stream crossings would continue to cause direct and indirect impacts to amphibians in those areas where habitat conditions existed. Of the 519 crossings, 17 are found in fish bearing streams, with two impacting anadromous habitat. Effects of the use on those stream crossings through fish bearing areas are displayed below by route.

Table 3.6-5: Unauthorized routes with crossings in fish habitat.

Route Number	Watershed	Species* habitat and existing impacts
PK762 2 Crossings	Headwaters North Fork Eel River	NCS, FYLF, TF, WPT would continue to be disturbed. Impact is limited to small area of stream due to gradient and large boulders. Impacts could include crushing of individuals, disturbance to feeding habitats for period of time vehicles in use. Sediment anticipated to be low, some insignificant amount of contaminents could be introduced to stream system
UALT0046r	Hawkins-Sharber Creek	RBT, FYLF, WPT would continue to be disturbed. The crossing is on Hawkins Creek directly above the Trinity River.
PK857	Lower Tribs Upper Mad River	RBT, FYLF, WPT would continue to be disturbed based on flow conditons. This area of the Mad River (above Ruth Reservor) can go subsurface. Sediment anticipated to be low, some insignificant amount of contaminents could be introduced to stream system
JM-2123x	Lower Tribs Upper Mad River	Same area as PK857
PK821	Lower Tribs Upper Mad River	RBT, WPT, FYLF would continue to be disturbed based on flow conditons. This area of the Mad River (above Ruth Reservor) can go subsurface. Sediment anticipated to be low, some insignificant amount of contaminents could be introduced to stream system
PK824	Lower Tribs Upper Mad River	Same area as PK821
PK834	Lower Tribs Upper Mad River	Same area as PK821
UAMR0053t	Lower Tribs Upper Mad River	RBT, FYLF would continue to be disturbed based on flow conditons. Armstrong Creek, tributary to the Mad River can go subsurface. Sediment anticipated to be low, some insignificant amount of contaminents could be introduced to stream system
PK858 2 Crossings	Lower Tribs Upper Mad River	Same area as PK821

Route Number	Watershed	Species* habitat and existing impacts
JM-2092	Middle Tribs Upper Van Duzen River	RBT, FYLF, WPT would continue to be disturbed along the Van Horn Creek. Based on flow conditions, RBT and FYLF would likely be able to avoid crushing. The stream is a low gradient channel, with one OHV crossing. Based on the sensitive terrain, some level of sediment could be introduced to stream system
TH214x	Middle Tribs Upper Van Duzen River	Same as JM-2092
TH1009	Upper Tribs Upper Mad River	Impacts would be similar to those described for PK857
UAMR0080r	Upper Tribs Upper Mad River	RBT, FYLF, WPT – South Fork Mad River will go subsurface but greater flow exists. Impacts would be greatest as flows diminish.
UALT0133r 2 Crossings	Grouse Creek	RBT, FYLF, WPT, STS would continue to be disturbed. Impact is limited to small area of stream due to gradient and large boulders. Impacts could include crushing of individuals, disturbance to feeding habitats for period of time vehicles in use. Sediment anticipated to be low, some insignificant amount of contaminents could be introduced to stream system
*NCS – northern California steelhead (threatened); FYLF – foothill yellow-legged frog; TF – tailed frog; WPT – western pond turtle; RBT – resident rainbow trout, STS – southern torrent salamander		

Indicator(s) con't: (3) Acres of species habitat affected (crenulated and fish bearing)), (4) Density of motor vehicle routes at the 6th field watershed level and, (5) Miles of unauthorized routes and the number of stream crossings within key watersheds. Indicators (6) and (7) do not apply to Alternative 1 as no action occurs.

Indicator 3 compares the acres of aquatic species habitat affected at the crenulated and fish bearing levels. Currently unauthorized routes affect 225 acres of stream habitat, of which 51 acres are in fish bearing streams and associate riparian zones.

The table below shows the road densities for the existing NFTS and for all alternatives (existing plus the density of the unauthorized routes). Across the project area, Key Watersheds currently have 81 miles of unauthorized routes crossing 196 streams and affecting 68 acres of riparian habitat. The densities reflect the decommissioning done to date in each watershed (see Hydrology section). All alternatives are displayed for reference.

Table 3.6-6: Alternative 1, 2, 3 and 4 – Aquatic Indicator 4 Density by Watershed

Indicator 4 **Bolded Watersheds are Key Watersheds**	**NFTS Current Density** (mi/sqmi)	**Alt 1 No Action**	**Alt 2 Proposed Action**	**Alt 3**	**Alt 4**
Mill Creek	0.06	0.11	0.06	0.06	0.06
Tish Tang a Tang Creek	0.25	0.41	0.27	0.27	0.25
Upper Tribs Lower Trinity River	1.76	2.01	1.84	1.84	1.76
Willow Creek	1.53	1.75	1.56	1.59	1.53
Hawkins-Sharber	2.68	2.98	2.86	2.86	2.68
Cedar Creek	**2.63**	**2.83**	**2.70**	**2.82**	**2.63**
Horse Linto Creek	**0.75**	**0.89**	**0.77**	**0.79**	**0.75**
Grouse Creek	**1.34**	**1.71**	**1.35**	**1.40**	**1.34**
Lower Tribs Lower South Fork Trinity	**2.21**	**2.47**	**2.32**	**2.32**	**2.21**
Madden Creek	**1.80**	**1.94**	**1.81**	**1.81**	**1.80**
Hyampom	**0.03**	**0.06**	**0.03**	**0.03**	**0.03**
Headwaters Redwood Creek	0.08	0.10	0.08	0.08	0.08
Pilot Creek	**2.41**	**2.71**	**2.48**	**2.48**	**2.41**
Upper Tribs Lower Mad River	0.23	0.53	0.24	0.28	0.23
Lower Middle Mad River	1.76	2.12	1.84	1.84	1.76
Ruth Reservoir	2.81	3.12	2.88	2.88	2.81
Lower Tribs Upper Mad River	3.15	3.60	3.28	3.28	3.15
Upper Tribs Upper Mad River	3.13	3.30	3.17	3.17	3.13
Headwaters North Fork Eel River	**2.36**	**2.52**	**2.27**	**2.29**	**2.36**
Salt Creek	**1.33**	**1.39**	**1.34**	**1.34**	**1.33**
Upper North Fork Eel River	**1.08**	**1.38**	**1.11**	**1.11**	**1.08**
Little Van Duzen River	0.43	0.62	0.48	0.48	0.43
Lower Tribs Upper Van Duzen River	2.30	2.84	2.38	2.38	2.30
Middle Tribs Upper Van Duzen River	2.43	3.25	2.74	2.74	2.43
Upper Tribs Upper Van Duzen River	2.54	2.76	2.62	2.72	2.54
Lower Dobbyn Creek	0.69	0.83	0.71	0.71	0.69
South Dobbyn Creek	0.89	0.98	0.90	0.90	0.89

Indicator 4 **Bolded Watersheds are Key Watersheds**	**NFTS Current Density** (mi/sqmi)	**Alt 1 No Action**	**Alt 2 Proposed Action**	**Alt 3**	**Alt 4**
Kekawaka Creek	0.05	0.06	0.05	0.05	0.05
Average Density by Watershed	**1.53**	**1.76**	**1.58**	**1.59**	**1.53**
Key Watersheds	**1.59**	**1.79**	**1.62**	**1.64**	**1.59**
Underlined routes indicate changes in road density due to changes from motorized to non motorized.					

Of the 27 watersheds, eleven have an existing road density over two and below four miles/square miles. With the addition of the unauthorized routes, an additional watershed would increase over the 2 mi/sqmi level. Of the four watersheds with a road density over 3 mi/sqmi, three are located above Ruth Reservoir.

For Key Watersheds (Indicator 5), the tables above indicate by watershed where affects are occurring. Under Alternative 1, out of the 255 miles of unauthorized routes, 81 are located within Key Watersheds with 192 out of 519 crossings.

Routes added to the NFTS:

There are no direct or indirect effects of adding motorized routes to the existing NFTS because under Alternative 1, no motorized routes would be legally added to the NFTS.

Changes to existing NFTS:

There are no direct or indirect effects of changing the existing NFTS because with this alternative, no changes are proposed to the NFTS.

3.6.7.2 Alternative 2 – Proposed Action

This alternative proposes adding 57 miles of currently unauthorized routes to the NFTS and placing a prohibition on cross-country travel in the project area. The prohibition would include all unauthorized routes not added to the NFTS and any newly created or unmapped routes. This alternative also proposes changes to the existing NFTS by co-locating motorized trails on roads currently closed the public and changing two existing motorized trails to non-motorized.

Direct/Indirect Effects of Prohibition of Cross-Country Travel:

Indicators: (1) Miles of unauthorized routes within or adjacent to TE habitat, and Forest Service sensitive and MIS habitat represented by a) crenulated stream layer, b) fish bearing, and c) anadromous habitat (TE species); (2) Number of stream crossings within aquatic biota habitat (a, b and c) (3) Acres of species habitat affected (crenulated and fish bearing), (4) Density of motor vehicle routes at the 6th field watershed level and, (5) Miles of unauthorized routes and the number of stream crossings within key watersheds.

Alternative 2 would prohibit motorized cross-country travel on 198 miles of unauthorized routes and any unmapped or newly created routes. Of the 198 miles included in the prohibition, about 47 miles (200 acres) would not be added within riparian reserves, including approximately

472 stream crossings. This represents a reduction of 13 acres of stream habitat impacted. The direct/indirect effects of not adding these 198 miles are not entirely beneficial to water resources and therefore the aquatic biota because no restorative treatments for high risk routes are included. Disturbance impacts to anadromous fish would be reduced with the 2.15 miles of unauthorized routes not added near anadromous habitat.

Direct/Indirect Effects of Adding Routes to the NFTS:

Indicators: (1) Miles of unauthorized routes within or adjacent to TE habitat, and Forest Service sensitive and MIS habitat represented by a) crenulated stream layer, b) fish bearing, and c) anadromous habitat (TE species); (2) Number of stream crossings within aquatic biota habitat (a, b and c) (3) Acres of species habitat affected (crenulated and fish bearing)), (4) Density of motor vehicle routes at the 6th field watershed level and, (5) Miles of unauthorized routes and the number of stream crossings within key watersheds.

Alternative 2 proposes to add approximately 57 miles of unauthorized routes to the NFTS, with 6.1 miles within riparian reserves. Within fish bearing riparian reserves, 2.11 miles would be added with one stream crossing in fish habitat. PK857 would cross the Mad River above Ruth Reservoir. Resident rainbow trout, western pond turtle and amphibians in the area would continue to be subject to disturbance and habitat impacts, however, this area goes subsurface in mid summer, limiting the timing of impacts.

Table 3.6-7: Alternative 2 - Aquatic Indicators

Indicator	Description	Alt 1	Alt 2
	Total Miles (approximate)	255	57
Indicator 1	Total Miles Within IRRs	53	6.1
	Total Miles Within Fish Bearing	16	3.25
	Total Adjacent to TES Fish Habitat	2.1	0.53
Indicator 2	Total Number of Stream Crossings	519	47
	Total within Fish Habitat	17	1
	Total within TES Fish Habitat	2	0
Indicator 3	Total Acres based on Crenulated Layer	225	27
	Total Acres based on Fish-Bearing streams	51	11
Indicator 4	Overall Road Denisty (Current NFTS is 1.53 miles/square mile without the unauthorized routes)	1.76	1.58
Indicator 5	Total Miles in Key Watersheds	81	12
	Total Crossings in Key Watersheds	192	9

Road Density (Indicator 4) in the affected watersheds would be reduced from the existing condition (Alternative 1). Of the 27 watersheds, eleven have an existing road density over two and below four miles/square miles. With the addition of the unauthorized routes, an additional watershed would increase over the 2 mi/sqmi level. Of the four watersheds with a road density over 3 mi/sqmi, three are located above Ruth Reservoir. Alternative 2 reduces the road density to that approaching the current NFTS road density. For each watershed, see the Density by Watershed in the above in Alternative 1 (Table 5 in the aquatic section).

In the majority of key watersheds, decommissioning has occurred to reduce the amount of road density in these watersheds. See Table 3 in the Water Resources section for the amount of decommissioning by watershed. The table below displays the miles of routes added in key watersheds for Alternatives 2 and 3.

Direct and Indirect Effects of Changes to Existing NFTS:

Indicators: ***(6)*** *Miles and location of Level 1 roads with co-located trails* ***(7)*** *Miles and location of motorized routes changed to non-motorized use.*

Changing the vehicle class on NFTS routes within riparian areas may result in adverse impacts to aquatic biota. Under Alternative 2, the 7.23 miles of ML1 roads (five separate roads) that will have a motorized trail collocated, all are located on ridgetops. Based on a GIS query using standard riparian buffer widths, three do not enter into riparian reserves while the other two roads skirt the headwater areas of riparian reserves: 7N15 follows the ridge between Sharber Creek and Bremer/Hudson creeks in the Trinity River and 2S24 runs down a ridge in the West Fork of the Van Duzen River. These headwater areas do not support populations of fish or turtles. Impacts to frogs or salamanders would be minor.

Alternative 2 also proposes to change the class of vehicle use of two motorized system trails to non motorized use only (5.8 miles) and change one trail class of vehicle use from motorcycle only to vehicles < 50 inches (3.9 miles). The change in class of vehicle use from motorcycle to vehicles <50 inches is not expected have any impact to water resources as the current width of this motorize trail is already wide enough to accommodate larger vehicles. No additional ground disturbance is expected.

Of the two trails changing to non motorized, one trail is a ridgetop trail with no crossings or aquatic biota concerns (Devils Backbone 6E27). No direct and indirect affects will occur in the short term (1 year) or long term to aquatic biota. The second trail, Bradburn Trail (7E04) is 4.56 miles long and is a steep trail that crosses the West Fork of the North Fork Eel at suitable spawning habitat for NC steelhead. It has received little motorized use historically (see Recreation). It would be assumed that with the increasing OHV use on National Forest lands, use of this route would increase. The change to horse-foot would keep impacts to steelhead and other aquatic biota minimized although some level of disturbance would still occur from use.

In the long term (25-30 years) sedimentation is expected to decrease from existing levels because mitigation measures and routine maintenance are expected to promote or enhance hydrologic function in sensitive areas.

3.6.7.3 Alternative 3 – Expanded Recreation.

Little differences exist between Alternative 2 and Alternative 3 in terms of their effects to aquatic biota. Alternative 3 includes all actions under Alternative 2 plus approximately seven additional miles over seven watersheds. The additional routes added under the Expanded Recreation include mostly ridgetop routes providing alternative travel for licensed vehicles off of main roads.

Direct/Indirect Effects of Prohibition of Cross Country Travel:

Indicators: (1) Miles of unauthorized routes within or adjacent to TE habitat, and Forest Service sensitive and MIS habitat represented by a) crenulated stream layer, b) fish bearing, and c) anadromous habitat (TE species); (2) Number of stream crossings within aquatic biota habitat (a, b and c) (3) Acres of species habitat affected (crenulated and fish bearing)), (4) Density of

motor vehicle routes at the 6th field watershed level and, (5) Miles of unauthorized routes and the number of stream crossings within key watersheds.

Alternative 3 would prohibit travel on 191 miles with 459 stream crossings allowed to recover. Alternative 3 would prohibit 40 miles within riparian areas. The additional 7 miles of routes in riparian areas under Alternative 3 are ridgetop routes unliklely to impact aquatic biota.

The direct/indirect effects of not adding these 190 are not entirely beneficial to water resources and therefore the aquatic biota because no restorative treatments are include in these alternatives. Disturbance impacts to anadromous fish would be reduced with the 2.15 miles of unauthorized routes not added near anadromous habitat.

Direct/Indirect Effects of Adding Routes to the NFTS:

Indicators: (1) Miles of unauthorized routes within or adjacent to TE habitat, and Forest Service sensitive and MIS habitat represented by a) crenulated stream layer, b) fish bearing, and c) anadromous habitat (TE species); (2) Number of stream crossings within aquatic biota habitat (a, b and c) (3) Acres of species habitat affected (crenulated and fish bearing), (4) Density of motor vehicle routes at the 6th field watershed level and, (5) Miles of unauthorized routes and the number of stream crossings within key watersheds.

Table 3.6-8: Alternative 3 - Aquatic Indicators

Indicator	Description	Alt 1	Alt 3
	Total Miles (approximate)	255	64
Indicator 1	Total Miles Within IRRs	53	7.8
	Total Miles Within Fish Bearing	16	3.25
	Total Adjacent to TES Fish Habitat	2.1	0.53
Indicator 2	Total Number of Stream Crossings	519	60
	Total within Fish Habitat	17	1
	Total within TES Fish Habitat	2	0
Indicator 3	Total Acres based on Crenulated Layer	225	34
	Total Acres based on Fish-Bearing streams	51	11
Indicator 4	Overall Road Denisty (Current NFTS is 1.53 miles/square mile without the unauthorized routes)	1.76	1.59
Indicator 5	Total Miles in Key Watersheds	81	16
	Total Crossings in Key Watersheds	192	16

Alternative 2 proposes to add approximately 64 miles of unauthorized routes to the NFTS. Within fish bearing riparian reserves, 2.11 miles would be added with one stream crossing in fish habitat. PK857 would cross the Mad River above Ruth Reservoir. Resident rainbow trout, western pond turtle and amphibians in the area would continue to be subject to disturbance and habitat impacts, however, this area goes subsurface in mid summer, limiting the timing of impacts.

Road Density (Indicator 4) in the affected watersheds would be reduced from the existing condition (Alternative 1). Of the 27 watersheds, eleven have an existing road density over two and below four miles/square miles. With the addition of the unauthorized routes, an additional watershed would increase over the 2 mi/sqmi level. Of the four watersheds with a road density

over 3 mi/sqmi, three are located above Ruth Reservoir. Alternative 3 reduces the road density to that approaching the current NFTS road density. For each watershed, see the Density by Watershed table above in Alternative 1.

In the majority of key watersheds, decommissioning has occurred to reduce the amount of road density in these watersheds. The table above displays the miles of routes added in key watersheds for Alternatives 3.

Changes to existing NFTS:

Alternative 3 does not propose any changes to the existing NFTS that are different than Alternative 2.

3.6.7.4 Alternative 4 – Prohibition of Cross-Country Use.

This alternative will add not any unauthorized routes to the NFTS and would prohibit use on approximately 255 miles. Also, existing and potential unauthorized vehicle access to the North Fork Eel Wilderness would be eliminated by blocking the unauthorized route indicated.

Direct/Indirect Effects of Prohibition of Cross Country Travel:

Under Alternative 4, cross-country motorized travel would be prohibited on all currently unauthorized routes (approximately 255 miles). Of the 255 miles, 53 miles of these routes intersect riparian reserves and about 519 route-stream crossings were tallied. Sediment production from vehicle use of native surfaced routes will likely continue in hydrologically sensitive areas because passive restoration is presumed; only the routes to the North Fork Eel Wilderness would be physically blocked. One of these routes (TH1082) is also adjacent to NC steelhead habitat, though this tributary typically goes subsurface during the later summer and early fall. These routes are not likely to alter peak or low stream flows because the density of these unauthorized routes is low (average 1.6 mi/sqmi project wide) and are spread across 27 6th field watersheds. While it is reasonable to assume that the prohibition will result in less traffic on these 255 miles and therefore less sediment production from motor vehicle use on native surfaced routes, it should be noted that existing erosional features on route travelways would continue to deliver sediment to streams (see Soils, Hydrology).

In the short term (1 year), there would be little recovery, as only passive recovery of these routes is anticipated. Long term recovery (25-30 years) of routes prohibited but located in hydrologically sensitive areas is expected to be slow based on field investigations and studies conducted on abandoned roads within the Six Rivers National Forest. Without active restoration (for example; decompaction of travelway, outsloping, water bars or drainage dips installed to direct water off the travelway and placement of vehicle barriers) it may take decades before the drainage patterns on these routes are returned to a more undisturbed condition.

Routes added to the NFTS:

There are no direct or indirect effects of adding unauthorized motorized routes to the existing NFTS because with this alternative, no motorized routes would be added to the NFTS.

Changes to existing NFTS:

Alternative 4 would not change the class of vehicle use of two motorized system trails to non motorized use only (5.8 miles) nor change one trail class of vehicle use from motorcycle only to vehicles < 50 inches (3.9 miles). Keeping the class of vehicle use motorcycle is not

expected have any impact to water resources as no additional ground disturbance is expected. No trails would be collocated on ML1 roads, therefore no additional impacts would occur.

Of the two trails Alternative 4 would not change to non motorized, one trail is a ridgetop trail with no crossings or aquatic biota concerns (Devils Backbone 6E27). No direct and indirect affects will occur in the short term (1 year) or long term to aquatic biota of keeping this trail motorized. The second trail, Bradburn Trail (7E04) is 4.56 miles long and is a steep trail that crosses the West Fork of the North Fork at suitable spawning habitat for NC steelhead. It has received little motorized use historically (see Recreation). It would be assumed that with the increasing OHV use on National Forest lands, use of this route would increase.

3.6.7.5 Cumulative Effects

Many past cumulative impacts have likely contributed to the decline in aquatic biota numbers and distribution. The reduction in these species distribution and population numbers has largely been attributed to loss or alteration of habitat. Across the Pacific Northwest, habitat loss and alteration for aquatic species is typically associated with the following management activities: vegetation management and associated roads, livestock grazing, mining, and water development projects. Within the watersheds covering the project area, no suction dredging activities or mining in the riparian areas is authorized.

Vegetation management activities and associated roads have the potential to impact individuals and habitat if activities occur in close proximity to occupied habitat. Impacts of roads and unauthorized routes have been described above. In the long term (25-30 years) sedimentation is expected to decrease from existing levels because mitigation measures and routine maintenance are expected to promote or enhance hydrologic function in sensitive areas.

Other ground disturbing activities, including timber harvest, have the potential to result in sedimentation of habitats with primary implications for survivorship and fitness. Prescribed fire in riparian areas may result in mortality of individuals or a disturbance of behavior. Prescribed fire also has the potential to modify riparian habitats if the fire is severe enough to consume woody and herbaceous species. Modification of habitat may locally reduce the suitability of riparian habitat for refuge and foraging activities; however, fire may be beneficial in providing a diversity of conditions that may meet the needs of aquatic biota. In general, current vegetation and fuels projects are designed to reduce potential impact on aquatic habitats and minimize disturbance to the species within riparian and stream habitats. Best management practices are implemented and monitored to minimize sediment delivery to streams and to prevent unexpected consequences to riparian habitats. At present, vegetation management activities under the Aquatic Conservation Strategy on Northwest Forest Plan public lands are having minor impacts to aquatic biota. Historically, vegetation management and fuels reduction projects likely had minor to moderate impacts on aquatic biota and their habitats, especially if project activities occurred in or immediately adjacent to aquatic habitats.

Livestock Grazing: Historic livestock grazing likely had a significant cumulative impact to aquatic biota and their habitat. Historic livestock grazing evidence indicates that heavy livestock use over the Mad River Ranger District led to riparian habitat degradation across parts of the district. Currently the Forest has 18 allotments in the project area that overlap portions of each aquatic biota habitat. In active allotments, livestock trampling has the potential to directly kill most life stages of aquatic biota in both the stream channels and associated riparian. In 1995, a total of five allotments covering most of the upper Mad River and all of the North Fork Eel

River were analyzed. In the North Fork Eel watershed, two of the allotments were identified for non-use due to livestock impacts to salmon and riparian species and one closed to future grazing. The streams within those allotments are showing trends toward improvement and aquatic species are not being subject to direct mortality, behavior modification or habitat impacts. The Forest has recently begun scoping on two additional allotments in the upper Mill Creek and Tish-a-Tang-Tang Creek watersheds. Ongoing impacts to aquatic biota would be decreased due to the change in livestock numbers and season of use.

Livestock grazing and related actions can have differing direct, indirect and cumulative effects on salmonids, herptofauna and their habitat. The most commonly cited potential effects of livestock grazing on stream habitat include modifying stream channel characteristics, changing water quality parameters and degrading riparian processes and function (summarized in Belsky et al 1999). While many of these impacts to the physical habitat can be directly tied to livestock use, the connection to populations is not as thoroughly understood (Rinne 1999).

The mortality risk from livestock trampling is greatest for FYLFs tadpoles and recently metamorphosed frogs still in the streams. Tadpoles have limited mobility and have a tendency to seek cover in the spaces between streambed substrates. By seeking cover in this manner, aquatic species may be unaware of the potential peril from trampling. The risk is particularly high in intermittent streams where water resources may be limited and livestock have few options for accessing water. Tailed frog tadpoles are at less of a risk as they are more likely to be found in higher gradient streams where livestock have little to no access. Risk is also higher for FYLF following metamorphosis when metamorphs are concentrated along aquatic margins. When livestock access water, there is the potential that their presence will result in a physical disturbance to individual basking turtles and cause them to seek refuge in aquatic habitat. The consequence of this disturbance is likely very minor in that it may interrupt an activity like basking that is necessary for basic metabolism. Basking is tied to metabolism which is linked with food intake and growth. If the interruptions are occasional, then the effect on metabolism is likely to be negligible.

Livestock may incur injury or mortality to individuals through trampling, particularly hatchlings in the nest. Grazing likely does not have a major influence on upland habitat attributes, such as vegetation composition or availability of overwintering sites.

Water development projects have resulted in the loss of suitable habitat and have reduced the suitability of habitat for the frog. Hydroelectric projects or impoundments are present on the Mad River and upstream of the Forest boundary on the Trinity River. These dams effectively eliminated dozens of miles of suitable habitat when they were impounded. These reservoirs also effectively eliminated the potential for individuals to move between watersheds. Several impoundments located upstream of suitable habitat have modified stream discharge patterns and water temperatures. In the case of Matthews Dam on the Mad River, this impoundment is believed to be beneficial to downstream steelhead by providing summer long water flows. However, Lind et al. (1996) and Bobzien and DiDonato (2007) documented reduced breeding success of FYLF downstream of dams due to releases of water that either strand or scour egg masses from their attachment sites. Reduced water temperatures may delay breeding or may delay the development of tadpoles which may affect survivorship upon metamorphosis. Currently, water developments are having a moderate impact on individuals and habitat.

CWE Summary: These ongoing and reasonably foreseeable activities species occur within the aquatic biota habitat, and have occurred in the past. The existing condition is a reflection of all past actions including the existing unauthorized routes. Vegetation has already been removed in riparian areas and at crossings. These actions have and in the future would cumulatively affect aquatic habitat site-specifically by primarily, the contribution of sediment and less frequently introduction of contaminants. Impacts from disturbance to individuals or mortality from crushing would be eliminated for those routes not added to the NFTS. All of these alternatives rely on passive restoration for the unauthorized routes.

From the Hydrology CWE section:

> None of the alternatives would move any analysis watershed to the threshold of concern because the routes are spread over such a large area (about 617,000 acres). The magnitude of observed effects is small as are the geographic extent of the impacts. The duration and frequency of motorized use are annual in nature and repetitive. Because the magnitude and spatial extent of the effects are small, and the repeated nature of motorized use impacts do not translate into significant cumulative watershed effects that put the affected watersheds over the threshold of concern.

Alternatives 2, 3 and 4 would reduce these cumulative impacts over the long term, with Alternative 4 having the greatest reduction.

3.6.7.6 Summary of Effects by Species

The above analysis is based on the habitat that each of the following species exists in. Due to their limited distribution on the landscape and life history requirements, most species of aquatic wildlife are similarly affected by motorized travel. The following tables display the impacts for the alternatives by the individual TES species and aquatic management indicator species. Determinations from the Aquatic BA/BE (draft) are listed for the action alternatives. Given the scope and scale of the project, the determinations do not change by action alternatives. Alternative 1 would have the potential to impact all species the most if use continues and new routes occur within and adjacent to aquatic species habitat. The degree of effect to individual species and their habitat may be different between each alternative, but not significantly enough to change the determinations.

Table 3.6-9: Determinations and Impacts across all Alternatives by Species

Species	Federally Listed Threatened	Forest Service Sensitive	Summary of Direct, Indirect and Cummulative Effects
Coho Salmon	MANLAA No effect to critical habitat	n/a	UA routes not in proximity to coho habitat, downstream impacts from UA routes sedimentation has a low probablity of occuring such that a measurable impact would occur. Less than a mile over three watersheds. Sharber Creek, key spawning area, has no UA routes. Action alternatives are beneficial in that cross country travel is prohibited and varying reduction in routes are proposed. Mitigations to routes added to reduce sedimentation impacts. Under action alternatives, no routes would be added in riparian reserves near coho streams. Change in NFTS would have no effect on coho salmon
Chinook Salmon	No Effect (CC Chinook)	May affect individuals No trend towards federal listing (Trinity Chinook)	UA routes not in proximity to CC Chinook habitat in the Mad, Van Duzen and NF Eel rivers, downstream impacts from UA routes have a very low probability of a measurable impact occurring. In Trinity Basin, Alt 1 would contine to allow use on UA routes that introduce sediment into Horse Linto and Cedar Creek. Alt 2, 3 and 4 would not add routes in habitat ajacent to Forest Service sensitive Chinook habitat. Downstream impacts negligible. Changes to NFTS would have no effect
Steelhead	MANLAA (NC Steelhead) No impact to critical habitat	May affect individuals No trend towards federal listing (Kla/Trin Steelhead)	UA routes access NC steelhead in NF Eel and Mad River watersheds Alt 1would continue to cause minor impacts to habitat and disturbance of individuals. Alt 2 and Alt 3 would add 2 routes to habitat in Mad River (0.53 miles total). Some level of unmeasurable disturbance could occur, habitat impacts minor. Alt 4 would not add any routes, disturbance/habitat impacts reduced as routes naturally recover. Alt 2 and 3 change in NFTS beneficial to NC steelhead as changes trail to nonmotorized, and colocated motorized trails on Level 1 would have no impact as ridgtop roads. Similar impacts to FSS steelhead througout remaining habitat. 2.68 miles of UA routes

Species	Federally Listed Threatened	Forest Service Sensitive	Summary of Direct, Indirect and Cummulative Effects
			overlap anadromous habitat of which only the 0.53 identified above would be added.
Foothill Yellow Legged Frog	-	May affect individuals No trend towards federal listing	Reducing road density across the project area will reduce fragmentation of habitat, increase patch size, reduce sedimentation in stream channels, and reduce disturbance and direct mortality, Based on the proximity of the routes to potentially occupied habitat, minor impacts could occur to indivuduals. Impacts to FYLF from changes in NFTS due to trails on existing level 1 roads unlikely as three of the roads do not enter riparian areas and the other two roads enter headwater swales at a total of six locations. Motorized to Non motorized would be beneficial as crossing is in FYLF habitat.
Tailed Frog	-	May affect individuals No trend towards federal listing	Reducing road density across the project area will reduce fragmentation of habitat, increase patch size, reduce sedimentation in stream channels, and reduce disturbance and direct mortality, Based on the proximity of the routes to potentially occupied habitat, minor impacts could occur to indivuduals. Changes in NFTS due to trails on existing level 1 roads unlikely as these roads cross only headwater swales. Motorized to Non motorized would be beneficial as crossing is in tailed frog habitat.
Western pond turtle	-	May affect individuals No trend towards federal listing	Alt 2 and Alt 3 would impact 11 acres of riparian habitat adjacent to fish bearing streams over the project area, primarily in the upper Mad River and Van Duzen rivers. Alt 4 does not add routes in riparian areas to the NFTS, however, no mitigations would occur. Based on the proximity of the routes to potentially occupied habitat, minor impacts could occur to indivuduals. Changes in NFTS do not effect Western pond turtle.
Southern Torrant Salamander	-	May affect individuals No trend towards federal	Reducing road density across the project area in Alt 2 and 3 will reduce fragmentation of habitat, increase patch size, reduce sedimentation in stream channels, and reduce disturbance and direct mortality. Alt 3 adds on additional route near a spring (JM722) with water quality mitgations. Alt 4 reduces density the most and adds no new routes in riparian areas. Based on the proximity of the routes to potentially occupied habitat,

Species	Federally Listed Threatened	Forest Service Sensitive	Summary of Direct, Indirect and Cummulative Effects
		listing	minor impacts could occur to indivuduals. Changes in NFTS due to trails on existing level 1 roads unlikely as these roads cross only headwater swales. Motorized to Non motorized would be beneficial as crossing is in southern torrant salamander habitat.

Table 3.6-10: Effects of Alternatives on Aquatic Management Indicator Species

MIS Assemblage	Species	Summary of Impacts
River/Stream/Creek Assemblage	Steelhead, Resident rainbow trout, Foothill yellow-legged frog	Alt 2 and 3 would reduce road density across the project area will reduce fragmentation of habitat, increase patch size, reduce sedimentation in stream channels, and reduce disturbance and direct mortality. Alt 4 reduces density most and adds no new routes in riparian areas, however, no mitigations would occur
Marsh/ Lake/ Pond/ Assemblage	Western Pond Turtle	Alt 2 and 3 would reduce road density across the project area will reduce fragmentation of habitat, increase patch size, reduce sedimentation in stream channels, and reduce disturbance and direct mortality. Alt 4 reduces density most and adds no new routes in riparian areas, however, no mitigations would occur
Bog/Seep/Spring/ Wet Meadow Assemblage	Torrant Salamander	Reducing road density across the proejct area will reduce fragmentation of habitat, increase patch size, reduce sedimentation in stream channels, and reduce disturbance and direct mortality.

No individual aquatic management indicator species are identified in the LRMP.

3.6.7.7 Comparison of Aquatic Biota Indictors

Comparison of Aquatic Biota indicators in the table below shows that Alternative 4 shows the least impacts to water resources and associated aquatic biota because it includes prohibition of unauthorized motorized trails (about 255 miles), however, for threatened steelhead, it does not change Bradburn trail to non-motorized – thereby continuing to allow motorized crossing of spawning habitat. The effects to aquatic resources are not that dramatically different between Alternatives 2 and 3.

The direct affect to riparian habitats has already occurred and is similar under all alternatives. The main difference between the action alternatives is the number of unauthorized routes allowed to passively recover under the prohibition of cross country travel. The miles of routes added and acres impacted in riparian areas are small to none in the action alternatives.

When considering the full array of prohibition, additions and changes to the NFTS, Alternative 4 has the least impact to water resources and Alternative 1 the most impact. Under Alternative 4, there would be the least likelihood of indirect and off-site impacts because no routes would be added to the NFTS and future use would be prohibited. There are only slight differences of impacts to water resources between Alternatives 2 and 3. Alternative 3 increases the amounts of routes primarily in Key Watersheds, however, most of the routes are ridgetop and have little additional impacts to aquatic biota.

Table 3.6-11: Comparison of Effects to Aquatic Biota

Indicators – Aquatic Biota	Rankings of Alternatives for Each Indicator[1]			
	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Miles of unauthorized routes within or adjacent to TES aquatic biota habitat.	1	3	2	4
Number of stream crossings at the LT/MR ranger district scale and within aquatic biota habitat	1	3	2	4
Acres of species habitat affected. Riparian reserves were used to determine acres of riparian and stream habitat	1	3	2	4
Density of motor vehicle routes as a measure of habitat effectiveness at the 6th field watershed level.	1	3	2	4
Miles of unauthorized routes (both in riparian reserves and watershed wide) and the number of stream crossings within Key Watersheds as a measure of Aquatic Conservation Strategy	1	3	2	4
Miles of existing Level 1 roads with co-located motorized trail within or adjacent to TES aquatic biota habitat.	1	3	3	4
Miles of Existing Trails changed to non-motorized within or adjacent to TES aquatic biota habitat.	1	4	4	1

[1] A score of 4 indicates the alternative has the least impact for aquatic biota related to the indicator; A score of 1 indicates the alternative has the most impact for aquatic biota related to the indicator.

3.6.8 Compliance with the Forest Plan and Other Direction

For aquatic ecosystems, the Forest Plan relies on standards and guidelines relating to meeting or not preventing the attainment of the Aquatic Conservation Strategy objectives. In the sections above, the alternatives for the Six Rivers NF Motorized Travel Management project were analyzed for consistency with the LRMP riparian reserve standards and guidelines.

Under the Aquatic Conservation Strategy, Riparian Reserves are used to maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide for greater connectivity of the watershed. The Riparian Reserves also serve as connectivity corridors among the Late-Successional Reserves (LRMP IV – 45).

In the case of this project, no new road or motorized trail construction is proposed. Impacts to the riparian areas have occurred either through old timber sale abandoned roads, dozer lines from fire fighting efforts and user created routes. All proposed action alternatives reduce or minimize the adverse effects to aquatic systems, including the prohibition of cross country travel. For the entire project area, Aquatic Conservation Strategy objectives were met by minimizing motorized route additions in Riparian Reserves including minimizing the number of routes with stream crossings.

Each route proposed for addition was evaluated to ensure these routes do not prevent, and to the extent practicable contribute to, attainment of Aquatic Conservation Strategy objectives (LRMP IV-48). Mitigations, such as water bars, were incorporated to reduce erosion. Seasonal restrictions were also applied to address potential water quality concerns (LRMP IV-49).

3.7 Terrestrial Wildlife

Management of terrestrial wildlife and habitat, and maintenance of a diversity of animal communities, is an important part of the mission of the Forest Service (Resource Planning Act of 1974, National Forest Management Act of 1976). Management activities on National Forest System (NFS) lands are planned and implemented so that they do not jeopardize the continued existence of threatened or endangered species or lead to a trend toward listing or loss of viability of Forest Service Sensitive species. In addition, management activities are designed to maintain or improve habitat for Management Indicator Species (MIS) to the degree consistent with multiple-use objectives established in each Forest Plan. Management decisions related to motor vehicle travel can affect terrestrial species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulak and Frissell l 2000, USDA Forest Service 2000). It is Forest Service policy to minimize damage to vegetation, minimize harassment to wildlife, and minimize significant disruption of wildlife habitat while providing for motor vehicle use on NFS lands (FSM 2353.03(2)). Therefore, management decisions related to motor vehicle travel on NFS lands must consider effects to wildlife and their habitat.

3.7.1 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

Direction relevant to the proposed action as it affects terrestrial wildlife includes:

Endangered Species Act (ESA) The Endangered Species Act of 1973 (16 USC 1531 et seq.) requires that any action authorized by a federal agency not be likely to jeopardize the continued existence of a threatened or endangered (TE) species, or result in the destruction or adverse modification of habitat of such species that is determined to be critical. Section 7 of the ESA, as amended, requires the responsible federal agency to consult the USFWS and the National Marine Fisheries Service concerning TE species under their jurisdiction. It is Forest Service policy to analyze impacts to TE species to ensure management activities are not be likely to jeopardize the continued existence of a TE species, or result in the destruction or adverse modification of habitat of such species that is determined to be critical. Six Rivers NF, Level 1 Coordinator initiated early involvement with the United States Fish and Wildlife Service (USFWS) as of November, 2008, explaining project overview and intended use of the Regional Programmatic Agreement. Therefore, no Biological Assessment (BA) is necessary because proposed alternatives will be in compliance with the Regional Programmatic Agreement and all routes will includes the Motorized Travel Management Project Design Criteria's for '*No effect*' or '*May affect not likely to Adversely Affect*' determination for the northern spotted owl, marbled murrelet, critical habitat and the bald eagle (October 2006).

Forest Service Manual and Handbooks (FSM/H 2670) Forest Service Sensitive (FSS) species are species identified by the Regional Forester for which population viability is a concern. The Forest Service develops and implements management practices to ensure that FSS species do not become threatened or endangered and ensure their continued viability on national forests. It is Forest Service policy to analyze impacts to FSS species to ensure management activities do not

create a significant trend toward federal listing or loss of viability. The assessment is fully documented in this Chapter (eliminating a separate Biological Evaluation (BE).

3.7.2 Six Rivers Land and Resource Management Plan (LRMP)

The LRMP contains the following management direction applicable to motorized travel management and terrestrial wildlife:

Motorized Recreation applicable to terrestrial wildlife

- 18-16 Manage most trails for multiple uses. Sign to indicate the preferred or desired use type. Restrict specific types of trail use only for reasons of resource protection or user conflicts.
- 18-17 Provide trailheads at road intersections as needed. Facilities at trailheads will be provided for health and safety or resource protection. 18-18 Trail maintenance will be performed in the following order of priority: 1) Correct trail hazards that endanger public health and safety, 2) prevent resource damage, 3) protect the trail resource, 4) repair, replace, or remove signs or markers, and 5) for the comfort and convenience of the user.
- 18-20 Wildlife viewing and other non-consumptive wildlife opportunities should be identified and developed.
- 18-24 Road, trail, or area use may be further restricted or prohibited by order of the Forest Supervisor if necessary to provide for public safety, prevent resource damage, or otherwise serve the public interest.
- 18-32 Use the TREAD LIGHTLY and 'Pack it in, Pack it out' programs to inform recreationists and other users about responsible land use ethics.

Wildlife Management applicable to motorized travel management

Plan IV-97 Proposed actions will be prohibited if they are found likely to adversely affect the continued existence of the species or the maintenance of viable populations throughout their existing range.

- 8-2 Activities generating loud or continuous noise (e.g., frequent vehicle traffic, etc) may be restricted.
- 8-9 Eliminate or minimize disturbance to breeding birds (bald eagle and peregrine falcon) from vehicle traffic. Vehicle use includes motorized vehicles such as automobiles, snowmobiles, and OHVs.

Transportation Direction (IV-113)

- Integrate the maintenance and development of routes with wildlife resource objectives to minimize open road densities.

Riparian Direction

- Management direction for wetlands and riparian areas is to insure high quality aquatic habitat and functioning riparian ecosystems now and in the future.

3.7.3 Effects Analysis Methodology

In recent years, the increasing demand for motorized recreational opportunities on National Forest System (NFS) lands has lead to controversy over the potential effects of this use on wildlife. Several scientific papers and literature reviews have been written on the interaction between the motorized roads and trails on terrestrial and aquatic wildlife species. The majority of the literature and reviews describe the interactions between wildlife and roads rather than wildlife and trails. Most of the research has focused on wide-ranging carnivores and ungulates (hoofed animals). Most commonly, interactions included displacement and avoidance where animals were reported as altering their use patterns in response to roads. Disturbance at specific sites are also commonly reported, such as disruption at breeding or wintering sites. Collision with vehicles is another common report. Edge effects and habitat fragmentation, especially in regard to late-successional forests is another commonly identified impact of roads.

The broad general impacts of wheeled motorized roads and trails to wildlife species relevant to the Six Rivers NF are:

1. Increased terrestrial and aquatic species mortality from collision with vehicles
2. Modification of animal behavior
3. Alteration of the terrestrial and aquatic habitat

The Six Rivers National Forest (NF) provides habitat for over 298 species of terrestrial wildlife, including 76 mammals, 185 birds, and 37 amphibians and reptiles. Forty-eight of these are game animals or furbearers. Species vary greatly in abundance and distribution. There are currently 2 terrestrial wildlife species listed as Threatened under the ESA and 9 additional species listed as Forest Service Sensitive. These species and their habitats on the Six Rivers NF are described in detail in the Six Rivers NF Motorized Travel Management EIS. In addition, there are individual species within 7 multi-species assemblages identified as Management Indicator Species on the Six Rivers NF and discussed in detail in the Six Rivers NF Motorized Travel Management Project MIS report.

Some of these species are currently being affected by cross-country motor vehicle use of the Six Rivers NF. Literature describing the effects of motor vehicle roads and trails upon wildlife have often grouped or categorized species in various ways to describe effects (Knight and Gutzwiller, ed. 1995, Gaines et al. 2003, Wisdom et al 2000).

This assessment consists of 4 steps: (1) identify wildlife species and groups; (2) identify road and trail associated factors for each group; (3) develop and apply assessment processes and GIS analysis to evaluated the influence of road and trail associated factors on each group; and (4) analyze the effects of the alternatives based on outputs and analyses.

Step 1: Identify wildlife species and groups

Existing information and knowledge about the distribution of the terrestrial species on the Six Rivers NF were used to develop the list of species and to develop species groups. Federally listed species, Forest Service Sensitive Species, Management Indicator Species and Roosevelt elk were selected and placed into species groups based on the potential for these species or their habitats to be affected by motor vehicle use on the Six Rivers NF.

Table 3.7-1: Six Rivers NF special status terrestrial species by habitat indicator and distribution

MR& LT Travel Management Project				
Species	**Listing Status[1]**	**Habitat Indicator**	**Potential for Occurrence in Project Area[2]**	**Species Excluded from Analysis[3]**
Terrestrial Wildlife				
Northern Spotted Owl	FT, FSMIS	Mature and late-successional conifer forest	Forest-wide within indicator habitat. 220 territories within project area	
Marbled Murrelet	FT, FSS	Mature and late-successional conifer forest	Forest-wide within indicator habitat. Site-specific survey within project area resulted in detections.	
Pacific Fisher	FC, FSS, FSMIS	Mature and late-successional conifer forest	Forest-wide within indicator habitat. Site-specific survey within project area resulted in detections.	
American Marten	FSS, FSMIS	Mature and late-successional conifer forest, above 4000’	Forest-wide within indicator habitat. Site specific survey within project area resulted in no detections. No confirmed detections.	
Bald Eagle	FSS	Mature conifer forest near large bodies of water	Each Ranger Districts has one active nest territory within project area	
American Peregrine Falcon	FSS	Nest on protruding high cliffs adjacent to major drainages	Four active nest territories within project area, two are within wilderness.	
Northern Goshawk	FSS	Mature and late-successional conifer forest	Forest-wide within indicator habitat. 12 suspected territories within project area.	

MR& LT Travel Management Project				
Species	**Listing Status[1]**	**Habitat Indicator**	**Potential for Occurrence in Project Area[2]**	**Species Excluded from Analysis[3]**
California Wolverine	FSS, ST	Red fir and sub-alpine habitats, high elevations	Habitat exists, site specific survey within project area, resulting in no confirmed detections.	Yes, Siskiyou County is nearest known detection
Great Gray Owl	FSS	Mixed conifer forest adjacent to high elevation (>4500 feet) large meadow systems	Marginal habitat occurs, no detections, not likely to breed within project area.	Yes, project is outside the range (GIS)
Willow Flycatcher	FSS	Willow and alder, wet meadow systems	Habitat occurs, no nesting detections, not likely to breed within project area.	Yes, no proposed routes occur within habitat (GIS)
Pacific Big-Eared Bat	FSS	Caves, mines, buildings	Habitat within project area and known to occur within Lower Trinity Ranger District.	Yes, there is no overlap between OHV use and species occurrence (GIS)
Hairy Woodpecker	FSMIS	Large snags and logs	Forest-wide within indicator habitat	
Black-Tailed deer	FSMIS HS	Early to mid-successional all forest types and meadows	Forest-wide within indicator habitat	
Black Bear	FSMIS HS	Mid to late-successional all forest types and meadows	Forest-wide within indicator habitat	

[1]Listing Status Key:
FE - Federally Endangered
FT - Federally Threatened
FC - Federal Candidate
FSS - USFS Sensitive Species
HS - Harvest Species
FSMIS - USFS Management Indicator Species

MR& LT Travel Management Project				
Species	**Listing Status[1]**	**Habitat Indicator**	**Potential for Occurrence in Project Area[2]**	**Species Excluded from Analysis[3]**

[2]Potential for occurrence could be based upon presence or absence of suitable habitat, incidental observations, and/or survey results.

[3]Examples of reasons to exclude species from the analysis:

- surveys have shown that the species' habitat does not occur in or near any OHV use area
- habitat is not affected and there is no overlap in time between OHV use and species occurrence (or sensitivity such as nesting)
- there are no known risk factors for the species that are related to OHV use (examples human-caused mortality, site disturbance, habitat modification, adequate numbers of snags [for cavity nesters], hollow logs as denning sites [for fur bearers])

The northern and California red-legged frog, California wolverine, great gray owl, willow flycatcher, and Pacific big-eared bat do not occur within the project area or would not be affected by the project. Foothill yellow-legged frog, tailed frog, southern torrent salamander, and western pond turtle will be analyzed in the Aquatic Section of Chapter 3.

Management Indicator Species are listed below and are selected to assess potential effects of management activities on the various habitats and habitat assemblages with which these species are associated.

Individual Species

Northern spotted owl
Pileated woodpecker
Black bear
American marten
Fisher
Black-tailed deer

Bog/Seep/Spring/Wet Meadow Assemblage

Torrent salamander

Marsh/Lake/Pond Assemblage

California red-legged frog
Western pond turtle
Wood duck

River/Stream/Creek Assemblage

Cutthroat trout
Steelhead/Rainbow trout
Summer Steelhead
Tailed frog
Common Merganser
Ruffed grouse
Winter wren
American dipper
Yellow-breasted chat

Tanoak/Madrone Assemblage

Hammond's flycatcher
Western tanager
Black-headed grosbeak

Snag Assemblage

Flummulated owl
Western screech owl
Red-breasted sapsucker
Downy woodpecker
Hairy woodpecker
White-headed woodpecker
Vaux's swift
Brown creeper
Western bluebird
Douglas squirrel

Down Woody Material Assemblage

Arboreal salamander
Clouded salamander
Blue grouse
Dusky-footed woodrat
Western fence lizard

Black Oak/White Oak Assemblage

Acorn woodpecker
Scrub jay
Lazuli bunting
Western gray squirrel

Analysis of the effects of the project alternatives in this report indicated that habitat would be unimpacted or nominally impacted by the action alternatives (2, 3 and 4). Continued proliferation of cross-country travel within Alternative 1 would contribute to habitat disturbance, fragmentation and resource damage. For further disclosure of the effects of the project alternatives to MIS species refer to the project MIS report.

These species groups are organized following Gaines et al. (2003) who categorized species into the following six groups based upon a combination of their biology and interactions with road- and motor vehicle trail-associated factors: (1) late-successional forest associated species; (2) wide-ranging carnivores; (3) ungulates; (4) riparian-associated species; and (5) cavity dependent species (6) waterfowl (habitat is not affected therefore waterfowl eliminated from analysis).

Table 3.7-2: Wildlife Group and Species Represented

Wildlife group	Species
Late-successional forest associated species	Northern spotted owl, marbled murrelet, northern goshawk, American marten, Pacific fisher
Wide-ranging carnivores	Black bear
Ungulates	Black-tailed deer
Riparian-associated species	Bald eagle, American peregrine falcon
Cavity-dependent species	Hairy woodpecker

This Six Rivers "Forest-wide Reference Document" provides reference information on the list of species considered, current management direction, species accounts (on which effects of proposed projects are evaluated), survey and research outcomes, and literature cited. The information in this document tiers to the Six Rivers National Forest (SRNF) Land and Resource Management Plan (LRMP, USDA 1995b), and also serves as an update to the LRMP regarding species considered and species accounts. The "Forest-wide Reference Document" is part of the project file.

Step 2: Identify Road- and Trail-Associated Risk Factors

As described in Gaines et al. (2003), road- and trail-associated risk factors are identified for each species under a three-tiered classification of disturbance. Disturbance type 1, referred to hereafter as site disturbance, includes risk factors such as displacement or avoidance behavior, disturbance at specific sites such as breeding sites, and physiological stress responses. Site disturbance to an individual animal occurs when an animal sees, hears, smells, or otherwise perceives the presence of a human but no contact is made. Site disturbance may or may not alter an animal's behavior. Disturbance type 2, referred to hereafter as habitat modification, occurs when habitat is modified through creation of a path, or removal of vegetation. Risk factors include creation of movement barriers or filters, displacement or avoidance of habitat near roads, habitat loss in quality or quantity, decreased habitat connectivity or increased fragmentation, and pathways or vectors for competitors, predators or disease which affect survivorship. Disturbance type 3, referred to hereafter as human-caused mortality, includes mortality or take of individual animals. Risk factors include hunting, collecting, poaching, malicious shooting or chasing, and accidental vehicle collision. Trapping is excluded from the risk factors because there is no legal trapping allowed and the incidence of illegal trapping is believed to be negligible.

Based on a review of literature and local knowledge of selected species on Six Rivers NF, disturbance factors were used for the assessment of each species group. The following table lists the road and trail associated risk factors associated with each disturbance type.

Table 3.7-3: Road and Trail Associated Factors with Documented Effects on Habitat or Populations of Wildlife Species

	Road- and Trail-Associated Factors[1]	Effects of the Factors	Disturbance Type
Site Disturbance (Disturbance Type1)	Displacement or Avoidance	Spatial shifts in populations or individual animals away from human activities on or near roads or trails.	1
	Disturbance at a Specific location	Displacement of individual animals from a specific location that is being used for reproduction and rearing of young.	1
	Physiological Response	Increase in heart rate or stress hormone production when near a road or trail.	1
Habitat Modification (Disturbance Type 2)	Habitat loss and Fragmentation	Loss and resulting fragmentation of habitat due to the establishment or use of roads or trails and associated human activities.	2
	Edge effects	Changes to habitat microclimates associated with the edge induced by roads or trails.	2
	Snag or down log Reduction	Reduction in density of large snags and downed logs owing to their removal near roads to remove hazards and as fuelwood.	2
	Route for Competitors and Predators	Providing access or greater hunting success for competitors or predators that would not have existed otherwise.	2
	Movement barrier	Interference with dispersal or other movements due to either the road itself or by human activities on or near roads or trails.	2
Human-Caused Mortality (Disturbance Type 3)	Collisions	Death or injury from a motorized vehicle running over or hitting an animal.	3
	Hunting	Mortality from hunting as facilitated by road and trail access.	3
	Poaching	Increased illegal take of animals as facilitated by trails and roads.	3
	Negative human Interactions	Increased mortality of animals resulting from increased contacts with humans, as facilitated by roads and trail access	3
	Collection	Collection of live animals (e.g. falconry) as facilitated by road or trail access.	3
	Collisions	Death or injury from a motorized vehicle running over or hitting an animal.	3

Step 3: Processes and Models

The assessment process to analyze the effects of motorized travel routes on the Six Rivers NF consisted of four primary steps: 1) Habitat models were derived for each species analyzed based on the Forest's geographic information system vegetation and wildlife species layers, California Wildlife Habitat Relationships, and past field surveys and data validation, 2) metrics

describing motorized travel routes in and adjacent to specific wildlife habitats were calculated, 3) direct, indirect and cumulative effects of travel routes on species or species groups were assessed based on a similar process completed by Gaines et al. (2003), and 4) the relative environmental risk of motorized travel routes to terrestrial habitats was determined.

3.7.3.1 Assumptions specific to the terrestrial wildlife analysis:

1. All vehicle types or classes result in the same amount of disturbance effect to wildlife.
2. Location of route is equal to disturbance effects from that route. All routes experiencing public motorized use are assumed to contribute the same level of disturbance.
3. Current ambient noise levels produced from roads designated as maintenance level 2 (open to OHVs) or higher road classification; private property; and other existing sources of noise, are considered background noise based on the assumption that site-specifically, individual animals are likely to be habituated to noise levels within ¼ mile of their locations.
4. Habitat is assumed impacted in the short-term. In the long-term, habitat will remain affected on routes added to the NFTS; but will improve, at least to some degree on routes not proposed for addition to the NFTS, by the prohibition of cross-country travel and subsequent passive restoration (under Alternatives 2-4).
5. Without a prohibition on cross-country travel, route proliferation would continue to occur. Alternative 1 does not prohibit cross-country travel, therefore, route proliferation would likely continue to incrementally affect additional habitat and incrementally increase disturbance to wildlife. It is not possible to predict where this route proliferation would occur.
6. The focus of the analysis is on effects to suitable habitat as in general, project-wide wildlife surveys have not been conducted. Therefore, suitable habitat is assumed occupied. Passive restoration is expected to occur on routes not added to the NFTS as the impacted area naturally decompacts and revegetates over time, depending on soil conditions, vegetation type and other site-specific conditions.
7. Off highway vehicle use is a primary mode of transportation for surveying for the northern spotted owl and forest carnivores (fisher and marten), often during the breeding season. It is assumed that individual animals are acclimated to some level of intermittent use given that this practice has been ongoing for over 20 years.
8. Current conditions capture the residual effects of past human actions and natural events, regardless of which particular action or event contributed to those effects. Therefore, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. Two Six Rivers NF, long-term monitoring projects occur within the project area: Northern Spotted Owl Willow Creek Demography Study and Pilot Creek Watershed Trail Use Strategy. If results from these studies indicate that recreational use is likely to adversely affect the continued existence of the species or threaten the maintenance of viable populations throughout the species existing range, activities will be evaluated and future decisions may restrict or prohibit activities.
9. Snow restricts vehicle access above 3000’ and these areas are assumed to be inaccessible from October to May annually. In general, attempting to quantify effects associated with potential future cross-country travel is speculative at best because it is impossible to predict exactly where, when, or how such use would occur. Under Alternative 1 approximately 505,430 acres of NFS land would not be covered by a permanent forest

order prohibiting cross-country travel. It is anticipated that some level of motorized vehicle use would continue to occur off of existing routes. Without a permanent order prohibiting cross-country travel, the ability of law enforcement personnel to successfully prosecute persons using a motor vehicle off of existing roads would be limited to cases where resource damage could be proven. In the short term, the acres of terrestrial wildlife habitat affected would be similar to the existing situation as use of existing unauthorized routes would continue. Over the longer term, the amount of habitat affected could increase if new routes become established as a result of cross-country travel. Under Alternatives 2 and 3, NFTS would clarify enforcement of existing LRMP direction and eliminate confusion regarding what constitutes cross-country travel. Instances of cross-country travel would likely decrease. Under Alternative 4 a permanent Forest Order would be enacted which prohibits cross-country travel everywhere on the forest.

10. Bald eagle and peregrine falcon nest site protection zone management direction implies that if future human disturbance exceed these affect analysis of biological and physical integrity of species, the ability to remove routes and, or change mitigation measures is guided by NFMA largely through local LRMP direction.
11. Hazard tree remove will tier to Six Rivers NF Hazard Tree Removal Programmatic and Biological Assessment/Evaluation ensuring hazard tree removal on trails or road maintenance level 1 does not occur during breeding season for any TESP species unless area does not occur within 0.25 miles of suitable habitat. This programmatic is in concurrence with US Fish and Wildlife Services (Case # 1-14-99-212).

3.7.3.2 Data Sources:

Presence or absence of wildlife species in the project area is based on the known range of each species and habitat suitability. Additionally, geographic information system layers of the following wildlife resources were used for analysis; records in the Six Rivers National Forest Wildlife Sighting Database, completed watershed analyses, the Forest's geographic information system vegetation and wildlife species layers, incidental observations, monitoring results and local studies, local knowledge and expertise, and published literature. Some habitat suitability evaluations were made using the California Wildlife Habitat Relationships System, Version 8.2software, developed by the California Department of Fish and Game.

Step 4: Effects Analysis

The potential direct, indirect and cumulative impacts were measured for each alternative as they pertain to terrestrial wildlife species and their habitat. The timeframes, spatial boundaries, and measurement indicators used in the analysis of the alternatives are described below.

Direct/indirect effects of the prohibition of cross-country motorized vehicle travel.

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Six Rivers National Forest Mad River and Lower Trinity Ranger District,

excluding designated wilderness. Approximately 505,430 acres of NFS land within the project area boundary represents a reasonable area within which to evaluate and describe cumulative effects associated with the project, since the area is sufficiently large to encompass wildlife habitats, movement corridors and complete home ranges of even the widest ranging species.

Indicator(s): Acres of habitat for terrestrial wildlife without a permanent Forest Order prohibiting cross-country travel.

Methodology: GIS overlay of suitable habitat for each species and areas where cross-country travel is currently allowed.

Rationale: Studies have documented that motorized travel can affect terrestrial species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulak and Frissell l 2000, USDA Forest Service 2000). This indicator addresses the potential for habitat modification from additional user created routes and the potential for disturbance of individual animals.

Direct/Indirect Effects of adding facilities (presently unauthorized routes) to the NFTS, including identifying seasons of use and vehicle class.

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Six Rivers National Forest Mad River and Lower Trinity Ranger District, excluding designated wilderness. Approximately 505,430 acres of NFS land within the project area boundary represents a reasonable area within which to evaluate and describe cumulative effects associated with the project, since the area is sufficiently large to encompass wildlife habitats, movement corridors and complete home ranges of even the widest ranging species.

Indicator(s): (1) Miles of motorized routes available for public use within suitable habitat for each species; (2) Number of sensitive sites for TES species (e.g., protected activity centers, nest sites, territories) within ¼ mile of an added route or area; (3) The proportion of a species (or species group's) habitat that is affected by motorized routes.

Methodology: GIS analysis of added routes in relation to habitat and important/sensitive terrestrial wildlife areas. For the No Action alternative, the term "routes available for public motorized use" includes all existing unauthorized routes, even though those routes will not be added to the NFTS. For the action alternatives, it includes only those unauthorized routes added to the NFTS in that alternative.

Rationale: Literature indicates that placement of routes in relation to habitat can affect terrestrial species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulak and Frissell l 2000, USDA Forest Service 2000). Rationale for the use of each indicator is provided below:

- Indicator 1. Miles of routes within terrestrial wildlife habitat. Use of motorized routes has the potential to affect wildlife through behavioral changes, increased stress or changes in reproductive success. The number of miles of motorized routes is used as a relative measure of disturbance potential.
- Indicator 2. Number of sensitive sites for TES species (e.g. activity centers, nests, territories) within ¼-mile of an added route or area. The number of sensitive sites within a particular distance from a motorized travel route can be used to determine the potential disturbance effect to reproduction and populations.
- Indicator 3. The proportion of a species' (or species group's) habitat that lies within a zone of influence of motorized routes. The effects to wildlife extend beyond the immediate road prism itself, into what can be referred to as a "zone of influence" adjacent to motorized roads and trails. In this "zone of influence" habitat effectiveness or suitability is potentially reduced and wildlife population densities could be lower (Trombulak and Frissell l 2000, Gaines, et al. 2003). The degree of effect of the various factors associated with roads and trails can be evaluated more effectively when considering the proportion of a given species habitat that occurs within this "zone of influence". The distances of the "zone of influence" for individual species that are used in the analysis of effects is based upon the best available science in the literature. Because there is limited data and studies for many species, assumptions and generalizations were made for some species where no data were available.

Changes to the existing NFTS.

This action is not analyzed in the terrestrial wildlife section of this document. The proposed changes to the NFTS described in Chapter 2 will not be considered further in this analysis. This is because:

- Proposed limited changes to the existing NFTS road network include managing; mixed-use that changes road maintenance level 3 to maintenance level 2 (OHV only), combine-use for licensed any drivers and collocated-use where road maintenance level 1 (for administrative purposes) includes a trail. Approximately, 30 miles of existing system roads will include such additions (see Transportation and Recreation Section). An assumption in this analysis is that all vehicle types or classes result in the same amount of disturbance effect to wildlife (see "Assumptions specific to the terrestrial wildlife analysis" above). Road maintenance level 3 to 2 is expected to reduce noise disturbance, a beneficial effect to wildlife. Therefore, conversion of system routes to motorized trails is not expected to create additional direct, indirect or cumulative impacts to wildlife species or their habitat that aren't already analyzed.
- No changes to current Limiting Operating Periods restricting seasonal access due to wildlife would occur on existing NFTS roads. These roads are currently part of the NFTS and their effects on wildlife have been considered in past management decisions.

Cumulative Effects

Short-term timeframe: Not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 20 years.

Spatial boundary: Six Rivers National Forest Mad River and Lower Trinity Ranger District, excluding designated wilderness. Approximately 505,430 acres of NFS land within the project area boundary represents a reasonable area within which to evaluate and describe cumulative effects associated with the project, since the area is sufficiently large to encompass wildlife habitats, movement corridors and complete home ranges of even the widest ranging species.

Indicator(s): (1) Miles of motorized routes; (2) Number of sensitive sites for TES species (e.g., activity centers, nest sites, territories) within ¼ mile of an added route or area; (3) The proportion of a species' (or species group's) habitat that is affected by motorized routes.

Methodology: GIS analysis of past/current, added, and future routes in relation to habitat and important/sensitive terrestrial areas and in context of other past/current and future management actions affecting terrestrial habitat.

Rationale: Literature indicates that placement of routes in relation to habitat can affect terrestrial species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulak and Frissell l 2000).

3.7.4 Affected Environment - General

The following section begins with a general discussion of the affected environment and the types of impacts identified in available literature as being associated with motor vehicle use of roads and trails. Direct, indirect and cumulative effects that are common to all alternatives are included in this discussion. More specific information about existing conditions and impacts are then addressed for each of the animal species that make up the six wildlife groups identified in Step 1.

3.7.4.1 Affected Environment

The project area includes Mad River (280,220 acres) and Lower Trinity (225,210 acres) Ranger Districts. The project area encompasses 505,430 acres which contains National Forest Transportation System miles on road maintenance levels 2, 3, and 4 totaling 1,264 miles. Unauthorized routes (Alternative 1) contain 1,309 miles and 56.86 or 64.72 (Alternative 2 and 3 respectively) miles of unauthorized routes. The forest contains a wide variety of vegetation types and covers a wide range of topography and micro-climates.

3.7.5 Environmental Consequences – General

Direct and Indirect Effects

Public wheeled motor vehicle use of roads and trails affects wildlife, directly and indirectly, in a wide variety of ways that can generally be placed into three categories: effects resulting from human-caused mortality, effects resulting from changes in behavior (site disturbance), and effects resulting from habitat modification. Relying on a review of available literature, Gaines et al. (2003) summarized road- and motorized trail-associated factors and their effects upon groups of wildlife species as shown in step two. The following is a general discussion of these roads and motorized trail-associated factors and their effects to wildlife sorted in to three categories.

Disturbance Type 1 Changes in Behavior or Site Disturbance (displacement or avoidance, impacts on breeding behavior, and physiological impacts):

Gaines et al. (2003) reviewed literature on road- and trail-associated effects upon wildlife and found that alteration of use of habitats in response to roads or road networks was the most common interaction reported (Gaines et al. 2003). Shifts in an animal's home range area, shifts in foraging patterns, and disturbance of nesting or breeding behaviors resulted from motorized road or trail use.

Many species avoid areas in proximity to roads or trails, or exhibit flight behavior within a certain distance of route use, though studies documenting the magnitude and duration of behavioral responses are limited. The amount of vehicle use of roads has a significant role in determining an animal's road avoidance behavior. Black bear, for example, crossed roads with low traffic volume more frequently than roads with high traffic volume. Displacement of deer has been reported up to 800 meters (2,624 feet) from major roads, and from 200 to 400 meters (656 to 1,312 feet) from secondary and primitive roads [citation].

Studies of the effects of human disturbance upon wildlife have revealed that the immediate postnatal period in mammals and the breeding period in birds are periods when individuals are most vulnerable to disturbance. Behaviors such as nest abandonment and decreased nest attentiveness have led to reduced reproductive success and survival of young in species that are intolerant of disturbance (Knight and Gutzwiller 1995). Reproductive success of forest bird species can decline in areas fragmented by roads for these and other reasons.

Bald eagle nests have been negatively correlated with their proximity to main logging roads, and the most recently used nests were located in areas farther from all types of roads and recreational facilities when compared to older nests in the same territory [citation]. Stress hormone levels were significantly higher in male northern spotted owls (but not females) when they were located less than 0.41 km (0.25 miles) from a major logging road compared to spotted owls in areas greater than 0.41 km from a major logging road [citation]. Chronic high levels of stress hormones may have negative consequences on reproduction or physical condition of birds, though these effects are not well understood.

Disturbance Type 2 Habitat modification (habitat loss, fragmentation, edge effects, snag and down log reduction, routes for competitors, movement barriers):

Road and trail networks remove habitat but also have a broader effect than just the conversion of a small area of land to route surfaces. As landscapes become fragmented; the combination of increasing isolation and decreasing patch size of suitable habitat is negatively synergistic, compounding the effects of simple habitat loss. As roads and trails break up forest patches, this may increase nest predation and parasitism rates by species such as jays, or provide increased access for generalist competitors or predators, such as coyotes.

Limited direct impacts to habitat are most likely to occur within the area immediately adjacent to the road prism (within 30 feet) if vehicles pull off the road to park or pass other vehicles. Localized areas of low growing native vegetation may be modified (e.g. crushed or uprooted). This could result in a minor reduction in habitat for forest small mammals which constitute the majority of prey items or shelter for species.

Habitat quality within 100 feet of a route may be indirectly impacted from altered drainage patterns associated with the route or decreased photosynthetic activity resulting from fugitive dust caused by vehicles traveling the route.

Effects to habitat could extend up to 200 feet from a road prism. Habitat modification occurs as an indirect effect of managing roads or trails for public wheeled motor vehicle use. Short term degradation may occur due to clearing of trail by brushing and the occasional removal of trees posing a potential safety hazard ("hazard trees"). These trees are typically snags that are within a tree-height distance from the road. Fallen snags are generally left contributing to the recruitment of large down wood. Large snags and down woody debris are important habitat components for many species. The 2008 annual harvest of fuelwood by the public averaged approximately 700 cords on Lower Trinity Ranger District and 1,000 cords on Mad River Ranger District. Cutting of all standing snags (dead or green) is prohibited. Logs easily accessible by road and closest to roads (maintenance level 3 and 4) tend to be removed more rapidly with firewood permits than those in areas with limited motor vehicle access. Holders of valid firewood permits are allowed to cut and remove downed logs in areas identified as "open" for firewood collection and prohibited from LSR and riparian reserves. Miles within 200 foot buffers include Late-Successional Reserves which make up 47 % of the project area therefore with respect to fire wood affects the estimated values would be much less than.

Major highways are known to create movement barriers for a number of wildlife species, particularly wide-ranging carnivores and ungulates, and are suspected of being a major factor in the decline of some forest carnivores. There are three major highways within the project area one of which is generally closed due to snow-cover generally through October to May. The slower speed and lower traffic volume unauthorized routes that are being evaluated in the project alternatives are less likely to create barriers to movement. However, the extent to which denser networks of such routes might hinder movement for some wildlife species is unknown.

Disturbance Type 3 Human-caused Mortality (collisions, hunting, poaching, negative human interactions, and collection):

Death or injury from a vehicle hitting or running over an animal is well documented and affects the vast majority of terrestrial species, though to varying degrees (Trombulak and Frissell l 2000). In general, road mortality increases with traffic volume and speed, and road kill on native surface forest roads is generally not significant for large mammals. Small mammals, reptiles and amphibians are more vulnerable, however, since individuals are inconspicuous and slow-moving. Amphibians may be especially vulnerable to road mortality because their life histories often involve migration between wetland and upland habitats (Trombulak and Frissell l 2000). Raptors may also be vulnerable to collisions on forest roads due to their foraging behaviors for prey along road edges, but the most substantial mortality occurs along highways. Road kill records are not regularly reported or recorded on the Six Rivers NF; however, documented mortality has occurred for some sensitive species, such as American marten, pacific fisher, and western pond turtle.

Roads and motorized trails can facilitate poaching or illegal shooting. These factors can be substantial for species with low population numbers for which even low rates of additive mortality may affect population stability. The likelihood for negative human interactions with wildlife (including encounters leading to issuance of depredation permits for

bears) also increases as greater human access is provided by roads and motorized trails (Wisdom et al. 2000). Such factors are considered low on Six Rivers NF because route use is rated light to low, most routes are inaccessible seasonally, and surrounding areas are very rural and primarily forested creating a large buffer between humans or livestock thereby reducing concerns of habituation and negative human interactions. Action alternatives further reduce concerns by reducing potential interactions between human and wildlife.

For each of the three disturbance types of potential effects, discussed above, the unauthorized roads considered in this analysis are generally narrow (less than or equal to 12 feet wide) and experience low levels of vehicular traffic. These narrow roads have a minimal direct impact on habitat and are unlikely to create barriers to movement for the species considered in this analysis. The low levels of vehicle traffic and generally slow speeds reduce the risk of mortality from collisions. Since many of these routes are used to travel to dispersed recreation sites, they do increase the potential for disturbance; however, the levels of use vary considerably from some sites likely used only a few times a year to others with more consistent use or with use focused during only a part of the year.]

Six Rivers National Forest conducted a National Visitor Use Survey in 2003. The survey results suggest that 450,000 visit Six Rivers NF yearly and 8 percent participated in off-road vehicle (OHV) use. OHV use as the primary activity was estimated for only 1 percent of visitors (see Recreation Section). Hunting as the primary activity is 21 percent; it is unclear what percent of these individuals uses OHV as not all do. Nevertheless, hunting season within the project area generally begins after critical reproductive seasons of species analyzed in the project area. Hunting season (October and November) results in the greatest use of routes considered in any alternative and are estimated to be 55 vehicle trips per week (use level equals “low”). Outside of hunting season use is estimated to be less than 25 vehicle trips per week (use level equals “light”) (R. McRae, Recreation Specialist, personal communication (2009).

Existing routes are encumbering a small amount of the vegetation or habitat type they pass through. In this analysis, routes are assumed to be 12 feet wide. For every mile of route, approximately 1.5 acres of habitat could be encumbered. If a route is not added to the NFTS, vegetation will gradually become re-established within the road prism, increasing the amount of habitat available for any given species. Passive restoration of habitat would occur more rapidly in riparian areas. Passive restoration would have more of a positive impact within habitat types dominated by close growing, continuous vegetation (e.g., early seral coniferous forest, shrubs communities, meadows). Late-seral forests would experience only minor changes in habitat quality, generally associated with a slight increase in understory vegetative cover or seedling establishment.

The effects of prohibiting cross-country travel are described below under individual species accounts using the measurement indicators listed above. Vehicle use is currently restricted or prohibited in designated wilderness areas.

Under Alternative 1 no unauthorized routes would be added to the NFTS; however, the public would not be restricted to NFTS roads and trails, and public motorized use of all unauthorized routes (1,309 miles) would continue. Proposed additions to the NFTS are reflected in the individual species narratives that follow in the direct, indirect and cumulative impact analysis discussions.

Effects of Mitigation Measures

The mitigation measures proposed for all resources have been assessed for potential to impacts on terrestrial wildlife or their habitats. The number of mitigation measures proposed varies by alternative. There are currently 1309 unauthorized routes that have been identified to have some form of wildlife limiting operating period that would occur in both Alternative 2 and 3. Alternatives 1 and 4 do not propose any mitigation measures except barrier installation that would have no or negligible adverse impacts on terrestrial species, as work would involve the Wildlife Biologist to assist in coordination of timing and placement as necessary.

A variety of mitigation measure are proposed, including barrier installation, creek crossing stabilization, drainage and waterbars, hardening of a route surface, monitoring, realignment to an alternate existing route, re-routing to a new location, , signage, and weed removal. The majority of these mitigation measures would have no or negligible adverse impacts on terrestrial species, as work would occur in or immediately adjacent to the route prism and ground disturbance would be minimal, or, in the case of monitoring, non-existent.

No adverse impacts are anticipated of realignment to an alternative existing route within the habitat types identified for any of the terrestrial species analyzed in this document. . Mitigation measures proposed that resulted in habitat degradation would be offset by the eventual passive restoration expected to occur on the portions of the routes no longer experiencing motor vehicle use.

Cumulative Effects

General

As described in the Analysis Methodology section above, the cumulative effects analysis area includes, Mad River and Lower Trinity Ranger District land within the boundary of the Six Rivers National Forest. The cumulative effects analysis includes assessment of wildlife habitats in proximity to all routes; existing system roads and trails as well as inventoried unauthorized routes. Within the cumulative effects boundary, cumulative effects are analyzed on the accumulation of all past, present, and reasonably foreseeable future actions, including the existence and use of previously designated system routes, unauthorized routes, and any future predictable disturbances or activities that would occur within the next 20 years.

In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, **this analysis relies on current environmental conditions as a proxy for the impacts of past actions (see Assumption 8).** This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. [It is impractical to compile, catalog and analyze all past individual actions that have occurred in the project area. Additionally, focusing on the impacts of past human actions risk ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. Estimation of affects by projects and activities on adjacent non-NFS lands (e.g. mining, grazing, water management, recreation and timber production) is impractical and unduly costly to obtain due to the extensive size of the project area. Current conditions capture the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effect. Therefore, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. Specific effects of these projects are discussed for each species in the sections below.]

Direct and indirect effects of current and future projects are expected to be similar in nature to past projects; vegetation will be removed through timber sales, fuels reduction projects, domestic livestock grazing, road maintenance and development. Vegetation reduction may

directly or indirectly affect either the quantity or quality of habitat for wildlife species associated with that vegetation type. Indirect impacts of vegetation removal can include soil disturbance and compaction and changes in hydrologic flow which can alter the structure and composition within a habitat type. Foreseeable future actions may also facilitate the introduction or spread of invasive plant species, which can out-compete native species and alter habitat quality and sustainability.

Vegetation removal and other uses of National Forest System lands may also disturb resident wildlife species causing a variety of responses including flight, avoidance or abandonment of areas within suitable habitat.

Since 1995, mitigation measures and design features were implemented to protect, enhance, and accelerate habitat quality. Therefore, vegetation management and fuels reduction practices are not expected to significantly decrease the quantity and quality of habitat due to the implementation of these practices. Current implementation of one project is included in this analysis; Mill Creek Roadside Fuels Reduction Project is approximately 673 acres. Two future projects; Trinity River Community Protection Project (project area approximately 800 acres) and Beaverslide Timber Sale (project area is approximately 11,796 acres) are currently in the planning phase. Analyses of species habitat affects are not final. However, all three projects incorporate mitigation measures and design features that may impact individuals, but will not cause a trend towards listing of this species and their habitat. These projects may remove or degrade habitat in the short-term, but will remain suitable post-project and are expected to improve and, or protect habitat conditions in the long-term (accelerate and protect late-successional characteristics).

Grazing allotments occur throughout the project area. Historically, 18 range allotments were active, six on Lower Trinity RD and 12 on Mad River RD. Presently, there is a total of 62,723 acres (12 percent of the project area) of capable foraging units; however 21,753 acres (35 percent) are inactive or vacant. Current use generally operates between May 1 and October 31. This results in approximately 31,464 acres (50 percent) at medium to high use while 9,506 acres (15 percent) are at low to medium use (J. Read, Range Specialist, personal communication, 2009). The foreseeable future may include an additional 3,663 acres with the re-activation of one allotment unit permit. Meadows are becoming encroached upon by conifers due to lack of fire in to these systems therefore an unknown acreage of meadow enhancement projects will likely be planned to reduce encroachment over the next 20 years. Analysis of species habitat affects is not available at this time. However, mitigation measures and design features would that may impact individuals, but will not cause a trend towards listing of this species and their habitat. These projects may remove or degrade habitat however in the long term it would provide for more meadow associated species.

The primary difference between historical activities and present and future actions is that the latter are designed to minimize loss of important wildlife habitat and disturbance of resident wildlife species. As a result, present and future projects may affect individual animals and their habitat, but not to a degree that population viability is threatened.

Ongoing and future activities that occur in the project area include domestic livestock grazing, vegetation management, road and trail use and maintenance, agriculture, dispersed and developed recreation, wildlife habitat enhancement, and highway easements. All of these projects are likely to have some impact on wildlife habitat and may result in some level of disturbance of animals.

On the other hand, the Forest road network can facilitate habitat protection and improvement projects. Habitat improvement projects that involve the use of equipment and/or personnel can be accomplished more safely, in less time, and with less expense provided there is adequate road access. Roads can help protect forest habitats by providing access for initial attack on wildfires, acting as fire lines, and providing safe deployment areas for fire fighting personnel. Population studies and long term research and monitoring projects are also facilitated by access to habitat areas.

Wildland fire is likely having a greater effect on wildlife habitats than all of the previously discussed activities combined. Although fire is a natural disturbance element in local ecosystems and existing vegetative communities have evolved in the presence of fire, current fire frequency and intensity appears to exceed historical levels. Since 1999, more than 97 percent of the fires on Mad River and Lower Trintiy Ranger Districts have burned less than 100 acres. Fires within conifer types generally burn at low to moderate intensity. Within shrub dominated communities, fire intensity is generally higher. It is not possible to predict when or where a fire will occur, or how many acres will burn during the next 20 years, but it is likely the acreage burned will not decrease substantially relative to current levels. The Six Rivers NF averages 64 fires that burn an average of 805 acres per year of which most result in a light to moderate change on the Forest environment. Low intensity understory fire does not generally render habitat unsuitable, but may affect specific habitat components such as snags and down logs. The most notable wildfire in the project area since 1987 was the Megram Wildfire (1999), the majority of which occurred in wilderness and the northern end of Lower Trinity Ranger District. By decade back to 1960, the study area has averaged 35-51 fires per year, with a marked increase in burned average annual acreage since the 1980's. Several of the recent wildfires (since 1999) have resulted in large areas of mortality (e.g., Megram [1999], Journey [2000], Sims [2004]). At the same time, extensive areas within these same wildfires and in other large recent fires (e.g., Panther [2006], Hell's Half [2008]) have also exhibited light to moderate effects on the Forest environment. Low intensity, understory fires do not necessarily render habitat unsuitable, but may affect habitat components such as snags and down logs. Since 1999, less than 3 percent of the fires on Mad River and Lower Trinity Ranger Districts have burned more than 100 acres. The most notable wildfire in the project area (since 1910) was the Megram Fire (1999), the majority of which occurred in wilderness (2008 fires analysis are incomplete).

Table 3.7-4: Average Number of Wildfires and Average Acres per Decade by Wildfire Since 1910

Decade	Avg No./Yr	Avg. Ac./Yr
1910's	15	469
1920's	13	763
1930's	33	2722
1940's	22	247
1950's	34	921
1960's	46	162
1970's	51	153
1980's	35	1596
1990's	46	5224
2000-2008	39	2726

3.7.6 Late-Successional Forest Associated Species

3.7.6.1 Introduction

The late-successional forest group is comprised of northern spotted owl, northern goshawk, American marten, marbled murrelet, and Pacific fisher. These species are associated with late-successional forests that can be affected by activities associated with routes. Gaines et al. (2003) conducted a literature review of 71 late-successional-forest-associated wildlife species and showed these species to be affected by a wide variety of road and trail-associated factors including collisions, collection, displacement or avoidance, disturbance at a specific site, edge effects, habitat loss and fragmentation, movement barrier or filter, and routes for competitors or predators. These factors will be discussed as they apply to the various species analyzed within this group. Wildlife species within this group are often vulnerable to the effects of forest fragmentation and increased edge, where changes in predator occurrence or predator success may affect populations.

Six Rivers National Forest created land allocations referred to as Late-Successional Reserves (LSR) to provide moderate to high quality habitat conditions for late-successional and old-growth associated species, including the northern spotted owl. There are four LSR across Six Rivers NF that correspond to Special Habitat Management Areas (or Habitat Conservation Areas [1990]); three (#305, #306, and #307) are within the project area (see table below). Late-Successional Reserves perform an important role in maintaining biodiversity between other land allocations generally around clusters of 20 or more northern spotted owl pairs and key watersheds. Forests in the matrix between LSRs function as connectivity between reserve areas and provide habitat for a variety of organisms associated with late-successional and younger forests. There are also 83 100-acre LSR that are scattered throughout the forest, located between the four LSR and neighboring Forests or BLM lands, in effort to provide corridors and relatively short dispersal distances. To ensure that late-successional and old-growth vegetation is retained in stands large enough to provide functional habitat and in a well distributed pattern across the landscape, LSR have been designated across the Six Rivers and Shasta-Trinity National Forest boundary.

The northern spotted owl and marbled murrelet are listed as Threatened. The final Northern Spotted Owl Recovery Plan (RP) was released in 2008 by U.S. Fish and Wildlife Services. The Recovery Plan for the Marbled Murrelet (*Brachyramphus marmoratus*) in Washington, Oregon, and California (USDI 1997) forms the basis for the management direction, in part. Management direction for both species will be guided by the Final Supplemental Environmental Impact Statement and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl (FSEIS) and the associated Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl (ROD) and incorporate the newly released Northern Spotted Owl Recovery Plan (RP).

Current landscape forests types differ from those pre-1850 conditions most significantly by: (1) a reduction of large trees and structural diversity within patches (local homogenization); (2) a loss of diversity among patches (landscape homogenization and simplification); and (3) a loss of continuity and distribution of old forests across the landscape (landscape gaps). Since 1995, mitigation measures and design features were implemented to protect, enhance, and accelerate habitat quality for the late-successional forest species. Therefore, vegetation management and fuels reduction practices are not expected to significantly decrease the quantity

and quality of habitat due to the implementation of these practices. Projects may remove or degrade habitat in the short-term, but will remain suitable post-project and are expected to improve and, or protect habitat conditions in the long-term (accelerate and protect late-successional characteristics).

The Forest Service EIS Record of Decision (ROD) evolved from the Forest Ecosystem Management Assessment Team (FEMAT) Report (USDA et al. 1993) and FSEIS (USDA and USDI 1994a). Collectively, the three documents are known as the President's Northwest Forest Plan or the President's Forest Ecosystem Plan. The ROD amended standards and guidelines of the draft Six Rivers LRMP (USDA 1993). Standards and guidelines from the preferred alternative of the draft plan, however, applied where they were more restrictive or provided greater benefits to late-successional forest related species than the provisions in the ROD. As a result, the final Six Rivers LRMP included additional standards and guidelines that address this wildlife group associated with late-successional forests.

Northern spotted owl Activity Centers (AC), LSR, CHU, and species management areas are boundaries within the project area and often overlap. These management areas specify "desired conditions" on the Six Rivers National Forest, and designed to improve and restore old forest habitats and species.

The table below shows the three allocated LSR and acres comprised of suitable nesting, roosting and foraging for northern spotted owl and other late-successional forest associated species.

Table 3.7-5: LSR & Adjoining Reserves, Six Rivers National Forest

LSR & Adjoining Reserves	**Six Rivers NF**	
	Total Acres	**NRF Acres**
LSR305	59,000	41,000
Trinity Alps Wilderness	52,700	13,300
	111,900	**54,300**
LSR 306	48,600	30,500
SF Trinity River	3,000	1,900
	51,600	**32,400**
LSR 307	64,600	41,600
N. Fork Wilderness	8,200	4,900
NF Eel Wild River	1,800	900
	74,600	**47,400**
Grand Total	**238,100**	**134,100**

3.7.6.2 Species

Northern Spotted Owl - Affected Environment

Northern Spotted Owl (NSO) is one of three recognized subspecies of spotted owls. It is a federally listed as threatened and is designated as a Forest Service Sensitive Species and Management Indicator Species (MIS) in Six Rivers NF. The U.S. Fish and Wildlife Service have designated northern spotted owl Critical Habitat Units (CHU). Most CHU boundaries are within the boundaries of LSR designation.

The table below summarizes the affected environment and direct, indirect, and cumulative effects indicators used in this analysis.

Table 3.7-6. Northern Spotted Owl: Direct, Indirect and Cumulative Effects Indicators

	Alt 1	**Alt 2**	**Alt 3**	**Alt 4**
Miles of routes added to the NFTS (existing 124.04 miles) within **Disturbance Zone, ¼ mile** radius of activity center	24.55	5.24	5.28	0
Miles of routes added to the NFTS (existing 1002 miles) within **Home Range 1.3 mile** radius of activity center	196	45	53	0
Number of **Activity Centers** (215 within project area) within ¼ mile (104) by routes added to the NFTS	50	8	9	0
Miles of routes added to the NFTS (existing 333) within **Nesting and Roosting Habitat** (180,663 acres within project area)	64	11.12	14.31	0
Miles of routes added to the NFTS (existing 334) within **Foraging Habitat** (123,595 acres within project area)	62.78	17.05	19.37	0
Miles of routes added to the NFTS (existing 425) within **Critical Habitat** (178,957 acres within project area)	73	15	17	0
Miles of routes added to the NFTS (existing 443) within **Late Successional Reserves** (238,100 acres within project area)	88	17	22	0

Late-successional reserves provide moderate to high quality habitat conditions for the northern spotted owl as well as several other species. Over ninety 100 acre LSR (referred to hereafter as LSR-100) that generally represent the best northern spotted owl habitat as close to a nest site or activity center as possible have been designated in the LRMP. In addition to the three LSR mentioned earlier which cover 34% of the project area, greater than 70% of the LSR-100 on the forest also occur within the project area.

The U.S. Fish and Wildlife Service had designated northern spotted owl Critical Habitat Units (CHU) across its range. The range of the spotted owl extends across the project area.

Six Rivers National Forest manages northern spotted owl activity centers (AC) that are areas delineated around spotted owl territorial pairs or territorial individuals. There are 215 AC within the project area Activity centers provide a means to manage suitable habitat and disturbance within the home range zone (1.3 mile radius) and zone of influence (0.25 mile radius).

Spotted owl activity centers within the project area currently contain existing NFTS roads and unauthorized routes available to the public. Suitable habitat is referred to on Six Rivers NF as nesting and roosting (NR) habitat and foraging (F) habitat. The remaining habitat is defined as dispersal habitat

Standards and guidelines in the Six Rivers National Forest LRMP direct that impacts be mitigated where there is documented evidence of disturbance to the nest site from existing road or motorized trail use. The Forest has not monitored spotted owl nest sites in proximity to roads

or trails and has not documented specific instances of disturbance. Actual nest locations are often difficult to locate and may move around from year-to-year within AC. Therefore, actual nest locations remain unknown for many of the AC and those nests that have been located may have moved since it was last located. Furthermore, it is not well known why owls choose certain nest sites from year-to-year but it is likely that the nest sites will continue to move within the AC over the long-term. Therefore, activity centers may be defined as a nest site, a pair roost location, or a territorial single located within the AC. In the absence of recent nest site locations, the relative risk of project alternatives resulting in disturbance to nesting spotted owls is evaluated by considering effects of activity centers and suitable habitat. All action alternatives would limit access and reduce miles of routes within activity centers as well as prohibit the proliferation of cross-country travel.

The project alternatives could result in direct and indirect effects to the northern spotted owl by prohibiting cross-county travel off of the NFTS and adding routes to NFTS.

Gaines et al. (2003) reviewed studies on the northern spotted owl and determined that road and trail associated factors that were likely to affect spotted owls were collisions, disturbance at a specific site, physiological response, edge effects and snag reduction. Collisions with vehicles typically occur along well maintained roadways that allow high rates of travel. Routes proposed for designation within the project alternatives are native surfaced routes and steep and challenging terrain that allow much slower rates of travel. These types of routes would result in far fewer, if any collisions. Although there is a risk of spotted owl mortality from illegal shooting or collisions, the degree to which this is happening on Six Rivers NF is unknown and believed to be extremely rare do to lack of reporting.

Disturbance at a Specific Site and Physiological Response: The Forest Service considers activities greater than 0.25 mile from a spotted owl nest site to have little potential to affect spotted owl nesting [citation]. Delaney et al. (1999) found that Mexican spotted owls showed an alert response to chainsaws at distances less than 0.25 mile. Preliminary results on a northern spotted owl study in northern California indicated that spotted owls did not flush from nest or roost sites when motorcycles were greater than 105 meters away during the post-fledgling period (Delaney and Grubb 2001). In addition, Delaney and Grubb (2003) found that spotted owl responses to motorcycle noise depended upon an array of complex factors including, sound level and frequency distribution, stimulus distance, event duration, motorcycle type and condition, frequency of motorcycle events, number of motorcycles per group, trail slope, topography, road substrate and condition and microphone position relative to sound source. In general, motorcycle noise did not appear to affect reproductive success. However, this study is ongoing and the impacts of motorcycle noise are not conclusive at this point.

A study by Wasser et al. (1997) found that stress hormone levels were significantly higher in male northern spotted owls (but not females) when they were located <0.25 mile from a major logging road. It is not well understood how elevated stress hormones affect spotted owl populations. Chronic high levels of stress hormones (corticosterone) may have negative effects on reproduction or the physical condition of individual owls. On the other hand Forest Service road and route network facilitates population studies, long term research and monitoring projects facilitated by OHV transportation (see Assumption 7). Additionally, adjacent private timber lands and reservation lands uses OHV to large extent.

Habitat Loss, Fragmentation Edge Effects and Snag Reduction:

Spotted owls may be affected by edge effects from roads when roads and trails fragment suitable habitat. Several studies suggest that California spotted owls are sensitive to changes in

forest canopy closure and habitat fragmentation (Seamans 2005, Blakesley 2003) that could result from a network of roads. Roads and trails can result in a reduction in interior forest patch size which decreases the amount of habitat available and increases the distance between suitable interior forest patches for late-successional species such as the spotted owl. Snags are not expected to have a negligible impact as hazard tree removal must concur with Assumption 11 on routes and trails. Hazard tree removal primarily occurs on road maintenance level 2, 3 and 4 which are outside the scope of this project but still are expected to meet Assumption 11. Future hazard tree removal resulting from project alternatives would result in minor amounts of impacts.

The Table below displays the acreage of suitable northern spotted habitat which occurs within three distances from roads available for public motorized use under each alternative. Limited direct impacts to habitat are most likely to occur within the area immediately adjacent to the road prism (within 30 feet) if vehicles pull off the road to park or pass other vehicles. Localized areas of low growing native vegetation may be modified (e.g. crushed or uprooted). This could result in a minor reduction in habitat for forest small mammals which constitute the majority of prey items for northern spotted owl. At most, 0.34 percent of available northern spotted owl habitat could be affected in this manner; however the actual amount would likely be much lower.

Habitat quality within 100 feet of a route may be indirectly impacted from altered drainage patterns associated with the route or decreased photosynthetic activity resulting from fugitive dust caused by vehicles traveling the route. Approximately 3,864 acres of suitable habitat are within 100 feet of existing unauthorized routes which would continue to receive motorized use under Alternative 1. The area potentially impacted in this fashion is reduced sequentially in Alternatives 2 (783 acres) and 3 (945 acres).

Effects to habitat could extend up to 200 feet from a road prism. Large snags are an important habitat component for northern spotted owl. Trees posing a potential safety hazard ("hazard trees") along roads, routes and trails and left as down woody debris. These trees are typically snags that are within a tree-height distance from the road. The 2008 annual harvest of fuelwood by the public averaged approximately 700 cords on Lower Trinity Ranger District and 1,000 cords on Mad River Ranger District. Cutting of all standing snags (dead or green) is prohibited. Logs easily accessible by road and closest to roads (maintenance level 3 and 4) tend to be removed more rapidly with firewood permits than those in areas with limited motor vehicle access. Holders of valid firewood permits are allowed to cut and remove downed logs in areas identified as "open" for firewood collection and prohibited from LSR and riparian reserves. Miles within 200 foot buffers (below) include LSR therefore with respect to fire wood affects the estimated values would be approximately 65 percent less than shown in the table below.

Table 3.7-7: Acres of Suitable Northern Spotted Owl Habitat within Three Buffer Distance from Added Routes Available for Motorized Use

Alternative	1[2]	2	3	4
30 Foot Buffer [1]	1054 (0.34%)	224 (0.07%)	268 (0.09%)	0
100 Foot Buffer	3,864 (1.3%)	783 (0.25%)	945 (0.3%)	0
200 Foot Buffer	8,606 (2.83%)	1,818 (0.6%)	2,170 (0.7%)	0

[1]Number in parenthesis indicates percent of total northern spotted owl habitat available in the project area. [2]Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use. Analysis assumes flat plane, thereby overestimating buffer area because slope, cut bank and other topographic features did not get excluded.

Northern Spotted Owl – Indirect and Direct Effects

The direct and indirect effects to breeding spotted owls may be measured by the amount of disturbance that may be generated from noise or other trail and road associated factors within suitable habitat and within a ¼-mile radius circle of a spotted owl activity center (nest or nest stand).

Within suitable nesting, roosting, and foraging habitat, the tables below display the measurement indicators which describe the differences between alternative for the three types of potential effects identified above (collisions, disturbance at a specific site and physiological response, habitat loss, fragmentation and edge effects). Through this section, direct and indirect effects focus on the routes available for public motorized use in the alternatives. For the no action alternative, this includes all existing unauthorized routes totaling 1,309 miles, even though those routes will not be added to the NFTS. For the action alternatives, it includes only those unauthorized routes added to the NFTS in each alternative, 56 total miles in Alt 1 and 64 total miles in Alt 2.

Table 3.7-8 Miles of Added Route Available for Public Motorized Use in Suitable (Nesting, Roosting, Foraging) Northern Spotted Owl Habitat

ALT 1	ALT 2	ALT 3	ALT 4
127	28	33	0

Alternative 1 would allow travel on the greatest mileage of unauthorized routes and continue fragmentation by the proliferation of cross-country travel within suitable northern spotted owl habitat as well as increase possibility for collisions. Such fragmentation would result in a greater possibility of negative impacts to individual birds. Each of these actions effectively reduces population size and removes potentially reproductive individuals. These potential impacts are reduced substantially in Alternatives 2 and 3. Under Alternative 4, no potential impacts would occur as no unauthorized routes would be added to the NFTS.

Analysis within activity centers focused on a ¼ mile radius to determine miles of unauthorized routes. All routes considered in this project are less than 3 miles in length and referred to as "segments". Many of these segments contribute to recreation management by accomplishing combined use, mixed use and collocating trails on maintenance level 1 roads as well as completing reroutes or loops on existing roads, routes and trails. The table below depicts the combine total of these short distances as well as number of activity centers within ¼ mile potentially affected by the addition of segments to NFTS..

Table 3.7-9 Miles of Routes within Northern Spotted Owl Activity Centers and Number of Nest within 1/4-mile of Added Routes Available for Public Use

Alternative	1[2]	2	3	4
Miles	25	5.24	5.28	0 (0)
Nests[1]	50	8	8	0 (0)

Number in parenthesis indicates the number of individual breeding territories affected. [2] Under Alternative 1, unauhtorized routes would not be added to the NFTS, but would remain available for public motorized use.

The table above displays the difference between alternatives for the two metrics that address potential for disturbance of northern spotted owl during the nesting and post-fledging period. Potential disturbance from human recreational activities has impacts at the scale of

activity centers located in areas that receive recreational use. This use changes seasonally, as do increase use to some areas during the camping and hunting season. Miles of routes within activity centers allows a relative comparison of both the potential for vehicle noise to disturb nesting birds and humans to access the nest stand. The problem is likely most acute where routes lead to dispersed camping or non-motorized trails or areas that receive heavy foot traffic near active northern spotted owl nests. However, most disturbances of this nature have less impact because recreational use by foot is considered low to light within the project area during the most critical early portions of the breeding season and other activities such as hunting occurs after the fledging period. These factors result in a lower risk for disturbance. During the nest establishment period (March – April) activity centers at higher elevation are usually inaccessible due to snow-covered routes and they often remain inaccessible until June. This limits the potential for disturbance during the most critical nesting period.

However, of the 8 activity centers there are 5 that may incur limiting operating periods on 7 segments within Alternative 2 and 3. This is to limit noise disturbance during the breeding season (February 1 through July 9). These 7 segments are currently being reassessed and will be finalized for the FEIS due to limited access from snow closures and 2008 survey data analysis. The seven segments where selected because the GIS analysis indicates that active known nests are within ¼ mile of segments that are accessible year round and not within ambient noise range. The final determination on these seven segments will not change the determination within this DEIS.

Under Alternative 1, motor vehicle use would continue on the greatest mileage (25) of routes within 1/4 mile of nests. There is ultimately no difference between Alternative 2 and 3 which would each add approximately 5 miles of unauthorized routes in activity centers to the NFTS. Under Alternative 4, no potential impacts would occur as no unauthorized routes would be added to the NFTS.

The greatest potential of direct and indirect impacts to northern spotted owl habitat, the acreage of suitable habitat within three distances (30 feet, 100 feet and 200 feet) of existing unauthorized routes results from Alternative 1. Current condition of unauthorized routes within nesting, roosting, and foraging suitable habitat that is potentially being impacted by use of existing unauthorized routes is displayed in the table below.

Table 3.7-10 Northern Spotted Owl Suitable Habitat Potentially Being Impacted by Existing Unauthorized Routes

	Habitat Within 30 Feet		Habitat Within 100 Feet		Habitat Within 200 Feet	
	Acres	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
Nesting & Roosting	530	0.3	1968	1.1%	4321	2.4
Foraging	524	0.4	1896	1.5	4285	3.5

These numbers, although low, are an overestimate because the numbers are derived within GIS using buffers on all segments of routes without providing for topography, slope, and existing vegetation. Additionally, the majority of these routes are within LSR therefore all action alternatives would result in an overall reduction of habitat impacts.

Northern spotted owl nests are exposed to a low to light level of recreational activity and light to moderate level of daily ambient noise levels from adjacent road maintenance level 2 and higher roads and year round community activities. Two long term monitoring projects continue to assess potential for future impacts to nesting spotted owl. Preliminary results from the demography study during 2008 field season indicate that of the 31 activity centers surveyed to protocol, 17 reproduced (10 of which fledged 2 off spring). The fledgling dates occurred concurrently with an early and long 2008 fire season. On the Lower Trinity Ranger District the demography study project area overlapped with Hells Half Acre wildfire boundary. Activity centers within the wildfire boundary successfully fledged offspring in spite of suppression operations, increase noise disturbance from ground (chain saw, vehicles, human) and air (helicopter and plane) support, decreased air quality from smoke and water drops. Future monitoring will continue.

Under alternative 1, approximately 304,258 acres of suitable northern spotted owl habitat would not be protected cross-country travel. Alternative 1 poses the greatest risk of reducing habitat effectiveness as a result of disturbance and minor habitat modification associated with cross-country motor vehicle use.

Northern Spotted Owl - Cumulative Effects

As stated previously, the major effects to habitat for northern spotted owls at the present time involve the effects of vegetation management (e.g. timber harvest, fuels treatments, etc.) and wildfire on the amount, distribution and quality of habitat. The negative impacts from past timber harvest have included habitat removal, degradation, and fragmentation, which affected not only nesting habitat, but also foraging and dispersal habitat.

Since 1995, mitigation measures and design features were implemented to protect, enhance, and accelerate habitat quality. Therefore, vegetation management and fuels reduction practices are not expected to significantly decrease the quantity and quality of habitat due to the implementation of these practices. Current implementation of one project is included in this analysis; Mill Creek Roadside Fuels Reduction Project is approximately 673 acres. Two future projects; Trinity River Community Protection Project (project area approximately 800 acres) and Beaverslide Timber Sale (project area is approximately 11,796 acres) are currently in the planning phase. Analyses of species habitat affects are not final. However, all three projects incorporate mitigation measures and design features that may impact individuals, but will not cause a trend towards listing of this species and their habitat. These projects may remove or degrade habitat in the short-term, but will remain suitable post-project and are expected to improve and, or protect habitat conditions in the long-term (accelerate and protect late-successional characteristics).

Current and present habitat analysis includes fragmentation caused by existing system roads and unauthorized routes within the project area. Primary constituent elements within northern spotted owl Critical Habitat Units, activity centers and the project area would not be affected because action alternatives would not build new routes or remove or degrade suitable habitat in CHU. There are 425 miles of existing NFTS roads in designated northern spotted owl CHU (178,957 acres). Using the greatest buffer width of 200 feet the total amount of NFTS roads within CHU represents 12 percent. This amount is considered low using habitat influence from roads index (Gaines et al. 2003). There are 667 miles of NFTS roads in suitable northern spotted owl habitat, 196 miles of which occur within 50 activity centers. The table below presents the total mileage of routes which will be available for public motorized use (existing system and added routes) in suitable habitat for each alternative as a means to compare the

potential for human-owl encounters. Alternative 1 poses the highest risk for negative encounters between humans by allowing public motorized use on 792 miles within suitable habitat. Alternatives 2 and 3 would reduce the risk by approximately 12 percent relative to Alternative 1 and decreased fragmentation through passive restoration on unauthorized or unclassified routes not carried forwarded in the Alternatives. Under Alternative 4, the risk is reduced 16 percent respectively relative to Alternative 1.

Table 3.7-11 Miles of Routes (existing system and added routes) for Public Motorized Use in Suitable Northern Spotted Owl Habitat

	ALT 1	ALT 2	ALT 3	ALT 4
Total	792	694	699	667

The table below includes existing NFTS miles and unauthorized routes within ¼ miles of activity centers, displaying a larger number of miles within the range of influence. Of the 215 activity centers within the project area 50 have NFTS. Alternative 1 would allow motor vehicle travel within ¼-mile of spotted owl nest to increase. Alternatives 2 and 3 would reduce the impacts on 42 activity centers and improve fragmentation within ¼-mile of territories affected.

Table 3.7-12 Total Miles of Routes (existing system and added routes) within 1/4-mile Radius Circle of Northern Spotted Owl Activity Centers and number of Nests

Alternative	1[2]	2	3	4
Miles	149	129	130	124
Nests[1]	50	42	42	50

Number in parenthesis indicates the number of individual breeding territories affected. ´Under Alternative 1, unauhtorized routes would not be added to the NFTS, but would remain available for public motorized use.

The total amount of northern spotted owl nesting, roosting and foraging habitat affected by existing system and added routes available for motorized use is presented in the table below.

Table 3.7-13 Acres of Suitable Northern Spotted Owl Habitat within Three Buffer Distance from Routes (existing system and added routes)

Alternative	1[2]	2	3	4
30 Foot Buffer1[1]	10,233 (3.4%)	9,403 (3.1%)	9,447 (3.1%)	11,463 (3.7%)
100 Foot Buffer1	36,088 (12%)	33,007 (11%)	33,169 (11%)	41,958 (14%)
200 Foot Buffer1	75,568 (25%)	68,780 (23%)	69,132 (23%)	86,820 (28%)

[1]Number in parenthesis indicates percent of total northern spotted owl habitat available in the project area. [2]Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use. Analysis assumes flat plane, thereby overestimating buffer area because slope, cut bank and other topographic features did not get excluded.

Gaines et al (2003) developed an index to assess habitat effectiveness for late-successional forest associated species. The habitat influence index is designed to address edge

effects, snag and downed log reduction, and habitat loss and fragmentation resulting from road-associated factors. Using this index, habitat influence from roads is considered low if less than 30 percent of late successional habitats are within a 200 foot habitat influence buffer, moderate if 30 – 50 percent, and high if greater than 50 percent of habitats are within that zone. Based on this index, **all alternatives result in a low level of habitat influence and moderate habitat effectiveness** for the northern spotted owl.

Vegetation management and wildland fire have the greatest potential to modify northern spotted owl suitable habitat. By decade back to 1960, the study area has averaged 35-51 fires per year, with a marked increase in burned average annual acreage since the 1980's. The most notable wildfire in the project area (since 1910) was the Megram Fire (1999), the majority of which occurred in wilderness. However, approximately 0.4 percent of northern spotted owl nesting and roosting habitat was affected.

Early vegetation management and fuels reduction practices likely reduced some high to moderate quality habitat. However, it is impractical to compile, catalog and analyze the effects of all past individual actions on this species. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events may contribute to cumulative effects just as much as human actions. Since 1995, mitigation measures and design features were implemented to protect, enhance, and accelerate habitat quality. Therefore, vegetation management and fuels reduction practices are not expected to significantly decrease the quantity and quality of habitat due to the implementation of these practices. Current conditions capture the residual effects of past human actions and natural events, regardless of which particular action or event contributed to those effects. Therefore, this analysis relies on current environmental conditions as a proxy for the impacts of past actions.

Evaluation of each Alternative's unauthorized routes and areas will be managed to minimize the potential to disturb known nest sites by adhering to U.S. Fish and Wildlife Service, October 2006, Route Designation Project Design Criteria that would achieve a "No Effect" or "May Affect Not Likely to Adversely Affect" determination. There are no new staging areas proposed within the project area therefore this project complies with the northern spotted owl design criteria.

Furthermore, in the project area there are 66 activity centers out of 94 that the Forest Service continues a long term (21 years of data collection) study referred to as the Northern Spotted Owl Willow Creek Demography Study (principle investigators, Dr. R. Gutiérrez and Dr. A. Franklin) that provides analyses to compare reproductive success between disturbed and non-disturbed territories. Reproduction patterns appear to be associated with weather patterns. Years with El Nino and La Nina climatic events are associated with "bad" reproductive output were as years without such "catastrophic" events are associated with "good" reproductive output. In 2008 this study was within Hells Half Acre Wildfire. Preliminary results indicate that 2008 was a "good year" even though the timing of this wildfire event began during nesting and throughout the fledging of young. Productivity and the proportion of nests that fledge young have remained relatively stable over the long term.

Given the proportion of spotted owl nest sites and habitat potentially affected, and considering the projections for future recreation uses and OHV activity, Alternative 1 may, over time, contribute to cumulative effects upon spotted owl populations. Because Alternative 1 does not restrict vehicles to designated routes, there is a high degree of uncertainty about future route proliferation in owl habitat which may have disturbance and habitat effects beyond the effects of routes open to motorized use. Alternative 1 presents the greatest risk of contributing to adverse

cumulative effects upon spotted owl habitat and populations because there would not be a prohibition on cross-country travel. Alternative 4 contributes the least to cumulative effects because cross-country travel would be prohibited, open route densities in spotted owl habitat are lowest, and no motorized routes would be designated. Alternatives 2 and 3 would result in progressively lower risk to spotted owls due to the amount of motorized routes being added to the system. Considering the proportion of spotted owl habitat influenced by motorized routes and projections for future recreation uses and OHV activity, the alternatives may result in minor cumulative impacts when combined with other factors affecting spotted owl habitat. Although the action alternatives may result in cumulative impacts, they are very minor in comparison to existing road densities and other potentially significant impacts (fire, fuels/vegetation management).

Determinations

Alternative 1

Although this alternative would result in increased amounts of disturbance and habitat fragmentation within the project area, continued route proliferation would ultimately be limited by topography and wilderness areas. Disturbance resulting from this alternative would likely result in adverse impacts to individual northern spotted owls. Increased habitat fragmentation from route proliferation would likely result in impacts to individuals over the short-term and long-term. Northern spotted owls are distributed throughout the project area. Therefore, population level impacts would be minor and would not threaten the long-term viability of the species.

Therefore, it is my determination that this alternative "*may affect not likely to adversely affect individuals or habitat including Critical Habitat, or lead towards trends for federal listing or cause a loss of viability to the population or species*" for the northern spotted owl.

Alternative 2 and 3

Both alternatives would result in decreased (respectively) amounts of disturbance and minor habitat fragmentation within the project area, but would be limited over the long-term since cross-country travel would be prohibited. Disturbance resulting from both alternatives would not likely result in adverse impacts to some pairs and individual spotted owls. Since northern spotted owls are widespread throughout the project area, effects would be limited to a small percentage of the activity centers, and cross-country travel would be prohibited, these effects would not likely result in any impacts to northern spotted owl populations within the project area over the short or long-term.

Therefore, it is my determination that both alternatives "*may affect not likely to adversely affect individuals or habitat including Critical Habitat, or lead towards trends for federal listing or cause a loss of viability to the population or species*" for the northern spotted owl.

Alternative 4

Since this alternative would not result in the addition of any routes to the NFTS, there would not be any direct or indirect effects to spotted owls over the short-term. Since cross-country travel would be prohibited, disturbance would be decreased over the long-term and all unauthorized routes within activity centers and emphasis habitat (critical habitat, LSR) would

slowly rehabilitate. The rehabilitation of these routes would result in minor improvements to northern spotted owl habitat over the long-term.

Therefore, it is my determination that this alternative would have a "*Beneficial Impact*" on the northern spotted owl or habitat including Critical Habitat

Manage Indicator Species Summary – Relationship of Project Level Habitat Impacts to Northern Spotted Owl: There are currently 304,258 acres (60 percent project area) of northern spotted owl suitable habitat associated with late seral closed canopy coniferous forest habitat on National Forest System lands within the project area.

Forest Service has 21 years of data collection from the Northern Spotted Owl Willow Creek Demography Study which can provide analyses to compare reproductive success between disturbed and non-disturbed territories. Reproduction patterns appear to be associated with weather patterns. Years with El Nino and La Nina climatic events are associated with "bad" reproductive output were as years without such "catastrophic" events are associated with "good" reproductive output. Productivity and the proportion of nests that fledge young have remained relatively stable over the long term.

The Six Rivers NF Motorized Travel Management Project may affect up to 8,606 acres of suitable habitat (late-seral coniferous) within northern spotted owl territories in Alternative 1 assuming that use continues on existing unauthorized routes and those areas are not allowed to passively recover. This represents 3 percent of northern spotted owl habitat available project-wide. Over time, this percentage would be reduced under all action alternatives as passive vegetative recovery would occur along routes not added to the NFTS. Based on the low amount of habitat affected, the Six Rivers NF Motorized Travel Management Project will not alter the existing trend in late-seral coniferous suitable habitats, nor lead to a change in the distribution of northern spotted owls across the project area. .

Marbled Murrelet - Affected Environment

Marbled murrelet (MAMU) is a late-successional forest associated species and federally listed as threatened and is designated as a Forest Service Sensitive Species in Six Rivers NF. The U.S. Fish and Wildlife Service have designated marbled murrelet Critical Habitat Units (CHU).

The table below summarizes the affected environment and direct, indirect, and cumulative effects indicators used in this analysis.

Table 3.7-14 Marbled Murrelet: Direct, Indirect and Cumulative Effects Indicators

	Alt 1	**Alt 2**	**Alt 3**	**Alt 4**
Miles of routes added to the NFTS (existing 170) within **Suitable Habitat** (97,505 acres within project area)	24.7	5.51	5.57	0
Miles of routes added to the NFTS (existing 204) within **Critical Habitat** (109,598 acres within project area)	33.24	4.72	9.5	0
Number of **known nests** within the project area	0	0	0	0

There are 109,598 acres of marbled murrelet CHU within the project area which currently contain 204 miles of existing NFTS roads and 33 miles of unauthorized routes. The range of the marbled murrelet is delineated by distance from the coast. The primary zone, designated as Zone 1, occurs between the western coast line and approximately 25-33 miles east while Zone 2 is

approximately 40 – 47 miles from the western coast line. There is 47,923 acres of CHU within Zone 1. All CHU falls within LSR boundaries.

Six Rivers NF manages marble murrelet suitable nesting habitat that is defined as late mature and old-growth coniferous forest or younger forests with large trees and limbs to provide nesting opportunities. Of the 97,506 acres of marble murrelet suitable nesting habitat within the project area, within Zone 1 there are 49,412 acres that currently contain 170 miles of NFTS and a total of 25 miles of unauthorized routes.

Project level surveys (for only a single season and, therefore, not to 1994 Pacific Seabird Group protocol) were implemented in 1992 by Lower Trinity Ranger District, in Grouse Creek Watershed, Zone 1. These surveys yielded no detections of marbled murrelets. The Forest performed a series of marbled murrelet surveys in 1995-1996 in the Inner North Coast Ranges, which includes both districts of the project area and the survey report concluded that Mad River Ranger District is not within the range of the marbled murrelet (Hunter 1997). Surveys were also implemented in 1995 to determine presence/absence; however, no marbled murrelets were detected (Hunter et al. 1998). Marbled murrelet intensive surveys have been conducted. In 1998 and 1999, intensive surveys were conducted within the project area during Phase II of the Marbled Murrelet Range and Distribution Study. The study focused on late-mature and old growth tanoak forest on the Lower Trinity and Orleans Ranger Districts, as well as portions of the Klamath National Forest and the Hoopa Valley Indian Reservation. The study yielded no detections of marbled murrelets within the project area or the entire study area.

The project alternatives could result in direct and indirect effects to the marbled murrelet by prohibiting cross-county travel off of the NFTS and adding routes to NFTS.

Six Rivers NF standards and guidelines include limiting operating periods for noise generating activities (use of heavy equipment, chainsaws, etc) within 500 feet of unsurveyed low-quality suitable marbled murrelet nesting habitat would not occur between March 24 and August 5. In addition work between August 5 and September 15 would not begin until 2 hours after sunrise and stop 2 hours before sunset unless surveys determine the site to be unoccupied. No large snags would be felled unless they pose a hazard to public or staff safety and all hazard tress will be felled and left on site as down woody debris. Road, route, and trail associated factors that are likely to affect marbled murrelet during the breeding season would be greatly reduced with restricted operating periods reducing effects.

Habitat Loss, Fragmentation Edge Effects:

The Table below displays the acreage of suitable Zone 1 habitat which occurs within three distances from roads available for public motorized use under each alternative. Limited direct impacts to habitat are most likely to occur within the area immediately adjacent to the road prism (within 30 feet) if vehicles pull off the road to park or pass other vehicles. Localized areas of low growing native vegetation may be modified (e.g. crushed or uprooted). The effects of this on marbled murrelet habitat are not well understood.

Habitat quality within 100 feet of a route may be indirectly impacted from altered drainage patterns associated with the route or decreased photosynthetic activity resulting from fugitive dust caused by vehicles traveling the route. Approximately 690 acres of suitable habitat are within 100 feet of existing unauthorized routes which would continue to receive motorized use under Alternative 1. The area potentially impacted in this fashion is reduced sequentially in Alternatives 2 and 3.

Effects to habitat could extend up to 200 feet from a road prism. Large snags are an important habitat component.

Table 3.7-15 Acres of Suitable Marbled Murrelet Zone 1 Habitat within Three Buffer Distance from Routes (existing system and added routes)

Alternative	1[2]	2	3	4
30 Foot Buffer1[1]	184 (0.37%)	37 (0.07%)	38 (0.08%)	0
100 Foot Buffer1	690 (1.40%)	128 (0.25%)	132 (0.27%)	0
200 Foot Buffer1	1622 (3.3%)	329 (0.08%)	340 (0.69%)	0

[1]Number in parenthesis indicates percent of total suitable available in the project area. [2]Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use. Analysis assumes flat plane, thereby overestimating buffer area because slope, cut bank and other topographic features did not get excluded.

Considering current conditions in the proportion of Zone 1 within the project area (Lower Trinity Ranger District only), contains 49,412 acres of suitable marbled murrelet habitat. Habitat analysis was accomplished based on 170 miles of NFTS and 25 miles of unauthorized routes within Zone 1 suitable habitat. Current condition of unauthorized routes within suitable habitat that is potentially being impacted by use of existing unauthorized routes is displayed in the table below.

Table 3.7-16 Marbled Murrelet Suitable Habitat Potentially Being Impacted by Existing Unauthorized Routes

	Habitat Within 30 Feet		Habitat Within 100 Feet		Habitat Within 200 Feet	
	Acres	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
Suitable Habitat	184	0.37	690	1.4%	1622	3.3%

These numbers, although low and are an overestimate because the numbers are derived within GIS using buffers on all segments of routes without providing for topography, slope, and existing vegetation. Additionally, the majority of these routes are within LSR therefore all action alternatives would result in an overall reduction.

Marbled murrelet would be exposed to a low to light level of recreational activity and light to moderate level of daily ambient noise levels from adjacent road maintenance level 2 and higher roads and year round community activities.

Under alternative 1, approximately 49,412 acres of suitable northern spotted owl habitat would not be protected cross-country travel. Alternative 1 poses the greatest risk of reducing habitat effectiveness as a result of disturbance and minor habitat modification associated with cross-country motor vehicle use.

Marbled Murrelet - Cumulative Effects

The major effects to habitat for marbled murrelet at the present time involve the effects of vegetation management (e.g. timber harvest, fuels treatments, etc.) and wildfire on the amount, distribution and quality of habitat. The negative impacts from past timber harvest have included habitat removal, degradation, and fragmentation.

Current and present habitat analysis includes fragmentation caused by existing system roads and unauthorized routes within the project area. Primary constituent elements within marbled murrelet Critical Habitat Units, suitable habitat and the project area would not be affected because action alternatives would not build new routes or remove or degrade suitable habitat in CHU. There are 170 miles of existing NFTS roads in suitable habitat. Using the greatest buffer width of 200 feet the total amount of NFTS roads within suitable habitat represents 20.8 percent.

The table below presents the total mileage of routes which will be available for public motorized use (existing system and added routes) in suitable habitat for each alternative as a means to compare the potential for human-murrelet encounters. Alternative 1 poses the highest risk for negative encounters between humans by allowing public motorized use on 194 miles within suitable habitat. Alternatives 2 and 3 would reduce the risk by approximately 10 percent relative to Alternative 1 and decreased fragmentation through passive restoration on unauthorized or unclassified routes not carried forwarded in the Alternatives. Under Alternative 4, the risk is reduced 12.7 percent respectively relative to Alternative 1.

Table 3.7-17 Miles of Route (existing system and added routes) for public Motorized Use in Suitable Marbled Murrelet Zone 1 Habitat

ALT 1	ALT 2	ALT 3	ALT 4
194.7	175.51	175.57	170

The total amount of suitable habitat affected by existing system and added routes available for motorized use within Zone 1 of Lower Trinity Ranger District is presented in the table below.

Table 3.7-18 Acres of Suitable Marbled Murrelet Zone 1 Habitat within Three Buffer Distance from Routes (existing system and added routes)

Alternative	1[2]	2	3	4
30 Foot Buffer1[1]	1,273 (2.58%)	1,126 (2.28%)	1,127 (2.28%)	1,089 (2.2%)
100 Foot Buffer1	5,809 (11.76%)	5,247 (10.61 %)	5,251 (10.62%)	5,119 (10.35%)
200 Foot Buffer1	11,938 (24.1%)	10,645 (21.54%)	10,656 (21.56%)	10,316 (20.87%)

[1]Number in parenthesis indicates percent of total marbled murrelet habitat available in the project area. [2]Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use. Analysis assumes flat plane, thereby overestimating buffer area because slope, cut bank and other topographic features did not get excluded.

Gaines et al (2003) developed an index to assess habitat effectiveness for late-successional forest associated species. The habitat influence index is designed to address edge effects, snag and downed log reduction, and habitat loss and fragmentation resulting from road-

associated factors. Using this index, habitat influence from roads is considered low if less than 30 percent of late successional habitats are within a 200 foot habitat influence buffer, moderate if 30 – 50 percent of habitats are within that buffer, and high if greater than 50 percent of habitats are within that zone. Based on this index, **all alternatives result in a low level of habitat influence and moderate habitat effectiveness** for the marbled murrelet.

Since 1995, mitigation measures and design features were implemented to protect, enhance, and accelerate habitat quality. Therefore, vegetation management and fuels reduction practices are not expected to significantly decrease the quantity and quality of habitat due to the implementation of these practices. Current conditions capture the residual effects of past human actions and natural events, regardless of which particular action or event contributed to those effects. Therefore, this analysis relies on current environmental conditions as a proxy for the impacts of past actions.

Although critical habitat for the murrelets has been designated within the project area and low to moderate suitable habitat occurs (although high quality habitat is restricted to areas adjacent to the coastline), surveys associated with Marbled Murrelet Range and Distribution Study as well as others resulted in no murrelets detections of individuals or nests. In the event that a marbled murrelet nest is detected, mitigation measures would be imposed according to Six Rivers NF Standard and Guidelines as well as the Regional Programmatic Agreement on all routes that occur within ¼-mile of a nest as directed in the Motorized Travel Management Project Design Criteria's for '*No effect*' or '*May affect not likely to Adversely Affect*' determination (October 2006). This project will not remove or degrade critical elements within suitable habitat. Additionally, under any action alternative cumulative effects would decrease because passive restoration would occur in approximately 79 percent of suitable habitat as well as potential disturbance compared to Alternative 1.

Given the lack of detections of individuals and habitat potentially affected, and considering the projections for future recreation uses and OHV activity, Alternative 1 may, over time, contribute to cumulative effects upon suitable habitat. Because Alternative 1 does not restrict vehicles to designated routes, there is a degree of uncertainty about future route proliferation in murrelet habitat which may have habitat effects beyond the effects of routes open to motorized use. Alternative 1 presents the greatest risk of contributing to adverse cumulative effects upon suitable habitat and populations because there would not be a prohibition on cross-country travel. Alternative 4 contributes the least to cumulative effects because cross-country travel would be prohibited, open route densities in suitable habitat are lowest, and no motorized routes would be designated. Alternatives 2 and 3 would result in progressively lower risk to marbled murrelet due to the amount of motorized routes being added to the system. Considering the proportion of suitable habitat influenced by motorized routes and projections for future recreation uses and OHV activity, the alternatives may result in minor cumulative impacts when combined with other factors affecting habitat. Although the action alternatives may result in cumulative impacts, they are very minor in comparison to existing road densities and other potentially significant impacts (fire, fuels/vegetation management).

Determinations

Alternative 1

Although this alternative would result in increased amounts of disturbance and habitat fragmentation within the project area, continued route proliferation would ultimately be limited by topography and wilderness areas. Disturbance resulting from this alternative would likely

result in adverse impacts to individual marbled murrelets. Increased habitat fragmentation from route proliferation would likely result in impacts to individuals over the short-term and long-term. Marbled murrelets are not distributed or known to occur throughout the project area. Therefore, population level impacts would be minor, if any, and would not threaten the long-term viability of the species.

Therefore, it is my determination that this alternative "*may affect not likely to adversely affect individuals or habitat including Critical Habitat, or lead towards trends for federal listing or cause a loss of viability to the population or species*" for the marbled murrelet.

Alternative 2 and 3

Both alternatives would result in decreased amounts of disturbance and minor habitat fragmentation within the project area, but would be limited over the long-term since cross-country travel would be prohibited. Disturbance resulting from both alternatives would not likely result in adverse impacts to individual because they are not known to occur. Since marbled murrelets are not known to occur throughout the project area, effects would not likely result in any impacts to marbled murrelet populations within the project area over the short or long-term.

Therefore, it is my determination that both alternatives "*may affect not likely to adversely affect individuals or habitat including Critical Habitat, or lead towards trends for federal listing or cause a loss of viability to the population or species*" for the marbled murrelet.

Alternative 4

Since this alternative would not result in the addition of any routes to the NFTS, there would not be any direct or indirect effects to marbled murrelets over the short-term. Since cross-country travel would be prohibited, disturbance would be decreased over the long-term and all unauthorized routes within emphasis habitat (critical habitat, LSR, zone 1 or 2) would slowly rehabilitate. The rehabilitation of these routes would result in minor improvements to marbled murrelet habitat over the long-term.

Therefore, it is my determination that this alternative would have a "*Beneficial Impact*" on the marbled murrelet or habitat including Critical Habitat

<u>American Marten – Affected Environment</u>

American marten is a Forest Service Sensitive Species and Management Indicator Species on Six Rivers National Forest. It is associated with late-seral closed canopy coniferous forest. Preferred habitat is characterized by multi-storied, multi-species, mid-high elevation (>3,000-feet), late seral coniferous forests with >40% canopy cover. Moderate and high quality habitats contain key habitat elements such as large snags and downed wood, which are important for denning and resting. Martens also require travel corridors comprised of closed canopy forests to move between quality habitat areas.

Within the project area the range of the marten includes only the northern section of Lower Trinity Ranger District all of which is within LSR and equates to 13,165 acres of suitable habitat. There are 35,830 acres of marten habitat within the project area beyond its range. The Six Rivers LRMP included additional standards and guidelines that provide greater benefits to late-successional forest related species that include habitat management areas for the American

marten (page IV-57). These areas and suitable habitat for this species is the premise of this analysis. Of the 35,830 acres of marten habitat within the project area there are currently 86 miles of existing NFTS roads and 15 miles of unauthorized routes. There are no known marten dens within the project area; however, dens are difficult to detect.

Marten observations have been recorded in the project area since 1972. However, it is very difficult to visually discern between a fisher and a marten therefore some observations are questionable. Confirmed detections are known in Orleans and to the north. An extensive research project by the USFS Redwood Sciences Laboratory resulted in no detections in the Pilot Creek Track Plate Study. Pilot Creek is rich in mature and old-growth coniferous forests located between two of the 3 LSRs in the project area consequently an area where much data and survey effort has occurred. The Pilot Creek Track Plate Study not only incorporated the Pilot Creek drainage but also the southern portions of Grouse Creek and Board Camp drainages in an effort to capture a high elevation corridor between the two Ranger Districts.

While the redwood belt once supported these marten, recent field surveys in north coast counties (**1989-1995)** for fisher and marten detected no marten. The surveys summarized by Zielinski and Golightly (**1996**), used approximately 1250 track plate or camera stations from 115 locations, for more the 20,000 survey days.

The home range of breeding marten in northern California is estimated to range between 1,400 and 2,100 acres. Large LSR in conjunction with adjoining wilderness areas, provide sufficient suitable habitat to support several reproductive units (male and two females); however LSR 306 and 307 within the project area have relatively small contiguous patches of mature and older true forest, and therefore may only support one or two reproductive units. Habitat loss and fragmentation as well as unsuitable low elevation hardwoods create unfavorable conditions for this species to persist. Motorized routes can impact martens in a number of ways including; collisions, displacement or avoidance, habitat loss or fragmentation, snag reduction, down log reduction, edge effects, movement barrier or filter and route for competitors.

Collisions:

Collisions with motor vehicles as a source of marten mortality have been documented in the literature. One instance of this occurring has been reported (2008 by RSL) on the Six Rivers NF, outside the project area on Orleans Ranger District and was likely a dispersing individual. Collisions are much less likely to occur along the slower-speed, native surface routes that are being evaluated for addition to the NFTS in this project.

Displacement or Avoidance:

The use of motorized vehicles in marten habitat may result in disturbance to martens that are foraging or denning. Although Robitaille and Aubrey (2000) studying marten in an area of low road density and low traffic (primarily logging roads), found that marten use of habitat within 300 and 400 meters of roads was significantly less than habitat use 700 or 800 meters distance, Zielinski et al. (2008) found that marten spatial distribution, occurrence, and diurnal activity were not affected by OHV use in northern California. Therefore, it did not appear that within the study area OHV activity resulted in changes to the foraging behavior of martens. While there is little research disclosing the specific effects of disturbance to marten den sites, other forest carnivores have been shown to abandon the den site upon human disturbance (Copeland 1996). Wet meadows have been shown to be particularly important foraging areas for marten. Routes added to the NFTS near and through meadows may increase disturbance within the meadow, thereby reducing the meadows value as a foraging habitat for martens. Roads may decrease pre and food availability for marten and fisher (Allen 1987) due to prey population

reductions from road kills and /or behavioral avoidance of roads. Six Rivers NF roads, routes, and trails with light to low level of traffic should not limit marten movements and standards and guidelines for wet meadow systems would limit disturbance.

Habitat Loss, Fragmentation and Edge Effects:

Martens are believed to be sensitive to changes in overhead cover. Routes can fragment habitat by creating small corridors with no overhead cover. Several studies have found that marten are found in landscapes above 4,000 feet with less than 25% of the area composed of openings [citations]. A high level of coarse woody debris is believed to be an essential component of marten habitat as they provide cover and habitat for prey. Activities that remove large logs are likely to degrade marten habitat. Hazard tree removal along roads will reduce future snags and down logs while wildland fire both creates and removed snags and down logs. Motorized routes provide access to woodcutters, also reducing amounts of down wood within roadside corridors.

To estimate the potential direct and indirect impacts to marten habitat, the acreage of suitable habitat within three distances (30 feet, 100 feet, and 200 feet) of existing unauthorized routes was determined. The table below displays the current proportion of overall marten habitat that is potentially being impacted by use of existing unauthorized routes.

Table 3.7-19 American Marten Habitat Potentially Being Impacted by Existing Unauthorized Routes

Habitat Within 30 Feet		Habitat Within 100 Feet		Habitat Within 200 Feet	
Acres	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
121	0.03%	439	1.2%	958	2.7%

Routes for Competitors:

Marten have unique morphologies that allow them to occupy deep snow habitats where they have a competitive advantage over other carnivores, such as coyotes and bobcats. Routes driven during the winter months may allow entry affecting competition and direct mortality from predation. These effects are expected to be negligible because the routes considered for addition to the NFTS in suitable marten habitat are generally not accessible to wheeled motor vehicle traffic during the winter months. Use of roads during winter months by non-wheeled motorized vehicles is outside the scope of this analysis.

American Marten – Direct and Indirect Effects

Based on the discussion above, habitat modification resulting from the maintenance of routes that include the removal of near ground vegetation and coarse woody material appears to be the primary potential effect of adding routes to the NFTS.

Table 3.7-20: Acres of Suitable American Marten Habitat within Three Buffer Distance from Routes to be Added for Motorized Use

Alternative	**1**[2]	**2**	**3**	**4**
30 Foot Buffer1[1]	121 (0.03%)	42 (0.12%)	48 (0.13%)	0 (0)
100 Foot Buffer1	439 (1.2%)	147 (0.4%)	172 (0.48%)	0 (0)
200 Foot	958 (2.7%)	317 (0.9%)	380 (1.1%)	0 (0)

Buffer1				

[1]Number in parenthesis indicates percent of total American marten habitat available in the project area. [2]Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use.

These numbers, although low, are an overestimate because the numbers are derived within GIS using buffers on all segments of routes without providing for topography, slope, and existing vegetation.

The table above displays the acreage of suitable American marten habitat which occurs within three distances from roads proposed to be added to the NFTS under each action alternative. Minor direct impacts to habitat are most likely to occur within the area immediately adjacent to the road prism (within 30 feet) if vehicles pull off the road to park or pass other vehicles. Localized areas of low growing native vegetation may be modified (e.g. crushed or uprooted). This could result in a minor reduction in habitat for forest species which constitute prey items for American martens. At most, 0.03 percent of available American marten habitat could be affected in this manner; however, the actual amount would likely be much lower.

Habitat quality within 100 feet of a route may be indirectly impacted from altered drainage patterns associated with the route or decreased photosynthetic activity resulting from fugitive dust caused by vehicles traveling the route. Approximately 439 acres of suitable habitat are within 100 feet of existing unauthorized routes which would continue to receive motorized use under Alternative 1. The area potentially impacted in this fashion is reduced sequentially in Alternative 2 (147 acreas), 3 (172 acreas), 4 (0 acreas).

Effects to habitat could extend up to 200 feet from a road prism. Large snags and down woody debri are important habitat components for American marten. Trees posing a potential safety hazard ("hazard trees") are felled and left as down woody debris. These trees are typically snags that are within a tree-height distance from the road. Snags are not expected to have a negligible impact as hazard tree removal must concur with Assumption 11 on routes and trails. Downed logs provide habitat for marten prey and are utilized by American marten for cover or natal and maternal dens. The 2008 annual harvest of fuelwood by the public averaged approximately 700 cords on Lower Trinity Ranger District and 1,000 cords on Mad River Ranger District. Cutting of all standing snags (dead or green) is prohibited. Logs easily accessible by road and closest to roads (maintenance level 3 and 4) tend to be removed more rapidly with firewood permits than those in areas with limited motor vehicle access. Holders of valid firewood permits are allowed to cut and remove downed logs in areas identified as "open" for firewood collection and prohibited from LSR and riparian reserves. Miles within 200 foot buffers (below) include LSR therefore with respect to fire wood affects the estimated values would be greatly reduced because firewood collection is not permitted within LSR and the majority of suitable habitat is within LSR. Nevertheless, habitat effect would be greatest under Alternative 1 with the proliferation of cross-country travel. These potential impacts are reduced incrementally in alternatives 2 and 3. Under Alternative 4, no potential impacts would occur associated with adding routes to the NFTS.

Under Alternative 1, approximately 35,830 acres of suitable American marten habitat would not be protected by the proliferation of cross-country travel. Alternative 1 poses the greatest risk of reducing habitat effectiveness as a result of disturbance and minor habitat modification associated with cross-country motor vehicle use. Under all action alternatives, a permanent Forest Order would prohibit motorize travel off the NFTS in all suitable American marten habitat

American Marten – Cumulative Effects

Major threats to American marten at the present time involve the effects of vegetation management (e.g. timber harvest, fuels treatments, etc.) and wildfire on the amount, distribution and quality of habitat. The negative impacts from past timber harvest have included habitat removal, degradation, and fragmentation, which affected not only nesting habitat, but also foraging and dispersal habitat. Early vegetation management and fuels reduction practices likely reduced some high to moderate quality habitat.

Since 1995, mitigation measures and design features were implemented to protect, enhance, and accelerate habitat quality for the American marten. Therefore, vegetation management and fuels reduction practices are not expected to significantly decrease the quantity and quality of habitat due to the implementation of these practices. Projects may remove or degrade habitat in the short-term, but will remain suitable post-project and are expected to improve and, or protect habitat conditions in the long-term (accelerate and protect late-successional characteristics).

Grazing allotments occur throughout the project area. Presently, there is a total of 62,723 acres (12 percent of the project area) of capable foraging units; however 21,753 acres (35 percent) are inactive or vacant. Current use generally operates between May 1 and October 31. This results in approximately 31,464 acres (50 percent) at medium to high use while 9,506 acres (15 percent) are at low to medium use (J. Read, Range Specialist, personal communication, 2009). Meadows are becoming encroached upon by conifers due to lack of fire in to these systems therefore an unknown acreage of meadow enhancement projects will likely be planned to reduce encroachment over the next 20 years. The Forest averages 64 fires that burn an average of 805 acres per year of which result in a light to moderate effect on the Forest environment. Low intensity, understory fire does not necessarily render habitat unsuitable, but may affect habitat components such as snags and down logs. The most notable wildfire in the project area (since 1987) was the Megram Wildfire (1999), the majority of which occurred in wilderness. Approximately 4 percent of American marten potential habitat was affected.

Current and present habitat analysis includes fragmentation caused by existing system roads and unauthorized routes within the project area. Primary constituent elements within marten territories and the project area would not be affected because this project would not build new routes or remove or degrade suitable habitat. There are 443 miles of NFTS roads in the three LSR (238,100 acres) resulting in 0.09 percent of fragmentation of roads (12 feet) which is considered low using habitat influence from roads index. There are 86 miles of NFTS roads and 15 miles unauthorized routes in suitable marten habitat. The table below presents the total mileage of routes which will be available for public motorized use (existing system and added routes) in suitable habitat for each alternative as a means to compare the potential for human-marten encounters. Alternative 1 poses the highest risk for negative encounters between humans by allowing public motorized use on 101 miles within suitable habitat. Alternatives 2 and 3 would allow motorized use on 91 and 92 miles of routes, respectively, reducing the risk by approximately 10 percent relative to Alternative 1 and decreased fragmentation through passive restoration on unauthorized routes not carried forwarded in the Alternatives. Under Alternative 4, the risk is reduced 15 percent respectively relative to Alternative 1.

The cumulative acreage of marten habitat potentially affected by all routes (existing system roads and routes added to the NFTS under each alternative) is presented in the table below.

Table 3.7-21 Acres of Suitable American Marten Habitat within Three Buffer Distances from All Routes Available for Motorized Use (existing system plus proposed additions) in Each Alternative

Alternative	1[2]	2	3	4
30 Foot Buffer[1]	623 (1.7%)	544 (1.5%)	550 (1.5%)	502 (1.4%)
100 Foot Buffer	2693 (7.5%)	2,401 (6.7%)	2,426 (6.8%)	2254 (6.3%)
200 Foot Buffer	5545 (15.5%)	4904 (13.7%)	4967 (13.9%)	4587 (12.8%)

[1] Number in parenthesis indicates percent of total American marten habitat available forest-wide. [2] Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use.

Gaines et al. (2003) developed an index to assess habitat effectiveness for late-successional forest associated species. The habitat influence index is designed to address edge effects, snag and downed log reduction, and habitat loss and fragmentation resulting from road-associated factors. Using this index, habitat influence from roads is considered **low if less than 30 percent** of late successional habitats are within a 200 foot habitat influence buffer, **moderate if 30 to 50 percent** of habitats are within that buffer, and high if greater than **50 percent** of habitats are within that zone. Based on this index, **all alternatives result in a low level of habitat influence and high habitat effectiveness** for marten.

Recreation use on Six Rivers NF is considered light to low. Although it is not expected to increase at the rate of areas within closer proximity of large metropolitan areas (see Recreation section Affected Environment). Nevertheless, this process will result in greater likelihood and magnitude of human disturbance to wildlife. The project alternatives would contribute to these past and current conditions with added displacement from noise and human activity, and fragmentation of habitat. Because Alternative 1 does not prohibit cross-country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon marten. The action alternatives do not result in a loss of habitat (no route construction), but noise and traffic disturbance would influence habitat use and availability where marten may be present. This influence, combined with fuels treatments and vegetation management, could affect marten and their habitat. In the future, trails may provide “connector routes” between existing NFTS routes and motorized access to historical dispersed camping opportunities, unauthorized motorized routes that are prohibited to motorized use may receive non-motorized use (hiking, mountain bicycling, equestrian). It is generally considered that non-motorized use would result in fewer disturbances to marten. The extent and magnitude of non-motorized use is unknown. However, it is expected that over time, unauthorized routes that are prohibited to motorized use will eventually become revegetated and recover either through active or passive restoration means.

American marten is a Forest Service sensitive species on the Six Rivers NF. There is the potential for disturbance to individual from use of the existing NFTS, particularly if use occurs during the early breeding season. This use is limited due to typical snow accumulations on these routes. Direct and indirect effects of the project alternatives, as described in the previous section, cumulatively contribute to each of the risk factors identified for marten. Because Alternative 1 does not prohibit cross-country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon marten. Alternative 4 would prohibit cross-country travel and would not add any routes to the NFTS, therefore the effects of this alternative would be beneficial. Alternatives 2 and 3 contribute cumulatively to the disturbance and habitat alteration from fuels treatments and habitat alteration from livestock grazing in meadows.

Alternatives 2 and 3 would result in progressively lower risk to martens due to the amount of motorized routes being added to the system. These alternatives do not result in a loss of habitat (no route construction), but may influence marten habitat. Considering the proportion of marten habitat influenced by motorized routes and projections for future increases in recreation uses and OHV activity, are very minor in comparison to existing road densities and other potentially significant impacts (fire, fuels/vegetation treatments).

Determinations

Alternative 1

Although this alternative would result in increased amounts of disturbance and habitat fragmentation within the project area, continued route proliferation would ultimately be limited by topography and wilderness areas. Disturbance resulting from this alternative would likely result in adverse impacts to individual American marten. Increased habitat fragmentation from route proliferation would likely result in impacts to individuals over the short-term and long-term. Disturbance resulting from this alternative would likely not result in adverse impacts to some individual martens because American martens are not distributed or known to occur throughout the project area. Therefore, population level impacts would be minor, if any, and would not threaten the long-term viability of the species.

Therefore, it is my determination that this alternative "*may affect impact individuals or habitat but will not cause a trend towards federal listing or alter the existing trend, nor lead to a change in distribution*" for the American marten.

Alternative 2 and 3

Both alternatives would result in decreased amounts of disturbance and minor habitat fragmentation within the project area, but would be limited over the long-term since cross-country travel would be prohibited. Disturbance resulting from both alternatives would not likely result in adverse impacts to individual because they are not known to occur. Since American martens are not known to occur throughout the project area, effects would not likely result in any impacts to American marten populations within the project area over the short or long-term.

Therefore, it is my determination that both alternatives "*may affect impact individuals or habitat but will not cause a trend towards federal listing or alter the existing trend, nor lead to a change in distribution*" for the American marten.

Alternative 4

Since this alternative would not result in the addition of any routes to the NFTS, there would not be any direct or indirect effects to American martens over the short-term. Since cross-country travel would be prohibited, disturbance would be decreased over the long-term and all unauthorized routes within emphasis habitat (LSR, Habitat Management Areas) would slowly rehabilitate. The rehabilitation of these routes would result in minor improvements to American marten habitat over the long-term.

Therefore, it is my determination that this alternative would have a "*beneficial impact*" for the American marten.

Pacific Fisher - Affected Environment

Pacific fisher is a Federal Candidate Species, Forest Service Sensitive Species, and Management Indicator Species on Six Rivers NF. It is associated with late-seral closed canopy coniferous forest. There are 133,277 acres of fisher habitat within the project area which currently contain 333 miles of existing NFTS roads. The range of the fisher extends across the project area. All three LSR within the project area have detected fisher. There are no known fisher dens within the project area, but like for American marten, fisher dens are extremely difficult to detect.

Preferred habitat is characterized by mid-elevation multi-storied mature and old-growth mixed conifer and deciduous-riparian habitats. These habitats have moderate to dense canopy closure (>50 percent), scattered patches with six to eight large snags per acre, and abundant accumulations of downed woody debris. Fishers use cavities in large trees, snags, logs, rock areas, brush piles, and concentrations of downed woody debris for denning and nesting. In the west, all natal and maternal dens were found in large diameter snags or logs. Hardwoods are also important because they provide mast crops that affect potential prey species of the fisher. Fishers use ridges and streamside areas covered by closed canopy forests when moving between quality habitat areas.

Extensive research projects (some within the project area) throughout the 1990's were performed by the USFS Redwood Sciences Laboratory and resulted in numerous publications by taxa expert W. Zielinski. Some of the results of these studies are summarized here. In California, the fisher's range is restricted to two areas: the North Coast Range and the southern Sierra-Nevada. This is thought to be a result primarily of historic trapping and habitat loss. Fishers are widely distributed, and detections are common throughout the northern Coast Range and Klamath Mountains of California where detections appear to be consistent with previous reports of fisher distribution. Based on the review of agency wildlife observations, Schempf & White (1977 *in* Zielinski et al. 1995) concluded that fishers were "common and increasing" in the extreme northwestern counties of California. In northwestern California, fisher populations appear to be sustaining themselves while nearby populations decline.

Collisions:

Roads can impact fisher in ways similar to the marten through direct mortality and habitat modification (see Marten section)

Habitat Loss, Fragmentation and Edge Effects, Displacement or Avoidance:

Habitat loss and fragmentation of suitable fisher habitat by roads and development is thought to have played a significant role in both the loss of fishers and failure to recolonize the central Sierra-Nevada population. High recreational use during the breeding season in suitable habitat may impact foraging and breeding activities. Roads may decrease prey and food availability for fisher due to prey population reductions from road kills and/or behavioral avoidance of roads. Occasional single lane forest roads with moderate levels of traffic should not limit fisher movement. Large logs with cavities provide rest and den sites for fisher. Motorized routes provide access to woodcutters, also reducing amounts of down wood within roadside corridors. Activities that remove large logs are likely to degrade fisher habitat. Hazard tree removal along roads will reduce future snags and down logs while trees damaged by wildland fire increase future snags and down logs. Recreational use within the fisher habitat in the project area is low during the breeding season (February through May) due to inaccessibility from snow and the recreation and hunting season occurs in summer and fall. Fishers within the

project area are elusive and believed to use landscapes with more contiguous, unfragmented forests and less human activity.

Standard and guidelines in the Six Rivers LRMP, provides management direction for habitat connectivity, snag and down log retention and limiting operating periods at den sites.

To estimate the potential direct and indirect impacts to fisher habitat, the acreage of suitable habitat within three distances (30 feet, 100 feet, and 200 feet) of existing unauthorized routes was determined. The table below displays the current proportion of overall fisher habitat that is potentially being impacted by use of existing unauthorized routes.

Table 3.7-22 Pacific Fisher Habitat Potentially Being Impacted by Existing Unauthorized Routes

Habitat Within 30 Feet		Habitat Within 100 Feet		Habitat Within 200 Feet	
Acres	% of Total	Acres	% of Total	Acres	% of Total
418	0.31	1,572	1.2	3,596	2.7%

Of the 133,277 acres of fisher habitat within the project area 108,027 acres are within LSR. Therefore over 80 percent of the habitat receives protection measures including removal of down woody debris for fire wood and restrictions of cutting of standing trees or snags.

Pacific Fisher - Direct and Indirect Effects

Based on the discussion above, habitat modification resulting from the maintenance of routes that include the removal of snags and coarse woody material appears to be the primary potential effect of adding routes to the NFTS.

Table 3.7-23 Acres of Suitable Pacific Fisher Habitat within Three Buffer Distance from Routes Available for Motorized Use

Alternative	1[2]	2	3	4
30 Foot Buffer[1]	418 (0.31%)	69 (0.05%)	81 (0.06%)	0 (0)
100 Foot Buffer	1572 (1.2%)	273 (0.2%)	313 (0.23%)	0 (0)
200 Foot Buffer	3596 (2.7%)	626 (0.5%)	708 (0.53%)	0 (0)

[1]Number in parenthesis indicates percent of total Pacific fisher habitat available in the project area. [2]Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use.

These numbers, although low, are an overestimate because the numbers are derived within GIS using buffers on all segments of routes without providing for topography, slope, and existing vegetation.

The table above displays the acreage of suitable Pacific fisher habitat which occurs within three distances from roads proposed to be added to the NFTS under each action alternative. Minor direct impacts to habitat are most likely to occur within the area immediately adjacent to the road prism (within 30 feet) if vehicles pull off the road to park or pass other vehicles. Localized areas of low growing native vegetation may be modified (e.g. crushed or uprooted). This could result in a minor reduction in habitat for forest species which constitute prey items for Pacific fishers. At most, 0.31 percent of available fisher habitat could be affected in this manner; however, the actual amount would likely be much lower.

Habitat quality within 100 feet of a route may be indirectly impacted from altered drainage patterns associated with the route or decreased photosynthetic activity resulting from

fugitive dust caused by vehicles traveling the route. Approximately, 1.2% acres of suitable habitat are within 100 feet of existing unauthorized routes which would continue to receive motorized use under Alternative 1. The area potentially impacted in this fashion is reduced sequentially in Alternative 2 (273 acreas), 3 (313 acreas), 4 (0 acreas).

Effects to habitat could extend up to 200 feet from a road prism. Large snags and down woody debri are important habitat components for fisher. Trees posing a potential safety hazard ("hazard trees") are often removed along roads. These trees are typically snags that are within a tree-height distance from the road. Downed logs provide habitat for fisher prey and are utilized by fisher for cover or natal and maternal dens. Downed logs provide habitat for prey. The annual harvest of fuelwood by the public averages approximately 4,400 cords. Holders of valid Firewood Permits are allowed to cut and remove downed logs in areas identified as "open" for firewood collection but restrictions occur in LSR and riparian reserves. Cutting of standing snags (dead or green) is prohibited. Logs easily accessible by road and closest to roads tend to be removed more rapidly than those in areas with limited motor vehicle access. This habitat effect would be greatest under Alternative 1 with up to 3596 acres adjacent to routes being affected. These potential impacts are reduced incrementally in alternatives 2 (626 acres) and 3 (708 acres). Under Alternative 4, no potential impacts would occur associated with adding routes to the NFTS.

Under Alternative 1, approximately 133,277 acres of suitable Pacific fisher habitat would not be protected by a permanent Forest Order prohibiting cross-country travel. Alternative 1 poses the greatest risk of reducing habitat effectiveness as a result of disturbance and minor habitat modification associated with cross-country motor vehicle use. Under all action alternatives, a permanent Forest Order would prohibit motorized travel off the NFTS in all suitable fisher habitat.

Pacific Fisher - Cumulative Effects

In 2004, the USFWS determined that listing of the West Coast population of the fisher was warranted, and identified the following primary threats from activities on NFS lands: (1) loss and fragmentation of habitat due to timber harvest and hazardous fuels reduction; (2) increased predation resulting from canopy cover reductions; (3) mortality from vehicle collisions; and (4) increased human disturbance.

The negative impacts from past timber harvest have included habitat removal, degradation, and fragmentation, which affected not only nesting habitat, but also foraging and dispersal habitat. Low intensity, understory fires do not necessarily render habitat unsuitable, but may affect habitat components such as snags and down logs.

Current and present habitat analysis includes fragmentation caused by existing system roads and unauthorized routes within the project area. There are 333 miles of NFTS roads and 57 miles of unauthorized routes in suitable fisher habitat. The table below presents the total mileage of routes which will be available for public motorized use (existing system and added routes) in suitable habitat for each alternative as a means to compare the potential for human-fisher encounters. Alternative 1 poses the highest risk for negative encounters between humans by allowing public motorized use on 390 miles within suitable habitat. Alternatives 2 and 3 would allow motorized use on 344 and 345 miles of routes, respectively, reducing the risk by approximately 12 percent relative to Alternative 1 and decreased fragmentation through passive restoration on unauthorized or unclassified routes not carried forwarded in the Alternatives. Under Alternative 4, the risk is reduced 15 percent respectively relative to Alternative 1.

Table 3.7-24 Miles of Routes (existing system and added routes) for Public Motorized Use in Suitable Pacific Fisher Habitat

	ALT 1	ALT 2	ALT 3	ALT 4
Total	390	344	345	333

There are no known fisher den sites in the project area. In the event that a fisher den site is detected, mitigation measures would be imposed according to the LRMP on all routes that occur within ¼-mile of a nest.

The total amount of Pacific fisher habitat affected by existing system and added routes available for motorized use is presented in the table below.

Table 3.7-27: Acres of Suitable Pacific Fisher Habitat within Three Buffer Distances from All Routes Available for Motorized Use (Existing System plus Proposed Additions) in Each Alternative

Alternative	1[2]	2	3	4
30 Foot Buffer[1]	2,672 (2%)	2,323 (1.7%)	2,335 (1.7	2,254 (1.7%)
100 Foot Buffer	10,210 (7.7%)	8911 (6.7%)	8,951 (6.7%)	8,638 (6.5%)
200 Foot Buffer	21,273 (16%)	18,303 (13.7%)	18,303 (13.7%)	17,677 (13.3%)

[1] Number in parenthesis indicates percent of total pacific fisher habitat available forest-wide. [2] Under Alternative 1, unauhtorized routes would not be added to the NFTS, but would remain available for public motorized use.

Gaines et al. (2003) developed an index to assess habitat effectiveness for late-successional forest associated species. The habitat influence index is designed to address edge effects, snag and downed log reduction, and habitat loss and fragmentation resulting from road-associated factors. Using this index, habitat influence from roads is considered **low if less than 30 percent** of late successional habitats are within a 200 foot habitat influence buffer, **moderate if 30 to 50 percent** of habitats are within that buffer, and high if greater than **50 percent** of habitats are within that zone. Based on this index, **all alternatives result in a low level of habitat influence and low habitat effectiveness** for Pacific fisher.

Pacific fisher is a Forest Service sensitive species on the Six Rivers NF. There is the potential for disturbance to individual from use of the existing NFTS, particularly if use occurs during the early breeding season. This use is limited due to typical snow accumulations on these routes. Recreation use on Six Rivers NF is considered light to low. Although it is not expected to increase at the rate of areas within closer proximity of large metropolitan areas (see Recreation section Affected Environment). Nevertheless, this process will result in greater likelihood and magnitude of human disturbance to wildlife. The project alternatives would contribute to these past and current conditions with added displacement from noise and human activity, and fragmentation of habitat. Because Alternative 1 does not prohibit cross-country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon marten. The action alternatives do not result in a loss of habitat (no route construction), but noise and traffic disturbance would influence habitat use and availability where fisher may be present.

In addressing the effects of roads upon fisher, the USFWS concluded that, road-related effects on low density carnivores like fishers “are more severe than most other wildlife species due to their large home ranges, relatively low fecundity, and low natural population density.” Since routes proposed within the action alternatives are native surfaced routes that do not

generally have high rates of travel, these road-related effects are expected to be minimal. The greatest influence upon fisher habitat occurs under Alternative 1 and progressively lower levels of impact occur under the action alternatives. Thus, the combined effect of the project alternatives and current projects may result in cumulative effects although they are very minor in comparison to existing road densities and other potentially significant impacts (fire, fuels/vegetation treatments).

Determinations

Alternative 1

Although this alternative would result in increased amounts of disturbance and habitat fragmentation within the project area, continued route proliferation would ultimately be limited by topography and wilderness areas. Disturbance resulting from this alternative would likely result in adverse impacts to individual Pacific fisher. Increased habitat fragmentation from route proliferation would likely result in impacts to individuals over the short-term and long-term. Disturbance resulting from this alternative would likely result in adverse impacts to some individual fisher. Increased habitat fragmentation from route proliferation may result in impacts to individuals over the long-term. Although route proliferation may impact some individual fisher and their habitat over the long-term, restricted access by topography, snow, vegetation, and wilderness areas would result in significant amounts of unimpacted suitable habitat over the short and long-term. Therefore, potential impacts from this alternative would not likely have measurable impacts to populations within the project area.

Therefore, it is my determination that this alternative "*may affect impact individuals or habitat but will not cause a trend towards federal listing or alter the existing trend, nor lead to a change in distribution*" for the Pacific fisher.

Alternative 2 and 3

Although both alternative would result in decreased amounts of disturbance and habitat fragmentation within the project area, but would be limited over the long-term since cross-country travel would be prohibited. Disturbance and habitat fragmentation resulting from this alternative would likely result in adverse impacts to individual Pacific fisher. These impacts would likely be minor, and would not likely impact the individual's fitness. Therefore, these effects would not likely result in any impacts to fisher populations within the project area over the short or long-term.

Therefore, it is my determination that both alternative "*may affect impact individuals or habitat but will not cause a trend towards federal listing or alter the existing trend, nor lead to a change in distribution*" for the Pacific fisher.

Alternative 4

Cross-country travel would be prohibited and there would not be any motorized routes added to the NFTS in this alternative. Prohibiting cross-country travel would reduce future disturbance to individual fisher and prevent further fragmentation of their habitat over the long-term.

Therefore, it is my determination that this alternative would have a "*beneficial impact*" for the Pacific fisher.

Northern Goshawk - Affected Environment

Northern goshawk is a Forest Service Sensitive Species on Six Rivers NF. It is associated with late-seral closed canopy coniferous forest. Habitat management guidelines within General Forest Management Areas (comprised of Matrix land and Adaptive Management Areas) for the northern goshawk provides management direction for habitat connectivity, snag and down log retention and limiting operating periods at nest sites.

There are 11,325 acres of goshawk habitat within the project area that currently contain 27 miles of existing NFTS roads and 4 miles of unauthorized routes. The range of the northern goshawk extends across the project area. There are 25 known or suspected goshawk territories that occur within the project area, 3 of which occur in wilderness and 2 share boarders on BLM land. Preferred habitat is characterized by a variety of forest types, forest ages, structural conditions, and successional stages, they typically nest in old-growth and mature coniferous and hardwood stands with high canopy closures and an open understory. Nests are usually located in the largest tree in the stand and on low gradient north-facing slopes or benches near water and small openings. Snags and dead-topped trees are important for observation and prey-plucking perches. Goshawks feed primarily on birds, but small mammals are also taken. Foraging habitat typically consists of open, unfragmented mature stands with small forest openings and meadows.

The late-succesional reserves and goshawk territories are expected to provide habitat and support reproductive pairs of goshawks. Northern goshawks probably were more common with the historical fire regime of more frequent, less intense fires which reduced understory vegetation [citation].

Goshawk surveys and monitoring have been ongoing since the early 1980s. Surveys in 1994 indicate that many of the known nest territories on Six Rivers NF no longer appear to be occupied and are thought to be due to lack of fire management within the system creating dense understory forest. These areas occur north the project area. In 1994 and 1995, a Forest-wide goshawk survey and habitat-use study was initiated in selected areas of the Forest. The only confirmed sightings from that study were on the Lower Trinity Ranger District; two active goshawks sites were found. In 2001-2002 historical goshawk sites were revisited across the Mad River and Lower Trinity River Ranger Districts and habitat associations were evaluated. Project level surveys within the project area occurred in 2003 and 2008 and will continue in 2009, did result in nest detections. Routes within 0.25 miles of active nests will incur a limiting operating period restricting use between March 1 and August 31, unless use of routes are determined to not affect the nest sites.

Within the project area all high quality goshawk nesting habitat has been surveyed in at least the last 15 years. Collection, disturbance at a specific site, habitat loss or fragmentation and edge effects were described by Gaines et al. (2003) as being road and trail-associated factors that potentially affect the northern goshawk. These factors are described in more detail below:

Collection:

Illegal harvest (shooting of an individual) and falconry take have been documented on other National Forest. There are no documented reports on the Six Rivers National Forest were goshawks were harassed or shot in areas where human recreation was concentrated. There is minimal concern on the Forest that illegal harvest may pose a risk to local populations. Both

illegal and legal harvest has the potential to affect local individual territories that receive repeated visits and harvesting.

The potential for collection or other harvest of goshawks is likely to be higher with greater opportunity for human-animal encounters in areas with higher road density or concentrated recreational use. Miles of routes available for public motorized use within suitable goshawk habitat is used as a relative index to measure the potential for human-animal encounters. There are currently 4 miles of unauthorized routes within suitable habitat.

Disturbance at a Specific Site:

Human disturbance has the potential to cause goshawk to abandon nesting during the nesting and post fledging period (February 15 through September 15). Goshawks initiate breeding when the ground is still covered in snow and sometimes nests are located along roads and trails when they are not yet in use. Additionally, roads and trails provide flight access for goshawk. When the snow melts, these sites can potentially be areas of conflict as these roads and trails are used by people. Vehicle traffic on roads more than 400 meters (0.25 miles) from nests did not elicit any discernable behavioral response from goshawks [citation].

To ascertain the potential for disturbance of goshawks, each alternative is compared in terms of the miles of routes available for public use within territories and the number of nests within 1/4-mile of routes available for public use.

Habitat Loss, Fragmentation and Edge Effects:

A network of roads and motorized trails can fragment goshawk habitat by reducing canopy closure and by reducing forest interior patch size. However, how habitat fragmentation from roads and trails affects goshawk habitat suitability is not well understood. Generally, the wider the road, the more it can fragment habitat. Native surface roads and trails probably do not pose as much risk of habitat fragmentation compared to smooth surfaced roads due to their narrow width relative to the natural tree spacing in late-seral forests. State and federal highways create the greatest habitat fragmentation due to the width of the road and associated edge effects.

To estimate the potential direct and indirect impacts to goshawk habitat, the acreage of suitable habitat within three distances (30 feet, 100 feet and 200 feet) of unauthorized routes was determined. The table below displays the current proportion of overall goshawk habitat that is potentially being impacted by unauthorized routes.

Table 3.7-25 Northern Goshawk Habitat Potentially Being Impacted by Existing Unauthorized Routes

Habitat Within 30 Feet		Habitat Within 100 Feet		Habitat Within 200 Feet	
Acres	% of Total	Acres	% of Total	Acres	% of Total
33	0.29%	120	1.05%	328	2.9%

Northern Goshawk – Direct and Indirect Effects

The major threat to northern goshawks at the present time involves the effects of vegetation management (e.g., timber harvest, fuels treatments, etc.) and wildfire on the amount, distribution and quality of habitat

The tables below display the measurement indicators which describe the differences between alternatives for the three types of potential effects identified above (collection, disturbance at a specific site, habitat modification). Throughout this section, direct and indirect effects focus on the **routes available for public motorized use** in the alternatives. For the no action alternative, this includes all existing unauthorized routes, even though those routes

will not be added to the NFTS. For the action alternatives, it includes only those unauthorized routes added to the NFTS in that alternative.

Table 3.7-26 Miles of Route Available for Public Motorized Use in Suitable Northern Goshawk Habitat

ALT 1[1]	ALT 2	ALT 3	ALT 4
3.33	0.63	0.85	0

[1]Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use

Alternative 1 would allow travel on the greatest mileage of unauthorized routes within suitable northern goshawk habitat however these are segments less than 3 miles in length being analyzed, reducing the possibility of negative impacts to individual birds. Birds may be killed by collisions with vehicles, shot or collected for falconry. Each of these actions effectively reduces population size and removes potentially reproductive individuals. These potential impacts are reduced incrementally in Alternatives 2 and 3, respectively. Under Alternative 4, no potential impacts would occur as no unauthorized routes would be added to the NFTS.

Table 3.7-27: Miles of Route within Suitable Northern Goshawk Habitat and Number of Nests within 1/4 mile of Routes Available for Public Use

Alternative	1	2	3	4
Miles	0.09	0.09	0.09	0
Nests[1]	1	1	1	0

Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use.

Potential disturbance from human recreational activities has impacts at the scale of individual territories located in areas that receive recreational use or at sub-regional scales, such as the hunting season, that receive an increase human recreational use. The problem appears most acute where active northern goshawks nests are located along non-motorized trails and in areas that receive heavy foot traffic. However, hunting season does not occur post-fledging period and recreational use by foot is considered low to light within the project area.

The table below displays the differences between alternatives for the two metrics that address potential for disturbance of northern goshawks during the nesting and post-fledging period. Miles of routes within territories allows a relative comparison of both the potential for vehicle noise to disturb nesting birds and humans to access the nest stand. Goshawks display a variety of responses to humans and vehicles. During the nest establishment period (March – April), repeated perturbations may cause individuals to abandon nest building. Once the female has begun incubating eggs, she is less likely to display any overt response when people or vehicles approach the nest. Observations of nests on the Six Rivers National Forest suggest that both the male and female adults become more aggressive shortly after juveniles hatch and will actively defend the nest by “dive bombing” approaching humans. This behavior results in an energetic cost to the adults and may also detract from their ability to tend to young or forage.

There is no difference between Alternatives 1, 2 and 3 less than one percent of goshawk nesting territories could experience some minor level of disturbance from routes within 1/4-mile of nest locations. Goshawk nests do not necessarily remain in the same location over time. New nests may be built annually or once every several years. New nests are generally built in relatively close proximity to existing or deteriorating nests and are almost always located within the core nest stand. It is expected that the number of nests located within ¼ mile of routes will

vary over time. To address the potential for future impacts to nesting goshawks, monitoring is identified as a mitigation measure.

Table 3.7-28 Acres of Suitable Northern Goshawk Habitat within Three Buffer Distance from Routes Available for Motorized Use

Alternative	1[2]	2	3	4
30 Foot Buffer[1]	33 (0.3%)	5 (0.04%)	10 (0.09%)	0
100 Foot Buffer	120 (1.05%)	17 (0.15%)	36 (0.3%)	0
200 Foot Buffer	328 (2.9%)	40 (0.35%)	74 (0.6%)	0

[1]Number in parenthesis indicates percent of total northern goshawk habitat available in the project area. [2]Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use.

These numbers, although low, are an overestimate because the numbers are derived within GIS using buffers on all segments of routes without providing for topography, slope, and existing vegetation.

The Table above displays the acreage of suitable northern goshawk habitat which occurs within three distances from roads available for public motorized use under each alternative. Limited direct impacts to habitat are most likely to occur within the area immediately adjacent to the road prism (within 30 feet) if vehicles pull off the road to park or pass other vehicles. Localized areas of low growing native vegetation may be modified (e.g. crushed or uprooted). This could result in a minor reduction in habitat for forest birds and rodents which constitute the majority of prey items for northern goshawks. At most, 0.3 percent of available northern goshawk habitat could be affected in this manner; however the actual amount would likely be much lower.

Habitat quality within 100 feet of a route may be indirectly impacted from altered drainage patterns associated with the route or decreased photosynthetic activity resulting from fugitive dust caused by vehicles traveling the route. Approximately 120 acres of suitable habitat are within 100 feet of existing unauthorized routes which would continue to receive motorized use under Alternative 1. The area potentially impacted in this fashion is reduced sequentially in Alternatives 2 (17 acres) and 3 (36 acres).

Effects to habitat could extend up to 200 feet from a road prism. Large snags are an important habitat component for goshawks. Trees posing a potential safety hazard ("hazard trees") along roads, routes and trails and left as down woody debri. These trees are typically snags that are within a tree-height distance from the road. The 2008 annual harvest of fuelwood by the public averaged approximately 700 cords on Lower Trinity Ranger District and 1,000 cords on Mad River Ranger District. Cutting of all standing snags (dead or green) is prohibited. Logs easily accessible by road and closest to roads (maintenance level 3 and 4) tend to be removed more rapidly with firewood permits than those in areas with limited motor vehicle access. Holders of valid firewood permits are allowed to cut and remove downed logs in areas identified as "open" for firewood collection and prohibited from LSR and riparian reserves. Miles within 200 foot buffers (below) include LSR therefore with respect to fire wood affects the estimated values would be approximately 65 percent less than shown in the table below. This habitat effect would be greatest under Alternative 1 with up to 328 acres being affected. These potential impacts are reduced incrementally in alternatives 2 (40 acres) and 3 (74 acres). Under Alternative 4, no potential impacts would occur associated with adding routes to the NFTS.

Northern Goshawk – Cumulative Effects

As stated previously, the major threats to northern goshawk at the present time involve the effects of vegetation management (e.g. timber harvest, fuels treatments, etc.) and wildife on the amount, distribution and quality of habitat. The negative impacts from past timber harvest have included habitat removal, degradation, and fragmentation, which affected not only nesting habitat, but also foraging and dispersal habitat.

Current and present habitat analysis includes fragmentation caused by existing system roads and unauthorized routes within the project area. There are 27 miles of NFTS roads and 3.88 miles of unauthorized routes in suitable northern goshawk habitat. The table below presents the total mileage of routes which will be available for public motorized use (existing system and added routes) in suitable habitat for each alternative as a means to compare the potential for human-goshawk encounters. Alternative 1 poses the highest risk for negative encounters between humans by allowing public motorized use on 31 miles within suitable habitat. Alternatives 2 and 3 would allow motorized use on 28 and 28 miles of routes, respectively, reducing the risk by approximately 10 percent relative to Alternative 1 and decreased fragmentation through passive restoration on unauthorized or unclassified routes not carried forwarded in the Alternatives. Under Alternative 4, the risk is reduced 12 percent respectively relative to Alternative 1.

Table 3.7-29 Miles of Routes (existing system and added routes) for Public Motorized Use in Suitable Northern Goshawk Habitat

	ALT 1	ALT 2	ALT 3	ALT 4
Total	31.37	28.12	28.34	27.49

Alternative 1, 2 and 3 would allow motor vehicle travel within ¼-mile of one known nests. Alternative 1 would allow motor vehicle travel within ¼ mile of nest trees to increase. All action alternatives would limit disturbance by prohibiting cross-country travel.

Table 3.7-30 Total Miles of Routes (existing system and added routes) within ¼ Mile Radius Circle of Northern Goshawk Activity Centers and number of Nests.

Alternative	**1**	**2**	**3**	**4**
Miles	0.09	0.09	0.09	0
Nests[1]	1	1	1	0

Under Alternative 1, unauhtorized routes would not be added to the NFTS, but would remain available for public motorized use.

The total amount of northern goshawk habitat affected by existing system and added routes available for motorized use is presented in the table below.

Table 3.7-31 Acres of Suitable Northern Goshawk Habitat within Three Buffer Distance from Routes (existing system and added routes)

Alternative	**1[2]**	**2**	**3**	**4**
30 Foot Buffer[1]	210 (1.85%)	182 (1.6%)	187 (1.6%)	177 (1.5%)
100 Foot Buffer	802 (7.08%)	699 (6.1%)	718 (6.3%)	682 (6%)
200 Foot Buffer	1,754 (15.5%)	1,466 (12.9%)	1,500 (13%)	1426 (12.6%)

[1]Number in parenthesis indicates percent of total northern goshawk habitat available in the project area. [2]Under Alternative 1, unauthorized

routes would not be added to the NFTS, but would remain available for public motorized use. Analysis assumes flat plane, thereby overestimating buffer area because slope, cut bank and other topographic features did not get excluded.

Gaines et al (2003) developed an index to assess habitat effectiveness for late-successional forest associated species. The habitat influence index is designed to address edge effects, snag and downed log reduction, and habitat loss and fragmentation resulting from road-associated factors. Using this index, habitat influence from roads is considered low if less than 30 percent of late successional are within a 200 foot habitat influence buffer, moderate if 30 – 50 percent of habitats are within that buffer, and high if greater than 50 percent of habitats are within that zone. Based on this index, **all alternatives result in a low level of habitat influence and low habitat effectiveness** for the northern goshawk.

Vegetation management and wildland fire have the greatest potential to modify northern goshawk habitat. Early vegetation management and fuels reduction practices likely increased some high to moderate quality habitat. Since 1995, mitigation measures and design features were implemented to protect, enhance, and accelerate habitat quality. Therefore, vegetation management and fuels reduction practices are not expected to significantly decrease the quantity and quality of habitat due to the implementation of these practices.

Fuel reduction, prescribed burning and understory thinning projects increase habitat for goshawk. Current implementation of one project is included in this analysis; Mill Creek Roadside Fuels Reduction Project is approximately 673 acres. Two future projects; Trinity River Community Protection Project (project area approximately 800 acres) and Beaverslide Timber Sale (project area is approximately 11,796 acres) are currently in the planning phase. Analyses of species habitat affects are not final. However, all three projects incorporate mitigation measures and design features that will improve habitat for the goshawk. Grazing allotments occur throughout the project area and provide foraging habitat for the goshawk. Presently, there is a total of 62,723 acres (12 percent of the project area) of capable foraging units; however 21,753 acres (35 percent) are inactive or vacant. Meadows are becoming encroached upon by conifers due to lack of fire in to these systems therefore an unknown acreage of meadow enhancement projects will likely be planned to reduce encroachment over the next 20 years contributing to habitat improvements for the goshawk.

Northern goshawk is a Forest Service sensitive species on the Six Rivers NF. There is the potential for disturbance to individual from use of the existing NFTS, particularly if use occurs during the early breeding season. This use is limited due to typical snow accumulations on these routes. Given the low proportion of nest sites and habitat potentially affected, and considering the projections for future recreation uses and OHV activity, Alternative 1 may, over time, contribute to cumulative effects upon goshawk populations. Because Alternative 1 does not restrict vehicles to designated routes, there is a high degree of uncertainty about future route proliferation in goshawk habitat which may have disturbance and habitat effects beyond the effects of routes open to motorized use. Alternative 1 presents the greatest risk of contributing to adverse cumulative effects upon goshawk habitat and populations because there would not be a prohibition on cross-country travel. Alternative 4 contributes the least to cumulative effects because cross-country travel would be prohibited, open route densities in goshawk habitat are lowest, and no motorized routes would be designated. Alternatives 2 and 3 would result in progressively lower risk to goshawk due to the amount of motorized routes being added to the system. Considering the proportion of goshawk habitat influenced by motorized routes and projections for future recreation uses and OHV activity, the alternatives may result in minor cumulative impacts when combined with other factors affecting goshawk habitat.

Determinations

Alternative 1

Although this alternative would result in increased amounts of disturbance and habitat fragmentation within the project area, continued route proliferation would ultimately be limited by topography and wilderness areas. Disturbance resulting from this alternative would likely result in adverse impacts to individual northern goshawks. Increased habitat fragmentation from route proliferation would likely result in impacts to individuals over the short-term and long-term. Northern goshawks are likely distributed throughout the project area where suitable habitat occurs and throughout the western United States. Therefore, population level impacts would be minor and would not threaten the long-term viability of the species.

Therefore, it is my determination that this alternative "*may affect impact individuals or habitat but will not cause a trend towards federal listing or alter the existing trend, nor lead to a change in distribution*" for the northern goshawk.

Alternative 2 and 3

Both alternatives would result in decreased (respectively) amounts of disturbance and minor habitat fragmentation within the project area, but would be limited over the long-term since cross-country travel would be prohibited. Disturbance resulting from both alternatives would not likely result in adverse impacts to some pairs and individual spotted owls. Since goshawks are not widespread throughout the project area, effects would be limited to a small percentage of suitable habitat, and cross-country travel would be prohibited, these effects would not likely result in any impacts to populations within the project area over the short or long-term.

Therefore, it is my determination that both alternative "*may affect impact individuals or habitat but will not cause a trend towards federal listing or alter the existing trend, nor lead to a change in distribution*" for the northern goshawk.

Alternative 4

Since this alternative would not result in the addition of any routes to the NFTS, there would not be any direct or indirect effects to goshawks over the short-term. Since cross-country travel would be prohibited, disturbance would be decreased over the long-term and all unauthorized routes within territories and emphasis habitat (Habitat Management Areas, LSR) would slowly rehabilitate. The rehabilitation of these routes would result in minor improvements to northern goshawk habitat over the long-term.

Therefore, it is my determination that this alternative would have a "*Beneficial Impact*" on the northern goshawk.

3.7.7 Riparian

The riparian-associated species group includes bald eagle and American peregrine falcon, (riparian management indicator species, ruffed grouse, winter wren, and yellow-breasted chat are analyzed in the MIS report). Wildlife species associated with riparian habitats are particularly vulnerable to the effects of recreation activities on their habitat because of the concentration of these activities in riparian areas. Riparian habitats occur in narrow, linear configurations that are

often traversed by roads and trails. Because of the availability of open water, cover, and concentrated food sources, these habitats are used by wildlife disproportionately to their availability (Gaines et al 2003).

Six Rivers NF applies mitigation standards and guidelines to ensure that the distribution and number of riparian-associated species do not severely decline. Riparian reserves (RR) standards and guidelines are designed to maintain adequate numbers of large snags and green-tree replacements for future snags in appropriate forest types. Additionally, the Aquatic Conservation Strategy (ACS) ensures the quality of aquatic and riparian resources protection by providing for diverse, high quality fish habitat and maintaining riparian dependent resources (water, fish, wildlife, riparian-related aesthetics, and aquatic vegetation) and riparian communities. See Aquatic Section for further discussion and analysis.

Bald Eagle- Management Direction

On July 9, 2007, the U. S. Fish and Wildlife Service published a Final Rule that removed (delisted) the bald eagle from the Federal List of Endangered and Threatened Wildlife in the lower 48 states. Official delisting of the bald eagle occurred 30 days from the date of the final rule. Bald eagles continue to receive federal protective status under statues of the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Upon delisting, the bald eagle was placed on the Regional Forester's list of Sensitive Species.

The Bald and Golden Eagle Protection Act was originally passed in 1940 to protect bald eagles and was amended in 1962 to protect golden eagles as well, by prohibiting the take, possession, sale, purchase, barter, transport, export or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit (16 U.S.C 668(a), 50 CFR 22). "Take" includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb (16 U.S.C 668(a), 50 CFR 22.3). On July 5, 2007 the USFWS published a final rule which defined "disturb" to encompass effects to individual birds that are likely to result in an adverse biological impact.

> "Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

Management direction is contained in the Regional Guide and was incorporated into the LRMP land allocations and standards and guides. The Recovery Plan for the Pacific Bald Eagle (USDI 1986) forms the basis for the management direction and provides recovery goals adopted by the Regional Guide.

The Recovery Plan is based on a zone concept within which habitat and nest sites will be managed at high to moderate levels of habitat capability, as defined in the bald eagle Habitat Capability Model in the LRMP FEIS (Appendix B, Table B-15). Each territory is divided into three zones. The nest site protection zone contains the nest tree and habitat that directly influences nest site conditions. The primary disturbance zone surrounds the nest site protection zone, buffering nesting birds from disturbance. The feeding zone provides foraging habitat.

Presently, the Forest monitors four active bald eagle territories; several suspected territories, and a small wintering population within Forest boundaries. The Forest will provide habitat for four breeding pairs and two wintering areas, and manage these areas in compliance with Recovery Plan goals and objectives. The Forest has delineated over 28,146 acres (11,390

ha) of suitable nesting and wintering habitat within 6 bald eagle network territories. Management of these areas is in accordance with the Recovery Plan. The Forest recovery goal of 4 pairs and 2 wintering areas has already been met.

All activities not related to nest monitoring will be restricted, unless site-specific analysis indicates otherwise, from January 1 to August 31 within nest site protection zones, and primary disturbance zones. Restrictions may be waived after June 1 if the area is not occupied or has failed. Road and river vehicle disturbance will be eliminated or minimized during the same time periods.

Bald Eagle – Affected Environment

The bald eagle occurs widely in North America. The bald eagle winters throughout most of California at lakes, reservoirs, river systems, and some rangelands and coastal wetlands, and breeds mainly in the northern two-thirds of the state, mostly in mountainous habitats near reservoirs, lakes and rivers.

The Six Rivers NF supports four breeding territories and two wintering areas. There are two territories with in the project area. These two territories are made up of nest protection zones, disturbance protection zones, foraging and winter zones and overall make up a combine total of 12,602 acres within the project area which currently contain 21 miles of existing NFTS roads and 3 miles of unauthorized routes. Much of the existing associated unauthorized routes are generally not accessible to wheeled motor vehicle traffic during the winter months due to snow and nest locations are remote enough that closures have not been warranted.

Generally, nests (typically nest in large greater than 36 inches in diameter) trees are located where they can overlook a large body of water, and bald eagles generally do most of their foraging in proximity to water. They primarily feed on fish but will also take waterfowl and carrion, especially in fall and winter. On the Six Rivers NF, they depend on the major river forks, but not directly on the minor tributaries. Factors that affect the availability of fish and waterfowl can also affect bald eagles. Numerous incidental detections occur near Ruth Lake, mainsteam Trinity River and South Fork Trinity River. The Ruth Lake nest is exposed to a light to moderate level of recreational activity and a low to light level of daily ambient noise levels from adjacent Level 4 road and year round community activities (boats, airplanes, construction). When compared to the South Fork nest disturbance is much less because disturbance is only from recreation uses which occurs mostly late in the breeding season and overall recreational use is light to low.

Table 3.7-32 Bald Eagle Territories Defined by Suitable Habitat Zones within Project Area of Concern

Nest Territory	Nest Site Protection Zone	Primary Disturbance Zone	Feeding Zone	Winter Roost Zone
Ruth Lake	350 Acres	1,016 Acres	1,622 Acres	778 Acres
South Fork	780 Acres	2,041 Acres	5,420 Acres	594 Acres

Annual monitoring occurs to determine reproductive status as a part of regular wildlife monitoring. Both nest territories are subjected to human activity from river recreation during summer months; however, both territories successfully reproduce most every year.

Gaines et al. (2003) identified the following road and motorized trail-associated factors as potentially affecting the bald eagle: poaching, disturbance at a specific site and displacement/avoidance. Bald eagle habitat modification is not a factor associated with motor vehicle use of roads. Large conifers in proximity to areas of open water are the primary elements that define high quality bald eagle habitat. Neither of these elements is affected by the low standard routes (i.e., equivalent of maintenance level 2 roads or motorized trails) considered in this document.

Poaching:

No instances of poaching have been documented on Six Rivers NF. All reports of poaching or harassing of bald eagles will be reported to appropriate law enforcement agencies. This activity is not considered a potential threat to local populations and will not be considered further in this analysis.

Disturbance at a Specific Site and Displacement/Avoidance:

The bald eagle nesting period consists of five phases: courtship and nest building, egg laying, incubation and hatching, early nestling period, and late nestling period. Eagle sensitivity to humans varies among these five phases, with eagles being most sensitive to human disturbance during the courtship and nest building phase, when disturbance may result in nest abandonment and reproductive failure.

Reported responses of bald eagles to human activities have included spatial avoidance of human activity and reproductive failure. Nest site protection through seasonal area closures is one of the primary ways that the Six Rivers NF has implemented measures to avoid the potential for nest failures due to human disturbance.

To determine the potential for disturbance of bald eagles, the number of miles of routes available for motorized travel within half mile of bald eagle nests was calculated. Existing routes within suitable winter roosting areas are generally snow-covered during late-December through April when bald eagles are present, reducing the potential for disturbance during the courtship and early breeding period. There are no unauthorized routes within a half mile of nests therefore no closures are required during the breeding season.

Bald Eagle – Direct and Indirect Effects

The response of bald eagles to human activities is variable. Individual bald eagles show different thresholds of tolerance for disturbance. Also, the distance at which a disturbance causes modified behavior is influenced by terrain, vegetation cover, line of sight, and prevailing winds. Forested habitats can mute noise generated by vehicles and screen the vehicle from sight.

Table 3.7-33 Miles of Added Route Available for Public Motorized Use in Bald Eagle Territories (total 12,602 acres)

ALT 1	ALT 2	ALT 3	ALT 4
3.13	**0.49**	**0.49**	**0**

Alternative 1, although very low, would allow travel on the greatest mileage of unauthorized routes and continue disturbance by the proliferation of cross-country travel within bald eagle territories. Such disturbance would result in a greater possibility of negative impacts to individual birds. This potential impact is reduced equally in Alternatives 2 and 3. Under

Alternative 4, no potential impacts would occur as no unauthorized routes would be added to the NFTS.

Within the nest protection zone there are only 2.33 miles of unauthorized routes of which 0.3 miles are included in Alternative 2 and 3. These low numbers explain why the following table shows zero across all alternatives. The following table displays the miles of route that would be available for motor vehicle use within a half mile of known bald eagle nest by alternative.

Table 3.7-34 Miles of Unauthorized Route within a 1/2 Mile of Known Bald Eagle Nest

ALT 1	ALT 2	ALT 3	ALT 4
0	0	0	0

There are no unauthorized routes within ½ mile of bald eagle nests; therefore the risk of disturbance is limited to the existing NFTS routes. Under all action alternatives, cross-country travel would prohibit future motorize travel off the NFTS in all habitat and within ½ mile of nests, which would eliminate the potential for disturbance at a specific site, cause displacement or avoidance.

Bald Eagle Cumulative Effects

The majority of past and present activities on the project area have had little impact on bald eagles or their habitat. Disturbance such as recreation, vegetative and fuels management, livestock grazing, and wildfire have not appreciably affected the availability or quality of habitat. Past and ongoing activities that have affected bald eagle habitat are chiefly associated with development of reservoirs, historic logging, and water transportation. Reservoir development created eagle foraging habitat at Ruth Lake. Conversely, the de-watering of portions of the mainstem Trinity River reduced available foraging habitat. Potential bald eagle nesting habitat is relatively unaltered relative to its historic condition. Eagle nesting habitat tends to be in close proximity to rivers and lakes in stand of timber containing large, old trees. Bald eagles appear to be able to adapt to a certain amount of human disturbance and continue to successfully reproduce.

There are 21 miles of NFTS roads and 24 miles of unauthorized suitable bald eagle territories, none within ½ mile of a known nest. The table below presents the total mileage of routes which will be available for public motorized use (existing system and added routes) in suitable habitat for each alternative as a means to compare the potential for human-eagle encounters. Alternative 1 poses the highest risk for negative encounters between humans specifically because of unregulated cross-country travel. The difference in unauthorized miles between alternative 1 and action alternatives (3 miles) is not expected to be substantial because the two nests are well established and reproductively successful most years. It is unlikely that use will increase during the breeding season as both nesting zones are in remote areas that cater mostly to summer recreation.

Table 3.7-35 Miles of Routes (existing NFTS and added routes) available for Public Motorized Use in Bald Eagle Territory

	ALT 1	ALT 2	ALT 3	ALT 4

Total	24	21.49	21.49	21

Perch sites and prey abundance will be maintained and improved by maintaining habitat. The Forest will minimize conflicts between eagles and recreational users in feeding areas where eagle activity is being significantly altered.

Bald eagle is a Forest Service sensitive species on the Six Rivers NF. There is the potential for disturbance to individual from use of the existing NFTS, particularly if use occurs during the early breeding season or during the wintering season. This use is limited due to typical snow accumulations on these routes. There are no unauthorized routes within ½ mile of an existing nest and therefore the risk of cross-country travel is expected to be very low. That risk continues in Alternative 1 but is eliminated in Alternatives 2, 3 and 4. The negligible disturbance associated with the routes evaluated in all alternatives is not expected to affect bald eagle abundance or distribution and poses a very low risk of impacting bald eagle viability on the Six Rivers National Forest.

Determinations

Based upon the above analysis it is my determination that all alternative "*may affect impact individuals or habitat but will not cause a trend towards federal listing or alter the existing trend, nor lead to a change in distribution or loss of viability*" for the bald eagles.

USFWS Programmatic Guidelines

Alternative 1 would not prohibit cross-country travel; therefore, this alternative would not prevent disturbance to nest sites during the breeding season and would not comply with programmatic guidelines restricting riparian crossings and resource damage to fisheries. All action alternatives do not include staging areas and would prohibit cross-country travel restricting routes within ½ mile of nest sites. No unauthorized routes with resource concerns (restrict fish passage) are included in any action alternative, therefore, these action alternatives would be in compliance with the programmatic guidelines.

American Peregrine Falcon - Affected Environment

The peregrine falcon was listed as a federally endangered species from 1970 through 1999. On August 25, 1999 the final rule was published to de-list the peregrine falcon and it was then identified by the Regional Forester as a Sensitive Species on Six Rivers National Forest. Management direction on Six Rivers NF is based on a zone concept within which habitat and nest sites will be managed at high to moderate levels of habitat capability, as defined in the bald eagle Habitat Capability Model in the LRMP FEIS (Appendix B). Each territory is divided into three zones. The nest site protection zone contains the nest tree and habitat that directly influences nest site conditions. The primary disturbance zone surrounds the nest site protection zone, buffering nesting birds from disturbance. The feeding zone provides foraging habitat.

Peregrine falcon is also associated with late-successional closed canopy coniferous forest and much of that section applies to this species including the LSR. Management direction within the LRMP included additional standards and guidelines to address Special Habitat Management Areas (in addition to Late Successional Reserves established in the FSEIS) for the American peregrine falcon (page IV-36). There are 238,100 acres of Late Successional Reserves within the project area.

In the Pacific states, suitable peregrine falcon habitat consists of high cliffs with ledges for nesting and perching. Ridge-top snags are also an important habitat component. Cliff nests, called eyries, are typically near a body of water with an adequate prey base. The diet of peregrine falcons consists almost entirely of birds. The peregrine falcon is grouped within the riparian associated wildlife group because their primary diet consists of waterfowl as prey.

The project is contains 164,953 acres of peregrine falcon delineated territories that includes both historic and current nest zones. Current NFTS routes within nest protection zones have closures in place to eliminate disturbance during the nesting season, therefore routes within proximity to nest sites will not be further analyzed. All proposed action alternatives would maintain the current capability of designated territory zones.

Long term monitoring continues to occur to determine reproductive status as a part of regular wildlife monitoring. Nest territories are subjected to human activity from river recreation, rock climbing and other outdoor recreating during summer months; however, territories success rate has been consistent most every year. For this species, disturbance through access and use of cliff nesting sites is the primary concern. Analysis will focus on how alternatives affect potential access to nest area and disturbance.

Gaines et al. (2003) identified the following road and motorized trail-associated factors as potentially affecting the peregrine falcon: disturbance at a specific site and displacement and avoidance. Peregrine falcon habitat modification is not a factor associated with motor vehicle use of roads. Proximity to areas of open water is the primary elements that define high quality foraging habitat. Neither of these elements is affected by the low standard routes (i.e., equivalent of maintenance level 2 roads or motorized trails) therefore habitat will not be considered in this analysis.

Displacement or Avoidance and Collection:

Illegal harvest (shooting of an individual) and falconry take have been documented on other National Forests. The potential for collection or other harvest of falcons is likely to be higher with greater opportunity for human-animal encounters in areas with higher road density or concentrated recreational use. There are no documented reports on the Six Rivers National Forest were falcons were harassed or shot in areas where human recreation was concentrated. The collection and use of birds for falconry is regulated by the California Department of Fish and Game (and USFWS?) and management considers both illegal and legal harvest. Nonetheless, collection has the potential to affect local individual territories if a particular site were to receive repeated visits and harvesting. Overall, at this time, there is minimal concern on the Forest that collection poses a risk to local populations.

Human disturbance has the potential to cause falcons to abandon nesting during the nesting and post fledging period (January 1 through August 31). Falcons initiate breeding when the ground is still covered in snow and roads and trails are generally not yet in use. When the snow melts, these sites can potentially be areas of conflict as these roads and trails are used by people.

To ascertain the potential for disturbance of falcons, each alternative is compared in terms of the miles of routes available for public use within territories and the number of nests within 1/4-mile of routes available for public use. There are currently approximately 85.4 miles of unauthorized routes within established territories. Existing closures are in place to protect breeding pairs therefore no further analysis will be done.

American Peregrine Falcon – Direct and Indirect Effects

The response of peregrine falcon to human activities is variable. Individuals show different thresholds of tolerance for disturbance. Also, the distance at which a disturbance causes modified behavior is influenced by terrain, vegetation cover, line of sight, and prevailing winds. Forested habitats can mute noise generated by vehicles and screen the vehicle from sight.

Most nests within the project areas are fairly remote and often inaccessible however a pair was observed displaying territorial behavior during 2008 fire suppression efforts when chainsaw crews and helicopters approached within ¼ mile of aerie. Fledglings successfully fledged that season in spite of a couple months of noise and air quality disturbance.

Table 3.7-36 Miles of Added Route Available for Public Motorized Use in Peregrine Falcon Territories (total 164,953 acres)

ALT 1	ALT 2	ALT 3	ALT 4
85.43	**24.02**	**27.69**	**0**

Alternative 1 would allow travel on the greatest mileage of unauthorized routes and continue disturbance by the proliferation of cross-country travel within peregrine falcon territories. Such disturbance would result in a greater possibility of negative impacts to individual birds particularly during nesting season. This potential impact is reduced in Alternatives 2 and 3. Under Alternative 4, no potential impacts would occur as no unauthorized routes would be added to the NFTS.

The following table displays the miles of route that would be available for motor vehicle use within a half mile of known peregrine falcon by alternative.

Table 3.7-37 Miles of Unauthorized Route within a 1/2 Mile of Known Peregrine Falcon Nest

ALT 1	ALT 2	ALT 3	ALT 4
0	0	0	0

There are no unauthorized routes within ¼ mile of peregrine falcon nests that do not already have a closure in place; therefore the risk of disturbance is limited to the existing NFTS routes. Under all action alternatives, cross-country travel would prohibit future motorize travel off the NFTS in all habitat and within ¼ mile of nests, which would eliminate the potential for disturbance at a specific site, cause displacement or avoidance.

American Peregrine Falcon – Cumulative Effects

The majority of past and present activities on the project area have had little impact on peregrine falcon or their habitat. Disturbance such as recreation, vegetative and fuels management, livestock grazing, and wildfire have not appreciably affected the availability or quality of habitat. Past and ongoing activities that have affected the species would be associated with helicopter logging, wildfire suppression efforts and development of reservoirs and highway transportation systems. Reservoir development created foraging habitat at Ruth Lake. Conversely, the de-watering of portions of the mainstem Trinity River reduced available

foraging habitat. Considering peregrine falcon nesting habitat are large rock outcrops and cliff faces it is likely that they are relatively unaltered relative to their historic condition. Falcons within the project area appear to be able to adapt to a certain amount of human disturbance and continue to successfully reproduce.

There are 280 miles of NFTS roads and 85 miles of unauthorized routes, none within ¼ mile of a known aerie. The table below presents the total mileage of routes which will be available for public motorized use (existing system and added routes) in falcon territories for each alternative as a means to compare the potential for human-eagle encounters. Alternative 1 poses the highest risk for negative encounters between humans specifically because of unregulated cross-country travel. The difference in unauthorized miles between alternative 1 and action alternatives (3 miles) is not expected to be substantial because the two nests are well established and reproductively successful most years. It is unlikely that use will increase during the breeding season as both nesting zones are in remote areas that cater mostly to summer recreation.

Table 3.7-38 Miles of Routes (existing system and added routes) for Public Motorized Use in Peregrine Falcon Territory

	ALT 1	ALT 2	ALT 3	ALT 4
Total	**365.43**	**304.02**	**307.69**	**280**

Peregrine falcon is a Forest Service sensitive species on the Six Rivers NF. There is the potential for disturbance to individual from use of the existing NFTS, particularly if use occurs during the early breeding season or during the wintering season. This use is limited due to typical snow accumulations on these routes. There are no unauthorized routes within ¼ mile of an existing nest and therefore the risk of cross-country travel is expected to be very low. That risk continues in Alternative 1 but is eliminated in Alternatives 2, 3 and 4. The negligible disturbance associated with the routes evaluated in all alternatives is not expected to affect peregrine falcon abundance or distribution and poses a very low risk of impacting peregrine falcon viability on the Six Rivers National Forest.

Determinations

Based upon the above analysis it is my determination that all alternative "*may affect impact individuals but will not cause a trend towards federal listing or alter the existing trend, nor lead to a change in distribution or loss of viability*" for the peregrine falcon.

3.7.8 Wide-Ranging Carnivores

3.7.8.1 Introduction

The wide-ranging carnivore group is represented by the black bear. Large and mid-sized carnivores are unique in their response to human-induced habitat changes due to their large spatial habitat needs and their sensitivity to landscape patterns, including road edge effects and road density (Buskirk and Zielinski 2003 in Zabel, et al 2003). On the Six Rivers NF, black bear within the project area are not believed to be habituated to human activities which occurs on other Forests where facilities and developments and high recreational use exposes black bear to

moderate and high levels of human encounters. Black bears within local communities of the project area are considered to be sensitive to the presence of humans and still exhibit avoidance behaviors. Gaines et al. (2003) conducted a literature review of nine wide-ranging carnivores which included the black bear and showed this species to be sensitive to an array of road- and trail-associated factors including collisions, poaching, displacement or avoidance, disturbance at a specific site and negative human interactions.

3.7.8.2 Species

Black Bear - Affected Environment

Black bear is a Management Indicator Species on the Six Rivers NF. It is associated with late-successional forests and much of that section applies to this species including the LSR. There are 238,100 acres of Late Successional Reserves within the project area.

The majority of the project area (505,430 acres) where suitable black bear habitat includes components of oak and canopy closures greater than >30 percent. There are approximately 304,258 acres of bear habitat within the project that currently contain 333 miles of NFTS roads and 127 miles of unauthorized routes.

This species is omnivorous and seasonally uses a wide range of foods and habitats, including brushy stands of forest, valley foothill riparian and wet meadows. Bears commonly consume ants and other insects in spring and summer, but prefer nut crops, especially acorns, and manzanita berries in the fall. Black bears are opportunistic foragers, commonly catching and consuming deer fawns. Black bears are born in hollow bases of trees, snags, stumps and use caves, root wads, log piles, and hollow trees as den sites; therefore much of the Cavity-Dependent Section also applies to this species.

Black bears mate in June and July and are dependant on the abundance of high quality summer and fall foods. Delayed implantation allows adult females to carry a fertilized egg in her womb for many months and if she has not accumulated enough fat by the time she settles into her den to hibernate, the egg will spontaneously abort. Reproduce age for females is 4.5-years old, breeding generally every other year and produce two to four cubs per litter. Births occur in February while the sow is hibernating. The newborn cubs weigh less than a pound at birth, and continue developing while suckling. They emerge with the sow from their dens in April or May at five to seven pounds. Cubs can remain with the sow for up to two years before they become independent and either drift away or are driven away. Therefore the critical reproductive periods are likely not effected do to inaccessible areas from snow.

Land management activities can affect the capability of an area to support bear populations. For instance, many of the common food plants (e.g., manzanita, oaks) require open areas for establishment. Therefore, controlled burns or other management strategies aimed at creating a mosaic of forest openings can be especially beneficial for black bears by providing abundant food resources in close proximity to cover. Similarly, roads provide gaps providing for other forage such as black berries, Manzanita berries and elder berries. Additionally, retention and recruitment of snags and large woody debris provide den sites and potential food sources (e.g., colonial insects). Conversely, management practices which result in even-aged stands without structural and vegetative species diversity decrease habitat quality for black bears. Other forest management activities, such as road construction, may also effect bear populations by increasing habitat fragmentation and hunter access.

Many species avoid areas in proximity to roads or trails, or exhibit flight behavior within a certain distance of route use, though studies documenting the magnitude and duration of

behavioral responses are limited. Road usage by vehicles has a significant role in determining animal's road avoidance behavior. Studies indicated black bears shifted their home ranges away from areas of high road density to areas of lower road densities. Road avoidance may vary seasonally. Black bear, for example, crossed roads with low traffic volume more frequently than roads with high traffic volume, and almost never crossed interstate highways.

Two measurement indicators are used in this analysis to compare the effects on black bear of adding routes to the NFTS. Miles of routes available for motorized use within bear habitat is used to measure potential for dispersal, potential for negative human encounters, disturbance and collisions with vehicles. The acreage of suitable habitat within three distances (30 feet, 100 feet and 200 feet) of existing unauthorized routes is used to measure the potential effects to habitat. The table below displays the current proportion of overall suitable habitat that is potentially being impacted by use of existing unauthorized routes.

Table 3.7-39 Black Bear Habitat Potentially Being Impacted by Existing Unauthorized Routes

Habitat Within 30 Feet		Habitat Within 100 Feet		Habitat Within 200 Feet	
Acres	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
1,054	0.34	3,864	1.3	8,606	2.8

Black Bear – Direct and Indirect Effects

The California Department of Fish and Game (2008) reported that the maximum level of bear-tags set annually rarely is reached. Incidences of collision most probably occur on higher speed paved highways. Collisions on lower speed unpaved routes being evaluated for this project are not likely to occur. The proportion of roads and trails is directly related to the amount of human access for bear hunting and poaching opportunities. As routes increase, access for bear hunting and poaching increase and visa versa. However, statewide bear monitoring indicates bear population trends are either stable or increasing. CDFG (2004) reports that legal and illegal bear harvest together "will not have significant negative effects on the State's bear resource." Therefore, it is possible to assume that human access for bear hunting and poaching does not have a negative impact on the bear population numbers.

Large snags are an important habitat component for black bear. Black bear diets are diverse and rely largely on dead and dying trees and down woody debris as a vital resource for invertebrate species and floristic nutrients. Therefore, analysis of routes within 200 foot buffer to examine habitat modification resulting from the removal of near ground vegetation and coarse woody material and if it appears to be the primary potential effect of adding routes to the NFTS.

Table 3.7-40 Acres of Suitable Black Bear Habitat within 200 Foot Buffer Distance from Routes Available for Motorized Use

Alternative	1[2]	2	3	4
200 Foot Buffer	8,606 (2.83%)	1818 (0.6%)	2170 (0.7%)	0

[1]Number in parenthesis indicates percent of total black bear habitat available in the project area. [2]Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use. Analysis assumes flat plane, thereby overestimating buffer area because slope, cut bank and other topographic features did not get excluded.

Habitat modification occurs as an indirect effect of managing roads or trails for public wheeled motor vehicle use. Short term degradation may occur due to clearing of trail by brushing and the occasional removal of trees posing a potential safety hazard ("hazard trees"). These trees are typically snags that are within a tree-height distance from the road. Fallen snags are generally left contributing to the recruitment of large down wood. The 2008 annual harvest of fuelwood by the public averaged approximately 700 cords on Lower Trinity Ranger District and 1,000 cords on Mad River Ranger District. Cutting of all standing snags (dead or green) is prohibited. Logs easily accessible by road and closest to roads (maintenance level 3 and 4) tend to be removed more rapidly with firewood permits than those in areas with limited motor vehicle access. Holders of valid firewood permits are allowed to cut and remove downed logs in areas identified as "open" for firewood collection and prohibited from LSR and riparian reserves. Miles within 200 foot buffers include Late-Successional Reserves which make up 47 % of the project area therefore with respect to fire wood affects the estimated values would be much less than. Cutting of all standing snags (dead or green) is prohibited

Under alternative 1, approximately 8,606 acres of suitable black bear habitat would not be protected from proliferation of cross-country travel. Alternative 1 poses the greatest risk of reducing habitat effectiveness as a result of disturbance and minor habitat modification associated with cross-country motor vehicle use.

Black Bear – Cumulative Effects

Vegetation management and wildland fire have the greatest potential to modify black bear suitable habitat. Low intensity, understory fires do not necessarily render habitat unsuitable, but may affect habitat components such as snags and down logs while providing an increase in forbs and new vegetation for this species.. Current and present habitat analysis includes fragmentation caused by existing system roads and unauthorized routes within the project area. There are 333 miles of NFTS roads and 127 miles of unauthorized routes in suitable black bear habitat. The table below presents the total mileage of routes which will be available for public motorized use (existing system and added routes) in suitable habitat for each alternative as a means to compare the potential for human-bear encounters. Alternative 1 poses the highest risk for negative encounters between humans by allowing public motorized use on 792 miles within suitable habitat. Alternatives 2 and 3 would allow motorized use on 694 and 699 miles of routes, respectively, reducing the risk by approximately 12 percent relative to Alternative 1 and decreased fragmentation through passive restoration on unauthorized or unclassified routes not carried forwarded in the Alternatives. Under Alternative 4, the risk is reduced 16 percent respectively relative to Alternative 1.

Table 3.7-41 Miles of Routes (existing system and added routes) for Public Motorized Use in Suitable Black Bear Habitat

	ALT 1	ALT 2	ALT 3	ALT 4
Total	792	694	699	666

Use levels on routes which would be added to the NFTS under any action alternative are generally classified as either low (25-100 vehicles/week) or light (<25 vehicles/week) and varies seasonally.

The total affected amount of black bear habitat within 200 feet by existing system and added routes available for motorized use is presented in the table below.

Table 3.7-42 Acres of Suitable Black Bear Habitat within Three Buffer Distance from Routes (existing system and added routes)

Alternative	1[2]	2	3	4
200 Foot Buffer	75,568 (25%)	68,780 (23%)	69,132 (23%)	86,820 (28%)

[1]Number in parenthesis indicates percent of total black bear habitat available in the project area. [2]Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use. Analysis assumes flat plane, thereby overestimating buffer area because slope, cut bank and other topographic features did not get excluded.

Gaines et al (2003) developed an index to assess habitat effectiveness for late-successional forest associated species. The habitat influence index is designed to address edge effects, snag and downed log reduction, and habitat loss and fragmentation resulting from road-associated factors. Using this index, habitat influence from roads is considered low if less than 30 percent of late successional are within a 200 foot habitat influence buffer, moderate if 30 – 50 percent of habitats are within that buffer, and high if greater than 50 percent of habitats are within that zone. Based on this index, **all alternatives result in a low level of habitat influence and low habitat effectiveness** for the black bear.

Over 67 percent of black bear suitable habitat falls within designated Late-Successional Reserves providing current and future mitigation measures and design features when implemented to protect, enhance, and accelerate habitat quality for the late-successional forest species. Therefore, vegetation management and fuels reduction practices are not expected to significantly decrease the quantity and quality of habitat due to the implementation of these practices. Projects may remove or degrade habitat in the short-term, but will remain suitable post-project and are expected to improve and, or protect habitat conditions in the long-term (accelerate and protect late-successional characteristics).

Manage Indicator Species Summary – Relationship of Project Level Habitat Impacts to Black Bear: There are currently 123,595 acres of black bear habitat on the National Forests system lands within the project area. The northern portion of California is continually noted by DFG as supporting the highest density of bears of any area within the western United States.

The California Department of Fish and Game (DFG) monitor black bear populations within northwestern California. Black bear is “S5- secure” (“demonstrably widespread, abundant, and secure”) in California (NatureServe 2006). California's black bear population has increased over the past 25 years. Sitton (1982) estimated the statewide bear population to be between 10,000 and 15,000 animals. Presently, the statewide black bear population within the 52,000 square miles of known range is conservatively estimated to be between 25,000 and 30,000 (DFG 2006). Previous and ongoing studies indicate that bear densities range from 1.0 to 2.5 bears per square mile in the North Coast/Cascade (50 % of the statewide population).

The Six Rivers NF Motorized Travel Management Project may affect up to 8,606 acres of black bear habitat. This represents 0.03 percent of black bear habitat available project-wide. Over time, this percentage would be reduced slightly under all action alternatives as the road-associated impacts described above would not occur along routes not added to the NFTS. Based

on the low amount of habitat affected, the Six Rivers NF Motorized Travel Management Project will not alter the existing trend in black bear habitats, nor lead to a change in the distribution of black bear across the project area.

Determinations

Based upon the above analysis it is my determination that all alternative "*may affect impact individuals or habitat but will not cause a trend towards federal listing or alter the existing trend, nor lead to a change in distribution or loss of viability*" for the black bear.

3.7.9 Ungulates

3.7.9.1 Introduction

The ungulate group is represented by black-tailed deer and Roosevelt elk. Gaines et al (2003) conducted a literature review of six ungulate species and showed ungulate species to be affected by a variety of road- and trail-associated factors, including hunting, poaching, collisions, displacement or avoidance, disturbance at a specific site, and physiological response.

In general, ungulates respond to recreational activities by avoiding areas near roads, recreation trails and other types of human activities. Human activities may have the greatest impact on ungulates when they occur on their winter ranges or where young are reared.

Historically and currently, for many local Native Americans, deer, and to a lesser degree elk, continue to be hunted as important subsistence foods. While black-tail deer have relatively specific home ranges, and generally do not move out of their accustomed ranges, elk on the other hand appear to be slowly expanding their natural range throughout the project area. Deer and elk often compete with livestock for forage, forbs and grasses in spring. California Fish and Game regulate the harvesting of both game species. Roosevelt elk are mostly at higher elevations, occur within wilderness boundaries and elk hunting zones are primarily in wilderness boundaries outside the project area and largely unaffected by travel management alternatives. Additionally, elk and deer are similar in effects deer are a reasonable proxy for elk; therefore the black-tailed deer will be the species to represent this wildlife group.

3.7.9.2 Species

Black-tailed Deer - Affected Environment

Black-tail deer is a Management Indicator Species and a Harvest Species on Six Rivers NF. Black-tail deer are associated with early to mid-successional hardwood and coniferous forest types as well as meadows, glades, ponds, springs and seeps. Deer zones including fawning, foraging, winter and summer range covers approximately 130,850 acres within the project area of which a total of approximately 74,890 acres of deer winter ranges covers forest land. Deer winter range currently contains 92 miles of existing NFTS roads and 21 miles unauthorized routes. The range of the black-tailed deer extends across the project area; however, much of the area is lightly used by ungulates. There are approximately 7 deer herds can occur within the project area.

Management and monitoring of deer on the Six Rivers NF is accomplished in cooperation by the California Department of Fish and Game (CDFG).

Gaines et al. 2003 identified the following road and motorized trail-associated factors as having an effect on deer: hunting, poaching, collisions, displacement or avoidance and disturbance at a specific site.

Hunting and Poaching:

- Human access facilitated by unauthorized routes has the potential to provide opportunities for illegal take of individuals and instances of poaching of deer and elk have been documented on the Six Rivers National Forest. During the hunting season, deer may become more wary of humans, and disturbance to deer appears to be greater during the hunting season.
- Since hunting levels for deer and elk are controlled through hunting zone quotas and tag limits established by the California Department of Fish and Game, an increase in hunting opportunity or hunter success is unlikely to impact deer populations. Hunting limits also take into account estimates of the amount of illegal kill and road kill occurring., Violators are cited by law enforcement agents annually however levels of illegal harvest are not well understood on Six Rivers NF due to lack of sufficient patrol.
- Local hunters and hunting clubs suggest that road side hunting (legal or illegal) has become more difficult due to increase cover on roadside forests. The assumption is that forests continue to be over grown with the decrease in timber implementation and thinning projects.
- Illegal agricultural plantations (outdoor growing operations of marijuana) within Six Rivers NF and non-forested lands are reported to be associated with poaching of ungulates and other animals as they pose a threat to harvest yield production due to foraging on crops (Pers. comm. LEO).

Collisions:

- The majority of deer-vehicle collisions occur in the early morning or late afternoon and evening hours, around dawn and sunset, when the deer are most active and when visibility is poor. More deer-vehicle collisions occur during the spring and fall, when deer are migrating. In the fall, hunting may cause deer to be more wary and active. In the spring, vegetation tends to green-up along roadsides and attract deer to roads. The frequency of deer and vehicle collisions differs by road type. Paved highways which experience high volume of traffic account for the vast majority of automobile associated mortality. There are little to no data on deer road kills along Forest roads; however, roads maintained at a higher standard for passenger vehicle (maintenance levels 3, 4, & 5), where vehicle speeds are greatest, have the most potential to contribute to deer-vehicle collisions. Deer-vehicle collisions on motorized trails and roads maintained for high clearance vehicles (maintenance level 2 roads) are probably not appreciable in number due to the lower speeds required to navigate steep terrain and environmental conditions across routes and the amount of use received by these roads.

Displacement or Avoidance and Disturbance at a Specific Site:

- In general, deer will move away from, or flush, from an approaching person and will usually allow a person in or on a vehicle or mounted on horse back to get closer than a person on foot. Wisdom et al. (2004) found that mule deer showed little measurable flight response to experimental OHV treatments, but cautioned that deer may well be responding with fine-scale changes in habitat use (i.e., avoidance), rather than substantial increases in movement rates and flight responses. Several studies have found that mule deer avoid areas in proximity to roads. Deer avoid primary roads more than secondary or

tertiary roads and also avoid roads more in open habitats as opposed to areas with vegetative or topographic cover (deVos et al. 2003). Primary roads include paved highways which experience high traffic volume. Secondary roads are also paved, but traffic volume and speed tends to be lower. Tertiary roads include native surfaced roads, such as the maintenance level 2 roads considered in this analysis.

- Various studies have shown that mule deer have displacement distances that vary between 200 and 800 meters (656 and 2,624 feet), depending upon the road type and traffic level, and the surrounding habitat (Perry and Overly 1977, Rost and Bailey 1979, Johnson et al. 2000). One study found that if habitat was available away from a linear road or trail, then deer avoided the disturbance corridor (Jalkotzy et al. 1997). However, when no suitable deer habitat was available away from the road or trail, then deer used the habitat adjacent to the road or trail. Deer and elk (less common in general) are often seen from roads in the project area, especially within 200 foot buffer and the level of habituation appears associated with the maintenance level of road use (e.g., level 4 pose little to no response, level 2 and 3 cause flight).
- Rost and Bailey's 1979 study in Colorado, indicated that deer were displaced within a 656 foot distance of secondary roads. Due to the differences in terrain, topography and limited use on Six Rivers NF the distance is likely less. A distance of 200 feet was applied to represent the Zone of Influence related to motorized routes, since the majority of Six Rivers NF roads and trails are not likely open and flat rather steep and forested. In order to assess the potential for disturbance and displacement of deer and elk, the amount of habitat within 200 feet of routes available for motorized use was calculated. This metric was applied to overall winter range. There are currently 4889 acres of NFTS routes and 1403 acres of unauthorized routes within 200 feet of winter, summer, fawning, and foraging range.

Black-tailed Deer – Direct and Indirect Effects

Based on the discussion above illegal poaching appears to be the primary potential effect of adding routes under the assumption that use would increase over time because Six Rivers NF estimates hunters hunt from roads 75 percent more often than on foot.

The table below presents the amount of acres of unauthorized routes within 200 feet of winter range available for motorized use.

Table 3.7-43 Acres of Black-Tailed Deer Suitable Habitats within 200 Feet of Routes Available for Motorized Use

Alternative	**1**[2]	**2**	**3**	**4**
Winter Range[1]	1,403 (1.9%)	204 (0.3%)	255 (0.34%)	0

[1]Number in parentheses indicates percent of total winter range or key area available project-wide. [2]Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use.

The figures displayed in the table above represent the amount of habitat where some level of disturbance or avoidance may be occurring. In contrast to these route-effect zones, areas less influenced by motorized routes effects are considered "security habitat". For alternative comparison purpose, a habitat index is described in Gaines et al. (2003), where 1) greater than 70 percent of winter range outside the zone has a low level of influence; 2) 50 to 70 percent of

winter range outside the zone has a moderate level of influence; and 3) less than 50 percent of winter range outside the zone would constitute a high level of influence.

Utilizing the index developed by Gaines et al., **all alternatives would result in a low level of habitat disturbance**, within deer winter range. Continued use of unauthorized routes under Alternative 1 would result in the highest level of relative to the other alternatives. Under Alternative 1, approximately 74,890 acres winter range would not be protected from proliferation of cross-country travel and poses the greatest risk of reducing habitat effectiveness as a result of disturbance and minor habitat modification associated with cross-country motor vehicle use.

Black-tailed Deer – Cumulative Effects

Past and current cumulative effects to deer include current and historic grazing of deer habitat; loss or creation of habitat through catastrophic wildfire; loss of hiding cover from timber and fuels projects, along with an increase in forage; and general increase in noise and sight disturbance from recreational activities such as hunting, camping, and pleasure driving, including all forms of motor vehicle use.

The table below presents the proportion of winter range cumulatively affected by roads and motorized trails within the project area for all alternatives. Utilizing the index developed by Gaines et al., all alternatives would have a low cumulative habitat disturbance influence when considering the combination of the existing NFTS plus proposed additions. Deer within the project area adjacent to private lands respond to disturbance with much less flight, if at all, than those in remote areas, particularly with respect to dispersing in the presence of traffic. Therefore, the numbers below are an overestimate when proximity is considered.

Table 3.7-44 Acres of Black-Tailed Deer Suitable Habitats within 200 Feet of Routes (Existing System plus Proposed Additions)

Alternative	**1[2]**	**2**	**3**	**4**
Winter Range[1]	6,292 (8.4%)	5,093 (6.8%)	5,144 (6.9%)	4,889 (6.5%)

[1]Number in parentheses indicates percent of total winter range available project-wide. [2]Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use.

Projects may remove or degrade habitat in the short-term, but will remain suitable post-project and are expected to improve and, or protect habitat conditions in the long-term (accelerate and protect late-successional characteristics).

Manage Indicator Species Summary – Relationship of Project Level Habitat Impacts to Black-Tailed Deer: Black-tailed deer is a Forest Service Management Indicator Species on Six Rivers NF. It is associated with late-seral closed canopy coniferous forest and is also a habitat generalist. There are 74,896 acres of deer winter range habitat within the project area which currently contain 92 miles of existing NFTS roads. The range of the black-tail deer extends across the project area. Based on the amount of available suitable habitat on the Forest and the fact that a majority of the habitat is protected in reserves and on range allotments, the amount of habitat potentially affected by this project would be insignificant. Considering that 1.8 percent of the winter range is currently being affected, over time, this percentage would be reduced slightly under all action alternatives as the road-associated impacts described above would not occur along routes not added to the NFTS. Based on the low amount of habitat

affected, the Six Rivers NF Motorized Travel Management Project will not alter the existing trend in deer habitats, nor lead to a change in the distribution of deer across the project area.

Determination

Based upon the above analysis it is my determination that all alternative "*may affect impact individuals or habitat but will not cause a trend towards federal listing or alter the existing trend, nor lead to a change in distribution or loss of viability*" for the deer.

3.7.10 Cavity Dependent Species

3.7.10.1 Introduction

Many wildlife species depend on snags or dead trees for nesting, roosting, denning, foraging, resting, or shelter. Cavity dependent or snag-associated species in this group include both primary and secondary excavators. Each species (listed below) home range over laps greater than 95 percent of the project area incorporating all action alternative routes. Therefore, hairy woodpecker and pileated woodpecker are the species chosen to represent the influence of alternatives on snags for this cavity dependent wildlife group. Many other species are snag-dependent species, including flammulated owl, western screech owl, red-breasted sapsucker, downy woodpecker, white-headed woodpecker, Vaux's swift, brown creeper, western bluebird, Douglas squirrel, acorn woodpecker, and western gray squirrel all of which are on Six Rivers NF, Management Indicator Species List and species specific sections are within Snag Assemblage or Black Oak/White Oak Assemblage of the Management Indicator Species Report

Snags and downed wood provide habitat for the prey species of raptors and carnivorous mammals, such as the northern spotted owl, northern goshawk and pacific fisher. Additionally, snags and downed wood provide fisher with denning and resting habitat, as well as escape cover, which allows them to avoid predators and inclement weather.

Snags are the result of tree mortality that can result from insect outbreaks, diseases, fire, drought, senescence, and flooding. Such events maintain the snag resource through time, though snag numbers may fluctuate as forests undergo cycles of drought accompanied by higher tree mortality, followed by lower tree mortality after stands have thinned.

Six Rivers NF management direction for snags and down woody material includes:

Snag requirements in the LRMP are developed for specific forest cover types, and these may be further broken down by geographic location. Six Rivers NF manages to provide a renewable supply of large snags and logs well distributed across the landscape in a manner that meets the needs of species and provides for ecological function. Snags and down logs retention guidelines include for example, 80-100% of the average numbers found in mature/old growth forests in the Douglas-fir and white fir vegetation series (LRMP IV-78-79). Snag levels for these bird species should be more than adequate when species specific requirements are compared to natural levels.

Additional provisions for the retention of large snags and decadent trees are included in the standard and guideline for green tree patches in matrix land allocations.

Six Rivers NF Hazard Tree Removal Programmatic (Assumption 11):

Hazard tree removal in general is necessary when designing, operating and maintaining a road, route or trail system open to the public. These requirements are

expressed as standards for highway programs as indicated under FSM 1535.11 and described in 23 CFR 1204.4. A tree leaning onto a public traveled roadway, route, trail, or campground with the likelihood of falling is considered a hazard tree when one or more of the following are meet:

1) The tree is showing signs of root failure or the soil supporting the tree is showing signs of movement and slope failure is probable or,

2) The tree is dead or dying (within 1 year) and there is defect either in the bole or top which poses a hazard to the public.

3) The tree is not dying within 1 year but there is a defect in the bole or top which poses a hazard to the public and the tree does not occur in suitable habitat for any listed species.

3.7.10.2 Species

This wildlife group of cavity-dependent species is a major influence of standards and guidelines for Six Rivers NF vegetative management program. Forest stands are managed to provide a renewable supply of large snags and logs well distributed across the landscape in a manner that meets the needs of species and provides for the ecological function. Forest inventory analysis across the forest and within the planning area confirm that snag and log data collected in sample plots are abundance and available to these cavity dependent species. Additional management direction focuses on snag recruitment under several areas including; riparian reserves, within suitable northern spotted owl and marbled murrelet habitat, late-successional reserves and special habitat areas. Further protections of snags are explained under Assumption 11 which provides guidance of hazard tree removal. Unique standard and guidelines are modeled for flammulated owls, white-headed woodpecker, and black-backed woodpecker within matrix lands.

Snag requirements are developed for specific forest cover types, and these may be further broken down by geographic location. The intent is to tailor the requirements to those species that are actually expected to occur in an area, taking into account tree species, diameters, falling rates, and decay rates.

This wildlife group includes numerous management indicator species particularly those listed under the Snag Assemblage, as well as others, because of their association with snags and cavities. Not all cavity dependent species use snags in the same way, some are primary or secondary cavity nesters, tree species, location, and size can differ, just as range of species across the project area. Because of the large size of the project area (505,430 acres), the diverse landscapes and ecology and the fact that current condition is the proxy of analysis, it is reasonable to assume one common species whose range covers the project area will represent this wildlife group. Because the hairy woodpecker is detected and occurs throughout the project area and the project area straddles varying ecological habitats this species best represents this wildlife group. Snag assemblage species including, pileated woodpecker, flammulated owl, western screech owl, red-breasted sapsucker, downy woodpecker, Vaux's swift, brown creeper, western bluebird, and Douglas squirrel are analyzed in the MIS report and result in the same determination as presented here.

Hairy Woodpecker

The hairy woodpecker is 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.

Low to moderate quality habitat exists within the project area. No surveys have been conducted for the hairy woodpecker within the project area. The Six Rivers NF Wildlife Sighting Record Database does not contain any sighting records within the watersheds. The species has also been recorded annually associated with the Orleans Breeding Bird Survey Route (CAL-167) (Orleans RD); detections have been recorded since route initiation, and, specifically, the average detection rate is 1.0 per route per annum with an increasing Forest trend of 11 percent and population appears stable.

Gaines et al. (2003) identified snag reduction and edge effects as the only road and motorized trail associated factors potentially affecting the majority of cavity-dependent species. Available literature does not suggest that recreation road- and trail-associated disturbances present a problem for primary cavity excavators (Hamann et al. 1999).

Snag Reduction and Edge Effects: The road-associated factors include the negative edge effects of roads on primary cavity excavator (PCE) habitat and snag and down log reduction resulting from wood cutting and hazard tree safety practices along roads (Bull and Holthausen 1993, Hutto 1995). Hazard tree removal along roads will reduce future snags and down logs while wildland fire both creates and removed snags and down logs. Short term degradation may occur due to clearing of trail by brushing and occasional removal of trees posing a potential safety hazard ("hazard trees"). These trees are typically snags that are within a tree-height distance from the road. Fallen snags are left contributing to the recruitment of large down wood (see Assumption 11). To determine the potential for modification of cavity-dependent species habitat, the acres of habitat within 200 feet of routes available for motorized use was calculated. Within the project area a total of 272 miles of unauthorized routes will be analyzed using a 200 foot buffer. Within Alternative 1 routes that occur in forested areas where included in the analysis to capture the potential of current and future snags.

To estimate the potential direct and indirect impacts to hairy woodpecker habitat, the acreage of suitable habitat within 200 feet distance of existing unauthorized routes was determined. The table below displays the current proportion of overall habitat that is potentially being impacted by use of existing unauthorized routes.

Table 3.7-45 Acres of Cavity-Dependent Species Habitat within 200 Feet of All Roads Open for Motor Vehicle Use

Alternatives	**1**[1]	**2**	**3**	**4**
Miles	272	57	65	0
200-Foot Buffer	16,207 (3.2%)	3,227 (0.6%)	3,663 (0.7%)	0

[1] Under Alternative 1, unauhtorized routes would not be added to the NFTS, but would remain available for public motorized use

These numbers, are an overestimate because the numbers are derived within GIS using buffers on all segments of routes without providing for topography, slope, and existing vegetation.

Cavity-Dependent Species – Direct and Indirect Effects

Based on the discussion above, habitat modification resulting from the maintenance of routes that include the removal of hazard trees appears to be the primary potential effect of adding routes to the NFTS.

Effects to habitat could extend up to 200 feet from a road prism. Large snags and dead and dying trees are important habitat components for Hairy woodpeckers. Trees posing a potential safety hazard ("hazard trees") are felled and left as down woody debris. These trees are typically snags that are within a tree-height distance from the road. Snags are not expected to have a negligible impact as hazard tree removal must concur with Assumption 11 on routes and trails. Cutting of fuelwood by the public is not expected to have a negligible impact as cutting of all standing snags (dead or green) is prohibited. This habitat effect would be greatest under Alternative 1. These potential impacts are reduced incrementally in alternatives 2 and 3. Under Alternative 4, no potential impacts would occur associated with adding routes to the NFTS.

Under Alternative 1, approximately 16,207 acres are being affected primarily by trail maintenance crews assessing and eliminating hazardous trees. Alternative 1 poses the greatest risk of reducing habitat effectiveness as a result of disturbance and minor habitat modification associated with cross-country motor vehicle use. Under all action alternatives, a cross-country travel would be prohibited of the NFTS in all suitable American marten habitat

Cavity-Dependent Species – Cumulative Effects

On Six Rivers National Forest the greatest threat to this wildlife cavity dependent group involves the effects of wildfire on the amount, distribution and quality of habitat. The direct effect of wildland fire is removing snags, creating snags and increasing the fuel loads for future fire. The effects of vegetation management (e.g., timber harvest, fuels treatments, etc) is less of a concern because silvicultural strategies will maintain and enhance desired stand structure components for wildlife according to standard and guidelines (FEIS Appendix B) at a moderate to high level for snag retention. Projects may remove or degrade habitat in the short-term, but will remain suitable post-project and are expected to improve and, or protect habitat conditions in the long-term (accelerate and protect late-successional characteristics).

Hazard tree removal is the primary concern with respect to routine maintenance of routes but is not expected to have a significant effect because of adherence to Assumption 11 necessitating a "no effect" or "may affect not likely to adversely affect" species and the use of standardized hazard tree is required prior to removal.

Current and present habitat analysis includes fragmentation caused by existing system roads and unauthorized routes within the project area.

There are 66,981 acres of NFTS roads and 16,207 acres of unauthorized routes within 200 foot buffers of routes available for public motorized use (existing system and added routes) in suitable hairy woodpecker habitat for each alternative as a means to compare the potential for snag reduction. Alternative 1 poses the highest risk. Alternatives 2 and 3 would reduce the habitat disturbance. Under Alternative 4, the risk is reduced the most. All action alternatives relative to Alternative 1 would decrease fragmentation through passive restoration on unauthorized routes not carried forwarded in the Alternatives providing the greatest benefit to cavity dependant species because routine route and trial maintenance would not continue removing hazard trees which typically result in suitable habitat.

The cumulative acreage of suitable hairy woodpecker habitat potentially affected by all routes (existing system roads and routes added to the NFTS under each alternative) is presented in the table below.

Table 3.7-46 Acres of Cavity-Dependent Species Habitat within 200 Feet of All Roads Open for Motor Vehicle Use

Alternatives	**1[2]**	**2**	**3**	**4**
200-Foot Buffer[1]	83,188 (16%)	70,208 (14%)	70,644 (14%)	66,981 (13%)

[1]Number in parenthesis indicates percent of total cavity-dependent habitat available in the project area. [2]Under Alternative 1, unauthorized routes would not be added to the NFTS, but would remain available for public motorized use. Analysis assumes flat plane, thereby overestimating buffer area because slope, cut bank and other topographic features did not get excluded.

Gaines et al (2003) developed an index to assess habitat effectiveness for cavity dependant associated species. The habitat influence index is designed to address edge effects and snag resulting from road-associated factors. Using this index, habitat influence from roads is considered low if less than 30 percent within a 200 foot habitat influence buffer. Based on this index, **all alternatives result in a low level of habitat influence and low habitat effectiveness** for the cavity-dependent species wildlife group.

Recreation use on Six Rivers NF is considered light to low. Although it is not expected to increase at the rate of areas within closer proximity of large metropolitan areas (see Recreation section Affected Environment). Recreational activity is unlikely to be focused around the nest sites of these species and, by design, woodpeckers and other cavity users are relatively more secure from nest predation than any other group of forest birds (Hamann et al. 1999). Therefore, at present, recreational disturbance is not known to be a major limiting factor. The road-associated factors included the negative edge effects of roads on PCE habitat and snag and down log reduction resulting from wood cutting and safety practices along roads However due to remote accessing and steep terrain on Six Rivers NF woodcutters are not expected to leave road maintenance level 2 and greater and harvest of standing dead or dying is prohibited.

Because Alternative 1 does not prohibit cross-country travel, there is a higher degree of uncertainty about future route proliferation and associated cumulative impacts upon cavity dependent species such as hairy woodpecker. The action alternatives do not directly result in a loss of habitat because no new route construction. In the future, trails may provide “connector routes” between existing NFTS routes and motorized access to historical dispersed camping opportunities, unauthorized motorized routes that are prohibited to motorized use may receive non-motorized use (hiking, mountain bicycling, equestrian). It is generally considered that non-motorized use would result in fewer disturbances to cavity dependent species such as hair woodpecker. It is expected that over time, unauthorized routes that are prohibited to motorized use will eventually become revegetated and recover either through active or passive restoration means creating and leaving a higher amount of snags per acre.

Given the proportion of habitat potentially affected, and considering the projections for future recreation uses and OHV activity, Alternative 1 may, over time, contribute to cumulative effects. Because Alternative 1 does not restrict vehicles to designated routes, there is a high degree of uncertainty about future route proliferation which may lead to habitat effects beyond

the effects of routes open to motorized use. Alternative 1 presents the greatest risk of contributing to adverse cumulative effects because there would not be a prohibition on cross-country travel. Alternative 4 contributes the least to cumulative effects because cross-country travel would be prohibited, open and no motorized routes would be designated. Alternatives 2 and 3 would result in progressively lower risk due to the amount of motorized routes being added to the system. Based on the low amount of habitat affected, the Six Rivers NF Motorized Travel Management Project will not alter the existing trend in cavity dependant species, nor lead to a change in the distribution within the project area.

Determination

Based upon the above analysis it is my determination that all alternative "*may affect impact individuals or habitat but will not cause a trend towards federal listing or alter the existing trend, nor lead to a change in distribution or loss of viability*" for the deer.

3.7.11 Summary of Effects Analysis Across All Alternatives

For terrestrial wildlife ecosystems, the Forest Plan relies on standards and guidelines relating to maintaining or improving populations of endangered, threatened, and sensitive species, by providing suitable habitats that are capable of meeting species requirements.

Under Alternative 1 approximately 505,430 acres of NFS land would not prohibit proliferation of cross-country travel. It is anticipated that some level of motorized vehicle use would continue to occur off of existing routes. In the short term, the acres of terrestrial wildlife habitat affected would be similar to the existing situation as use of existing unauthorized routes would continue. Over the longer term, the amount of habitat affected could increase if new routes become established as a result of cross-country travel.

Current and present habitat analysis includes fragmentation caused by existing system roads and unauthorized routes within the project area. There are currently 1,264 miles of NFTS roads and 1,309 miles of unauthorized routes across all landscapes. The table below presents the total mileage of routes which will be available for public motorized use (existing system and added routes) in across the landscape for each alternative as a means to compare.

Table 3.7-47: Miles of Routes (existing system and added routes) for Public Motorized Use across Terrestrial Wildlife

	ALT 1	ALT 2	ALT 3	ALT 4
Total	1,309	56.9	64.7	0

The total amount of habitat affected by existing system and added routes available for motorized use is presented in the table below.

Table 3.7-48 Acres of Terrestrial Wildlife Habitat within Three Buffer Distances from All Routes Available for Motorized Use (Existing System plus Proposed Additions) in Each Alternative

Alternative	1[2]	2	3	4
30 Foot Buffer[1]	2,018	417	475	0

100 Foot Buffer	7,324	1,485	1,689	0
200 Foot Buffer	16,207	3,227	3,663	0

Alternative 1, the no action alternative, has the greatest potential to impact terrestrial wildlife and their habitats. Use would continue on all existing unauthorized routes and proliferation of cross-country travel would continue off the NFTS. Some degree of cross-country travel is expected to continue, with associated route proliferation and an increase in the amount of terrestrial wildlife habitats affected. Disturbance resulting from this alternative would likely result in adverse impacts over the long term.

Under Alternatives 2 and 3, cross-country travel would be prohibited. This, in conjunction with a clearly defined NFTS would clarify enforcement of existing LRMP direction and eliminate confusion regarding what constitutes cross-country travel. Both alternatives would result in decreased (respectively) amounts of disturbance and minor habitat fragmentation within the project area. Disturbance resulting from both alternatives would not likely result in adverse

Since Alternative 4 would not result in the addition of any routes to the NFTS, there would not be any direct or indirect effects over the short-term. Since cross-country travel would be prohibited, disturbance would be decreased over the long-term and all unauthorized routes within emphasis habitat (critical habitat, LSR, special habitat management areas) would slowly rehabilitate. The rehabilitation of these routes would result in minor improvements to habitat over the long-term. This alternative would have a "*Beneficial Impact*" on species and their habitat.

The table below summarizes the average for terrestrial wildlife for each alternative by ranking of greatest to least impacts for each indicator.

Table 3.7-49 Comparison of Effects to Terrestrial Wildlife.

Indicators – Terrestrial Wildlife	**Rankings of Alternatives for Each Indicator[1]**			
	Alt. 1	**Alt. 2**	**Alt. 3**	**Alt. 4**
Density of motor vehicle routes at the watershed level.	1	3	2	4
Acres open to motor vehicle use and Miles of unauthorized routes within terrestrial wildlife habitat.	1	3	2	4
Miles of motor vehicle routes at project-wide scale and within the habitat for each species group.	1	3	2	4
Number of sensitive sites for TES species within ¼ mile of an added route or area.	1	3	2	4
The proportion of a species (or species group's) habitat that is affected by motor vehicle routes.	1	3	2	4
Average for Terrestrial Wildlife	**1**	**3**	**2**	**4**

[1] A score of 4 indicates the alternative has the least impact for terrestrial wildlife related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial wildlife related to the indicator.

Analysis of the effects of the project alternatives in this report indicated that habitat would be unimpacted or nominally impacted by the action alternatives (2, 3 and 4). Continued proliferation of cross-country travel within Alternative 1 would contribute to habitat disturbance, fragmentation and resource damage. For further disclosure of the effects of the project alternatives to MIS species refer to the project MIS report.

3.7.12 Compliance with the Forest Plan and Other Direction

The project file contains Six Rivers NF, Forest-wide Reference Biological Assessment/Evaluation Document. This Reference Document contains current management direction, species life history and habitat requirements information (on which effects of proposed projects are evaluated), and literature cited. The Reference Document is updated periodically as species status or other information changes. Much of the local information within this document is derived from the Reference Document.

Current Management Direction

The Six Rivers National Forest developed a Land and Resource Management Plan (LRMP) that adopted all the standards and guidelines in the Final Supplemental Environmental Impact Statement Record of Decision (FSEIS ROD) for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl (USDA and USDI 1994b). All Forest actions will be consistent with this direction, which amended standards and guidelines in the FSEIS (Vol. II, Appendix B).

FSEIS ROD and Forest LRMP

The FSEIS ROD evolved from the Forest Ecosystem Management Assessment Team (FEMAT) Report (USDA et al. 1993) and FSEIS (USDA and USDI 1994a). Collectively, the three documents are known as the President's Northwest Forest Plan or the President's Forest Ecosystem Plan. The ROD amended standards and guidelines of the draft Six Rivers LRMP (USDA 1993). Standards and guidelines from the preferred alternative of the draft plan, however, applied where they were more restrictive or provided greater benefits to late-successional forest related species than the provisions in the ROD.

The attainment of the desired future condition is dictated by land allocations, standards and guidelines, and monitoring strategies outlined in the: (1) FSEIS ROD (USDA and USDI 1994b), and (2) Six Rivers National Forest LRMP (USDA 1995b).

Specific Forest management direction for each listed threatened, endangered, proposed, or Forest Service sensitive species is reviewed in the "Species Account" subsection of the "Existing Environment" section. In general, direction for federally listed threatened and endangered species is to achieve recovery objectives so that special protection measures provided under the Endangered Species Act are no longer necessary (FSM 2670.21). Habitats for Forest Service sensitive species are managed to maintain well-distributed populations throughout their ranges, and to prevent them from becoming federally listed as threatened or endangered.

Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended, requires that a Federal Agency, in consultation with and with the assistance of the Secretary of the Interior, ensures that any action it authorizes, funds, or carries out is not likely to jeopardize the continued

existence of any listed species or result in the destruction or adverse modification of critical habitat.

Northern Spotted Owl- Management Direction

The FSEIS ROD amended standards and guidelines of the draft Six Rivers LRMP (USDA 1993). The 1995 SRNF LRMP contains the amended direction and standards and guidelines for managing spotted owl populations and habitat by land allocation.

The Forest will manage large late-successional reserves (LSRs) to protect and enhance habitat for northern spotted owls and other plants and animals associated with mature and old growth forests. In addition, 100 acres (40.5 ha) of the best habitat were designated around known owl activity centers (as of January 1, 1994) falling outside of large LSRs. The FSEIS ROD defines "activity center" as an area of concentrated activity of either a pair of spotted owls or a “territorial” single owl (at least 3 detections in the same area).

The use of mechanized equipment will be restricted within 500 feet of suitable habitat from February 1 through July 31 (USDI 2006). Use of mechanized equipment may occur after July 9, provided informal consultation with USFWS is initiated. Removal of unsurveyed suitable habitat with a high probability of occupancy is restricted from February 1 through September 15.

USFWS Compliance – Northern Spotted Owl

Six Rivers National Forest is in compliance with the Regional Programmatic Agreement and all routes will includes the Motorized Travel Management Project Design Criteria’s for ‘No effect’ or ‘May affect not likely to Adversely Affect’ determination for the northern spotted owl, marbled murrelet, and the bald eagle (October 2006). Alternative 2 and 3 include limiting operating periods on routes as directed in the Regional Programmatic Agreement.

Marbled Murrelet- Management Direction

Management direction is contained in the FSEIS ROD and was incorporated into the LRMP land allocations and standards and guides. The Recovery Plan for the Marbled Murrelet (*Brachyramphus marmoratus*) in Washington, Oregon, and California (USDI 1997) forms the basis for the management direction, in part. The Recovery Plan calls for the protection of habitat essential for recovery in larger contiguous, blocks; maintaining occupied habitat; and monitoring trends, productivity, and reproduction. In addition, the FEIS ROD contains standards and guidelines for management and protection of the MAMU, including the requirement for surveys to Regional protocol prior to any modification of potentially suitable MAMU habitat.

USFWS Compliance – Marbled Murrelet

Six Rivers National Forest is in concurrence with the Regional Programmatic Agreement and all routes will includes the Motorized Travel Management Project Design Criteria’s for ‘No effect’ or ‘May affect not likely to Adversely Affect’ determination for the northern spotted owl, marbled murrelet, and the bald eagle (October 2006). Alternative 2 and 3 include limiting operating periods on routes as directed in the Regional Programmatic Agreement.

USFWS Compliance – Bald Eagle

Six Rivers National Forest is in concurrence with the Regional Programmatic Agreement and all routes will includes the Motorized Travel Management Project Design Criteria’s for ‘No effect’ or ‘May affect not likely to Adversely Affect’ determination for the northern spotted owl,

marbled murrelet, and the bald eagle (October 2006). Alternative 2 and 3 include limiting operating periods on routes as directed in the Regional Programmatic Agreement.

Survey and Manage - Management Direction

No Survey and Manage species occur within the project area.

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3.8 Botanical Resources

Of the Forest Service Regions, the Pacific Southwest Region contains the largest assemblage of sensitive plant species in comparison to its land base. Of the more than 8,000 vascular plant species occurring in California, well over half are known to occur on National Forest System (NFS) lands. This is due to topography, geography, geology and soils, climate, and vegetation, the same factors that account for the exceptionally high endemic flora of the State. Over 100 plant species are found only on NFS lands and no where else in the world (Powell 2001).

Management of plant, lichen, bryophyte and fungi species and habitat, and maintenance of a diversity of plant communities, is an important part of the mission of the Forest Service (Resource Planning Act of 1974, National Forest Management Act of 1976). Management activities on NFS lands must be planned and implemented so that they do not jeopardize the continued existence of threatened or endangered species or lead to a trend toward listing or loss of viability of Forest Service Sensitive species. In addition, management activities should be designed to maintain or improve habitat for rare plants and natural communities to the degree consistent with multiple-use objectives established in each Forest LRMP. Key parts include: developing and implementing management practices to ensure that species do not become threatened or endangered because of Forest Service (FS) actions; maintaining viable populations of all native and desired non-native wildlife, fish, and plant species in habitats distributed throughout their geographic range on NFS lands; and developing and implementing management objectives for populations and/or habitats of rare species. The Pacific Southwest Region has over 425 rare plant species to manage.

Management decisions related to motor vehicle travel can affect plant, lichen, bryophyte and fungi species, their habitats, and natural communities. Effects include, but are not limited to, death or injury to botanical resources and habitat modification, habitat fragmentation, and habitat quality, including increased risk of weed introduction and spread, change in hydrology, increased erosion, compaction, and sediment, risk to pollinators, loss of vegetation, over-collection, or other factors reducing or eliminating plant growth and reproduction (including Trombulek and Frissell 2000). The FS provides a process and standard through which rare plants, lichen, bryophyte and fungi species receive full consideration throughout the planning process, reducing negative impacts on species and enhancing opportunities for mitigation by developing and implementing management objectives for populations and/or habitats of sensitive species. It is Forest Service policy to minimize damage to soils and vegetation, avoid harassment to wildlife, and avoid significant disruption of wildlife habitat while providing for public motor vehicle use on NFS lands (FSM 2353.03(2)). Therefore, management decisions related to motor vehicle travel on NFS lands must consider effects to plant species, fungi species, and their habitats.

3.8.1 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

Direction relevant to the proposed action as it affects botanical resources includes:

Endangered Species Act (ESA). The Endangered Species Act of 1973 (16 USC 1531 et seq.) requires that any action authorized by a federal agency not be likely to jeopardize the continued

existence of a threatened or endangered (TE) species, or result in the destruction or adverse modification of habitat of such species that is determined to be critical. Section 7 of the ESA, as amended, requires the responsible federal agency to consult the USFWS and the National Marine Fisheries Service concerning TE species under their jurisdiction. It is forest service policy to analyze impacts to TE species to ensure management activities are not be likely to jeopardize the continued existence of a TE species, or result in the destruction or adverse modification of habitat of such species that is determined to be critical. This assessment is documented in a Biological Assessment (BA) and is summarized or referenced in this Chapter.

E.O. 13112 Invasive Species 64 FR 6183 (February 8, 1999). To prevent and control the introduction and spread of invasive species.

Forest Service Manual and Handbooks (FSM/H 2670) - Forest Service Sensitive (FSS) species are species identified by the Regional Forester for which population viability is a concern. The Forest Service develops and implements management practices to ensure that rare plants and animals do not become threatened or endangered and ensure their continued viability on national forests. It is forest service policy to analyze impacts to sensitive species to ensure management activities do not create a significant trend toward federal listing or loss of viability. This assessment is documented in a Biological Evaluation (BE) and is summarized or referenced in this Chapter.

The Northwest Forest Plan (NWFP) – The Bureau of Land Management and Forest Service adopted standards and guidelines for the management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl, commonly known as the Northwest Forest Plan. The NWFP included measures for management of known sites, site-specific pre-habitat disturbing surveys, and/or landscape scale surveys for about 400 rare and/or isolated species. The standards and guidelines for these mitigation measures are known as Survey and Manage.

On September 30, 2002, the Secretaries of Agriculture and Interior entered into a settlement agreement with Douglas Timber Operators and the American Forest Resource Council concerning a lawsuit involving the 2001 Record of Decision for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines. The settlement agreement required the Agencies to examine, in a Supplemental Environmental Impact Statement (SEIS) an alternative "that replaces the Survey and Manage mitigation requirements with existing Forest Service and BLM special status species programs to achieve the goals of the Northwest Forest Plan through a more streamlined process." The selected alternative in the January 2004 Final Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measures Standards and Guidelines was Alternative 2.

The March 2004 Record of Decision to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines documents this decision and the reasons for selecting Alternative 2. This alternative discontinued the Survey and Manage program and assumed transfer of selected Survey and Manage taxa to Agency Special-Status Species Programs (SSSP).

A coalition of environmental and conservation groups filed suit against the Departments of Agriculture and Interior challenging the 2004 decision to eliminate the Survey and Manage

program. On August 1, 2005, Judge Pechman issued an Order (Northwest Ecosytem Alliance et al. v. Mark E. Rey et al., No. 04-844P, W.D. Wash) that found the agencies deficient in three areas. On January 9, 2006, Judge Pechman set aside the 2004 Record of Decision and reinstated the January 2001 Record of Decision including any amendments or modifications to the 2001 ROD that were in effect as of March 21, 2004. On October 11, 2006, the court modified the January 9, 2006 injunction to provide relief to the federal agencies; it allowed for four exemptions to the Survey and Manage mitigation measure. These four exceptions did not include actions proposed herein. To address the deficiencies identified in the August 1, 2005 Order, the agencies prepared a Supplement to the 2004 Final Supplemental Environmental Impact Statement (FSEIS) to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines (June 2007).

On July 24 and 25, 2007, the FS and BLM, respectively, signed Records of Decision adopting the proposed action of the June 2007 FSEIS eliminating the Survey and Manage standards and guidelines once again.

On July 22, 2008, a coalition of environmental and conservation groups (Conservation Northwest et. al.) filed suit against the 2007 Final SEIS and Records of Decision, and the biological opinion of the U.S. Fish and Wildlife Service. On September 22, 2008, the Federal agencies filed their response to the plaintiffs' complaint with the U.S. District Court Western District of Washington

On July 24, 2007, the Under Secretary of the Department of Agriculture signed a new Survey and Manage Record of Decision[2] that removed the survey and manage requirements from all of the National Forests' land and resource management plans (LRMPs) within the range of the northern spotted owl. However, since the court in *Northwest Ecosystem Alliance et al v. Mark Rey et al, Civ. No. 04-844, Western District of Washington* has not yet granted the government's motion to lift the modified October 11, 2006, the action alternatives herein were designed to be consistent with the 2001 Survey and Manage ROD as modified by subsequent annual species reviews as allowed by the modified October 11, 2006 injunction.

To be in compliance with the 2001 Record Of Decision for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guideline (USDA and USDI 2001), projects must have pre-disturbance surveys conducted if the activity is potentially considered to be "habitat-disturbing." "Habitat-disturbing activities are defined as those disturbances likely to have a significant negative impact on the species' habitat, its life cycle, microclimate, or life support requirements" (USDA USDI 2001 - Standards and Guidelines (S&G), p. 22). Species-specific standards & guidelines from the Northwest Forest Plan are identified below under species effects analysis.

McDonald's Rock-cress Recovery Plan (USDI 1984) - Summarizes current knowledge of the taxonomy, former and current distribution, and biology of the species, and presents recommendations for a program to restore it to threatened status.

2

Complete Title: Record of Decision To Remove the Survey and Manage Mitigation Measure Standards and Guidelines from Forest Service Land and Resource Management Plans Within the Range of the Northern Spotted Owl

Conservation Assessment for *Buxbaumia viridis* (DC.) Moug. & Nestl. (USDA 2006) - Synthesizes known information about the biology, distribution, threats, management, and conservation of the species.

Conservation Assessment for Cypripedium fasciculatum and Cypripedium montanum. (USDA 2005) – Addresses the biology, management and conservation of the species within California.
Conservation Assessment for *Ptilidium californicum* (Aust.) Underw. (USDA 2006) - synthesizes known information about the biology, distribution, threats, management, and conservation of the species.

Conservation Strategy for Sanicula Tracyi Shan & Constance. (USDA 2008) - The goal of the conservation strategy is to develop an approach to management that will ensure the long-term conservation of the species. The conservation strategy identifies "core" sub-populations chosen to the population over time and space.

Six Rivers Land and Resource Management Plan (SRLRMP)
The Six Rivers National Forest LRMP contains the following management direction applicable to motorized travel management and botanical resources:

Sensitive Plant Species Management Goals (SRLRMP, Ch.4, p.83): Maintain the health and well-being of threatened, endangered and sensitive species and their habitats. Take all steps necessary to ensure that actions authorized, funded, or carried out by the Forest Service are not likely to jeopardize the continued existence of these species.

Standards and Guidelines

- Federally listed threatened and endangered plants and their habitats will be managed to achieve recovery plan objectives. If an approved plan is not available, all known populations and their occupied habitat will be protected from negative impacts associated with forest management activities.
- Before the NEPA process is completed, projects will be assessed through a biological evaluation to determine if management activities are likely to adversely affect sensitive plant resources. After completion of the evaluation, proposed actions will be prohibited if they are found likely to jeopardize the continued existence of the species or the maintenance of the viable populations through their existing range. Appropriate mitigation measures will be required if activities are not prohibited.

Invasive Exotic Plant Species (SRLRMP, Ch.4, p.131): Invasive exotic plant species are those that are ecologically harmful and have the ability to alter the natural or historic scene and impair the natural functioning of native plant communities.

Standards and Guidelines

- Sites for which ground disturbing activities are planned shall be evaluated for the presence of invasive exotic plant species.

- Invasive exotic species shall be prioritized and selected for management action based on their disruptive nature, distribution and the feasibility of successful control.
- 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.
- Sites treated to eradicate invasive exotic plant species shall receive follow-up monitoring.

Survey and Manage (SRLRMP, Ch.4, p. 84 – 85): The survey and manage provision will apply to the range of that species and the particular habitats that it is known to occupy. The "survey and manage" standards and guidelines will provide benefits to amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropods.

Standards and Guidelines

Manage known sites: Management of known species sites should receive the highest priority of these four categories. Efforts must be undertaken to acquire information on these known sites and to manage this information so that it is available to all project planners. An effective way to accomplish this is to compile the information in a GIS data base. Those efforts should be coordinated by the Regional Ecosystem Office, and should be completed expeditiously. As soon as the information becomes available, it should be used in the design or modification of activities. Activities that are implemented in 1994 should use this information to the greatest degree possible. Activities implemented in 1995 and later must include provisions for these known sites. In most cases, the appropriate action will be protection of relatively small sites, on the order of tens of acres. For some species, including some vascular plants, the appropriate action will include the use of specific management treatments such as prescribed fire.

Survey prior to ground-disturbing activities: Measures to survey for species and manage newly discovered sites are to be phased in over a somewhat longer time frame than the measures specified for currently known sites (see above). For some species, these efforts have been ongoing through rare and sensitive species programs. Where such efforts have been ongoing, they should continue. Where surveys are completed, the information gathered from them should be used to establish managed sites for species. Management standards will be developed to manage habitat for the species on sites where they are located. These surveys may be conducted at a scale most appropriate to the species. For most species, this survey would start at the watershed analysis level with identification of likely species locations based on habitat. Those likely locations would then be thoroughly searched prior to implementation of activities. For other species, the identification of likely sites may be most appropriately one at the scale of individual projects. Surveys should be designed for maximum efficiency, focusing on the likely range and habitats of the target species. Multi-species surveys should be used wherever they would be most efficient. To the degree possible, surveys should be designed to minimize the number of site visits needed to acquire credible information. Survey protocols and proposed site management should be incorporated into interagency conservation strategies developed as part of ongoing planning efforts coordinated by the Regional Ecosystem Office.

Guidelines for Extensive and General Regional surveys are also described in the SRLRMP but are not detailed here as these are inventory efforts and not pertinent to the project level analysis contained herein

Manage Recreation Areas to Minimize Disturbance to Species: This standard and guideline applies throughout all land allocations. This Standard and guideline will benefit a number of fungi and lichen species whose known locations are predominantly within established recreation sites.

Six Rivers National Forest Survey Status Change for the category A lichen, *Leptogium cyanscens* Taxonomic Update for this Species: The current taxonomic treatment of this species has removed California from it's known or suspected geographic range removing the requirement to survey for this species on Six Rivers National Forest (USDA 2009). Survey & Manage Species to be protected through survey and management standards and guidelines for which suitable habitat exists within and whose range includes Six Rivers National Forest (SRNF) are shown in the following table. The table that appears in SRLRMP has been amended to include results of annual species reviews that occurred in 2001, 2002 and 2003. (Bold text indicates presence on SRNF.)

Table 3.8-1 Survey and Manage Species Requiring Protection on Six Rivers NF

TAXON	2003 CATEGORY
FUNGI	
Bridgeoporus nobilissimus	A
Clavariadelphus occidentalis	B
Clitocybe senilis	B
Clitocybe subditopoda	B
Galerina heterocystis	E
Mycena tenax	B
Otidea leporina	B
Phaeocollybia kauffmanii	D
Ramaria conjunctipes	B
Ramaria maculatipes	B
Rhizopogon truncatus	D
Spathularia flavida	B
Tremiscus helvelloides	B
LICHENS	
Calicium glaucellum	F
Calicium viride	F
Chaenotheca chrysocephala	B
Chaenotheca ferruginea	B
Chaenotheca subroscida	E

TAXON	2003 CATEGORY
Chaenothecopsis pusilla	E
Dendriscocaulon intricatulum	E
Dermatocarpon luridum	E
Leptogium teretiusculum	E
Lobaria oregana, In California	A
Leptogium rivale	B
Pannaria saubinetii	F
Platismatia lacunosa	C
Ramalina thrausta	A
Usnea longissima	A
BRYOPHYTES	
Buxbaumia viridis	D
Kurzia makinoana	B
Orthodontium gracile	B
Ptilidium californicum	A
Racomitrium aquaticum	B
VASCULAR PLANTS	
Bensoniella oregana	A
Cypripedium fasciculatum	C
Cypripedium montanum	C

Table 3.8-2 Survey and Manage Species

Relative Rarity	Pre-Disturbance Surveys Practical	Pre-Disturbance Surveys Not Practical	Status Undetermined
Rare	Category A · Manage All Known Sites · Pre-Disturbance Surveys · Strategic Surveys	Category B · Manage All Known Sites · N/A · Strategic Surveys	Category E · Manage All Known Sites · N/A · Strategic Surveys
Uncommon	Category C · Manage High Priority Sites · Pre-Disturbance Surveys · Strategic Surveys	Category D · Manage High Priority Sites · N/A · Strategic Surveys	Category F · N/A · N/A · Strategic Surveys

Research Natural Areas (SRLRMP, Ch.4, p.30 – 31): Research Natural Areas (RNAs) are part of a national network of field ecological areas designated for non-manipulative research, observation, and to study and maintain biological diversity on National Forest System lands. The objectives of establishing RNAs are: (1) to preserve a wide spectrum of pristine, representative areas that typify target vegetation types and/or types considered of scientific interest; (2) to serve

as control areas for comparing landscapes manipulated by humans; (3) to serve as baseline areas for measuring long-term ecological change; and (4) to preserve and maintain genetic diversity and to provide a laboratory for the study of ecological succession. RNAs may serve as education and research sites on plant and animal communities, and may also help to implement provisions of special acts, such as the Endangered Species Act and the monitoring provisions of the National Forest Management Act. Research should be limited to non-consumptive, non-destructive, and essentially observational activities. Collecting soil, plants, or animal specimens (with California state collecting permits) may be permitted on a case-by-case basis.

- Noxious weeds shall be controlled to maintain the diversity of the area. Activities which are likely to increase the potential of introducing non-native seed are not compatible with RNA management direction.
- All new special uses will be denied except for research permits approved by the PSW Experiment Station.
- Noncompatible existing special uses will be terminated, except rights-of-way authorizations existing before RNA establishment. Upgrading that would compromise the objectives of the RNA will be discouraged.
- Recreation activities and uses within an RNA will be discouraged if they threaten the values for which the RNA is established. If other recreation uses threaten research or education values, closures or permits should be instituted.
- Existing trails may be allowed to remain as long as the RNA objectives are not compromised.
- Recreational access shall be addressed on an area-by-area basis.
- Maintain a ROS class of primitive.
- High-intensity recreational development is inconsistent with the management area direction for these areas.

Special Interest Areas (SRLRMP, Ch. 5, p. 50 – 53): These areas are set aside to manage for their unique ecological values for public use, education, and enjoyment. On Six Rivers N. F. there are three botanical areas, one botanical/cultural area, one botanical/geologic area, one geologic area, and one ecological area within this management area. Manage to maintain ecological processes and the unique feature for which the area was designated.

Goal is to promote public use, education, interpretation, and enjoyment of the special interest values of the area when such activities do not harm the values for which the area was designated.

The desired condition for these areas is that natural processes—biological and geophysical—will prevail and natural elements of the area will be maintained or enhanced where appropriate. Few signs of management activities will be present, other than to provide public access and accommodations. Educational or interpretive information on the ecological or scenic values of the area will be provided.

Special Interest Area management strategies are identified in the section that follows under that title.

Botanical Areas**:** Botanical areas are classified under 36 CFR 294.1 and managed to protect areas of the Forest with important botanical resources. These areas include some of the

best examples of indigenous and sensitive plant concentrations, sensitive plant habitat, conifer diversity and unique plant communities on the forest.

Geologic Areas**:** The complex geologic history of the Forest has produced an equally complex distribution of interesting geologic materials and features, including bedrock structures and landforms. The goals and desired future conditions of geologic areas are similar to those of botanical areas.

Recreation**:** Recreation opportunities exist within the SIA but shall be secondary to managing for the botanical, ecological, and/or geologic features of the area. Education and interpretation shall be the focus of recreational use and should be encouraged to the extent that the special values of the areas are not compromised.

1. The Recreation Opportunity Spectrum (ROS) classes provided within these areas include roaded natural, semi-primitive motorized and semi-primitive non-motorized. Opportunities exist to manage portions of the areas as semi-primitive non-motorized to avoid resource conflicts.
2. When issuing special use permits for organized events, primary consideration will be given to the botanical, ecological, geologic, and/or cultural values of the area.
3. Due to the threat of introduction of non-natives to the area and the potential for resource damage, pack animals shall be restricted to designated access routes in some areas and prohibited in others.
4. Primitive camping is permitted in designated areas. Campsites will be located to minimize adverse impacts. Impacts associated with heavy visitor use may warrant site closure for camping or the development of appropriate support facilities.
5. Recreational access will be determined on an area-by-area basis.
6. The use of sites within Special Interest Areas as shooting ranges shall be discouraged.

Transportation and Facilities: Facilities development and the identification of access routes shall be identified in the management plan for each area.

Consider existing routes (old roads, trails) within the areas for designation as multiple-use routes where possible and appropriate. If identified as appropriate during SIA recreation planning, use existing routes for public access. Construct new routes as necessary to direct use so as not to impact sensitive areas and/or to encourage access to areas with interpretive values.

Special Interest Area Management Strategy (USDA 1998) – identifies opportunities and possible management practices that protect each Special Interest Area's unique values and encourages public use and enjoyment compatible with the protection of the unique ecological, botanical, cultural and geologic features for which they were established.

Horse Mountain Botanical Area – was established due to the presence of distinctive serpentine vegetation and associated rare plants. The soil chemistry of the ultramafic soils is exclusionary to most plant species yet tends to support an extraordinary number of rare an endemic plant species. One of the most distinctive features of the botanical area is the presence of Port Orford cedar. Port Orford cedar reaches its southern most extent in this area. Genetic research conducted on Port Orford cedar populations scattered through northern California, found the Horse Mountain population important due to the presence of unique alleles. From a

conservation perspective, populations supporting unique or unusual genetic diversity should be protected.

Issues and Concerns:

1. Access to areas within has the potential to introduce POC root disease into the un-infested Horse Mountain and Ruby Creek drainages.
2. There are some non-system roads in the SIA, and access on these roads (some of which cross POC) can contribute to resource damage (i.e. gullies which alter drainage patterns, remove habitat and contribute sediment to the creeks). In addition, vehicle use of the old ski run has caused resource damage.
3. There is little public awareness of the unique features of the SIA.

Opportunities:

1. Prevent the introduction of POC root disease into the SIA. Possible routes of introduction: 6N36, 16N36A, 6N38, 6N18, and various non-system mining roads.
2. Implement recommendations from the Trinity River Basin POC Risk Assessment.
3. Continue to maintain the seasonal gate closure at the beginning of 6N38 and 6N18.
4. Inventory non-system roads (e.g. old mining roads) to determine if access along these roads could increase the risk of introducing POC root disease. If so determined, consider decommissioning or rehabilitating based on site-specific considerations.
5. Update the special use permit for the communication site at Horse Mountain to ensure that maintenance of and access to the facility incorporate POC root disease prevention measures.
6. Education
    a. Place information signs at critical road junctions (i.e. Route 1 and 6N36, along Route 1 near its junction with Highway 299).
    b. Place standard POC signs on the gates.
    c. Educate communication site permittees on the disease, vectors for spreading the spores, and prevention.
    d. Contact the County to ensure POC disease prevention measures are incorporated into road maintenance procedures.
    e. Keep personnel involved in visitor services informed about developments related to POC (provide brochures or handouts, maps) and incorporate POC disease prevention language into all Forest permits. Inform people who apply for special use permits about the prohibition of SFP collection in SIAs.
    f. Coordinate with California Department of Fish and Game to include information on POC root disease with hunting and fishing permits. Inform hunters about gates and potential road closures.
7. Direct special use permits (outside the SIA) for collection away from these watersheds.
8. Provide periodic patrol by law enforcement to monitor compliance with gate closures.
    a. Improve public access to the area, and reduce any resource impacts caused by non-system roads and access along these roads (including the old ski run).

b. Provide greater awareness of the SIA and its designated values. Ensure that recreational opportunities are consistent with these values.

Lassics Botanical Area – was designated as a Botanical/Geologic SIA because it is a high elevation area that supports many unique habitats and associated plant communities. Distinctive geology contributes to the interesting flora here. Rare and endemic plants in the area include three Forest Service Sensitive species (Lassics lupine, Lassics sandwort, and scabrid raillardella and many plant species that have a limited distribution and are endemic to the local serpentine soils, such as the Lassics lupine. Plant habitats worth noting are the serpentine barrens, rock outcrops and talus slopes, Jeffrey pine woodlands, montane chaparral and seasonal wetlands. The wetlands, localized throughout the Lassics, are distinctive habitat features. Their occurrence is linked to the geological and geomorphologic setting of the area. In the vicinity of Red Lassic, small slides have deposited debris in the stream channels leading to the formation of ponds or wetlands. One wetland in the area supports a species of fairy shrimp. The Lassics population represents one of only 2 populations of the species in the North Coast Range.

Issues and Concerns:

1. There are currently no interpretive trails or features directing the public to the unique features of the area. Non-system roads/trails are located in the area, and there is evidence of nonconforming use of these routes. One of the trails (5E33-not a system trail) contours Signal Peak (also called Mt. Lassic) and dissects an occurrence of Lassics lupine; use of the trail is impacting this plant occurrence.
2. Cross-country travel off routes 1S07, 1S11, 1S19, and 2S06 has the potential to affect Sensitive and rare plants and plant habitat.
3. There is little public awareness of the unique resources in the SIA.
4. Use of the area may be adversely affecting aquatic resources such as vernal wetlands and fairy shrimp habitat in the SIA.

Opportunities:

1. To provide greater awareness of the SIAs and their recreational opportunities as they relate to the values for which the area was designated.
2. To provide recreational opportunities for visitors to the SIAs that are consistent with the values for which each area was designated, and ensure that the unique features of the area are not impacted by recreational activities.

3.8.2 Effects Analysis Methodology

The analysis of effects on rare botanical species (Federally Listed, Forest Service Sensitive and Survey and Manage botanical species) involved a process that starts with reviewing existing data sources (FSM 2672.43). In the first step, all rare botanical species that are known or are believed to have potential to occur in the analysis area were identified. Existing Forest records, GIS, tabular data from the California Natural Diversity (CNDDB) (California Department of Fish and Game 2008), the California On-line Inventory of Rare and Endangered Plants of California (California Native Plant Society 2008), and the Jepson Manual (Hickman 1993) were reviewed to determine known locations, range, and habitat requirements for each species. In addition, for the proposed action alternative, topographical maps and digital

vegetation data and aerial photography were utilized to identify potential areas accessible off proposed routes.

A list of species to review for the analysis was compiled using the Arcata U.S. Fish and Wildlife Office on-line species list search page (USDI 2008), the USDA Forest Service Region 5 Sensitive Species List (USDA Forest Service 2006) and the list of Survey & Manage Species to be protected through survey and management standards and guidelines as amended (USDA/USDI 2003) for which suitable habitat exists within and whose range includes SRNF (USDA/USDI 2001).

As a result of the pre-field exercise, a list of species for further analysis was developed (Table 3.8 - 4) as well as species that were eliminated from further analysis (Table 3.8 - 3). It was determined that no Federally listed species would be affected by this project given that the project area does not correspond with the range or habitat of the listed species, specifically McDonald's rock-cress (*Arabis Macdonaldiana*), Menzies wallflower (*Erysimum Menziesii*), Beach layia (*Layia carnosa*), Kneeland prairie pennycress (*Thlaspi californicum*), and western lily (*Lilium occidentale*). A number of Sensitive species were eliminated from further analysis for the same reason as the Federally listed species. The Six Rivers Sensitive species list includes serpentine endemics or associates located on the Josephine ultramafic areas in Del Norte County (e.g. opposite-leaved lewisia, *Lewisia oppositifolia*), high elevation species of the Klamath-Siskiyous Mountains (e.g. Howell's lousewort, *Pedicularis howellii*), also in Del Norte County, and a species associated with the redwood forest, *Otidea smithii*. These Sensitive species outside the range of the project area are eliminated from further analysis.

A number of Sensitive species whose range and habitat overlap the project area were also eliminated from further analysis due to specific factors. The rationale for elimination includes: the restrictive or specific nature of the habitat (e.g. talus slopes), species (e.g. grows on the bole of trees), or population (e.g. only occurring in a specific area that does not coincide with project activities) and a taxonomic clarification. The species that meet these criteria and thus not carried forward in the analysis are listed in Table 3.8 - 3. More detailed information on the rationale is included in the Biological Evaluation/Biological Assessment for this project (McRae 2009).

Relative to Survey and Manage (S&M) species, continued cross country travel on inventoried unauthorized routes at current low rates of use, proposed changes to the existing NFTS, prohibition of cross country travel, pulling over to let other vehicles pass 30 feet from routes and indirect effects 30 to 100 feet from either inventoried unauthorized or NFTS routes are not likely to have a significant negative impact on Survey and Manage species' habitat, life cycle, microclimate, or life support requirements. Hence, the actions proposed do not constitute "habitat disturbing" activities (USDI USDA 2001) and pre-disturbance surveys are not required. Additionally, there are no known sites of S&M species within 100 feet of inventoried unauthorized routes proposed for addition to the NFTS. Therefore, in all action alternatives, unless also treated as Sensitive species, Survey and Manage species will not be further analyzed except in Alternative 1 where occupancy is assumed adjacent to all routes not included in Alternative 2 or 3, due to the absence of surveys.

Table 3.8-3 Sensitive Species Eliminated from Further Analysis

Species Name	Rationale
Anisocarpus scabridus	Restrictive nature of habitat and population extent
Bensoniella oregana	Restrictive nature of habitat and population extent
Boletus pulcherrimus	Proposed activity will not affect species or habitat
Buxbaumia viridis	Restrictive nature of habitat and population extent
Calicium adspersum	Restrictive nature of habitat and population extent
Cudonia monticola	Proposed activity will not affect species or habitat
Dendrocollybia racemosa	Proposed activity will not affect species or habitat
Epilobium oreganum	Taxonomic clarification, now considered *E. ciliatum,* ssp. *glandulosum*
Lathyrus biflorus	Restrictive nature of habitat and population extent
Lupinus constancei	Restrictive nature of habitat and population extent
Minuartia decumbens	Restrictive nature of habitat and population extent
Peltigera hydrotheria	Restrictive nature of habitat and population extent
Phaeocollybia olivaceae	Proposed activity will not affect species or habitat
Sedum paradisum	Restrictive nature of habitat and population extent
Sowerbyella rhenana	Proposed activity will not affect species or habitat
Sulcaria badia	Restrictive nature of habitat and population extent
Tricholompsis fulvescens	Proposed activity will not affect species or habitat

The second step was field reconnaissance surveys, focused primarily on routes where target species could be affected. Surveys were performed on a subset of routes contained in the proposed action. NFTS roads proposed for mixed use were not surveyed as their highly altered, engineered surfaces are not considered suitable habitat for rare botanical species nor are they known to occur on these highly disturbed surfaces. On inventoried unauthorized routes proposed for addition to the NFTS, highly disturbed surfaces and areas adjacent to routes where off route travel is not feasible due to steep terrain or obstacles such as vegetation or boulders were not surveyed. Field surveys were conducted in 2008 on approximately 46.50 miles of inventoried unauthorized routes, 25.9 miles of which are in Alternative 2, and 27.6 miles of which are in Alternative 3. Field surveys were conducted at the time of year when plants were evident and identifiable. Additionally, information on rare plants from past field surveys, monitoring, and personal field observations were utilized during the analysis.

For those inventoried unauthorized routes that have not been surveyed, but are proposed for addition to the NFTS in the no action alternative, existing information from the SRNF rare plant database files, CNDDB records, and Forest GIS Vegetation coverage were used to analyze the potential effects to known occurrences or to potential suitable habitat.

3.8.2.1 Impacts relevant to botanical resources

Examples of human caused and habitat modification effects include but are not limited to: death and damage to plants and habitats when run over, and/or damage to seed banks resulting in reduced seed production or diminished seed bank; loss of viability and vigor; increase in access resulting in collection and over-collection of flowers, bulbs, and botanical products (for example, tribal basketry materials), habitat loss and fragmentation, edge effects, changes in hydrology,

changes to soils, especially erosion and sedimentation, changes in mycorrhizal associations, and increase in risk of weed introduction and spread.

Several studies have addressed the impacts of roads and off-highway vehicle (OHV) use on native vegetation (Trombulak & Frissell 2000, others). OHV use, or off road vehicle use, in the context of the following discussion of effects may refer to motorized use on roads as well as cross-country travel. The effects of off road vehicle use on vegetation include both the immediate direct effects of running over plants or parts of plants, as well as altering habitat capability in numerous ways. The direct impacts on vegetation caused by vehicles include crushing of the foliage, root systems, and seedlings by the wheels; uprooting; and disruption of root systems of larger plants by shear stresses induced in the soil. Root exposure and/or direct root damage may occur due to vehicle passes over vegetation, particularly in loose soils, or in wet soils susceptible to rutting, also affecting plant vigor and survival success. In addition, plant foliage and stems can be damaged and plants uprooted by the overhanging body of vehicles, so that actual plant damage may occur over an area larger than the track width. Some plant populations are more susceptible than others to physical damage from vehicle traffic, due to the root structure, life form, soil type, or other factors. Damage to plants from vehicles can potentially lead to reductions in photosynthetic capacity, poor reproduction, mortality, increases in bare ground, diminished litter cover, and a reduction in the overall cover and frequency of plant species, including a loss of biotic crusts. In addition, these impacts to native plants and changes in habitat can lead to the eventual replacement of native plant species with non-native species more adapted to frequent disturbances and altered soil conditions, such as invasive non-native species (weeds). Many invasive species have life forms that are adapted to persist in disturbed habitats such as roadsides and areas with frequent vehicle use. All of the effects discussed above are of particular concern with rare plant species, which are typically represented by a limited number of populations and/or individuals.

Blankets of fugitive dust raised by vehicle traffic can disrupt photosynthetic processes, thereby suppressing plant growth and vigor, especially immediately adjacent to heavily used routes. Dust can block photosynthesis, respiration, and transpiration, and may even be sufficient in some cases to alter community structure (Trombulak & Frissell 2000).

All of the impacts discussed above have the potential to affect the long term viability of rare plant populations by increasing mortality and decreasing the vigor and productivity of populations. The magnitude of these various effects of vehicle use on rare plant species on the Forest will be assessed through the use of the indicator measures introduced in the Effects Analysis Methodology section of this document. Impacts to rare botanical species that may be affected by the impacts discussed above, are quantified for each alternative below.

3.8.2.2 Assumptions specific to botanical resources analysis:

1. Vehicle use on and off established routes has affected or has the potential to affect rare plant populations, either directly by damage or death to individual plants from motorized vehicles (stem breaking, crushing, etc.), or indirectly by altering the habitat through soil disturbance, changes in hydrologic functioning, or by the introduction of non-native, invasive plant species that can out-compete sensitive species for water, sunlight, and nutrients. Direct effects occur within a zone 30 feet on either side of the route's edge because of the need for parking and pulling off to allow another vehicle to pass. This zone, in many cases, is shortened due to barriers to off route accessibility resulting from steep topography, impenetrable

vegetation, boulders or outcrops. Indirect effects occur from 30 to 100 feet either side of the route's edge.

2. The analysis assumes use is light (less than 25 vehicle trips per week) or low (25 to 100 trips per week) and it will examine effects in terms of direct and indirect effects to occurrences and/or direct and indirect effects to potential rare plant habitat that is assumed to be occupied. The latter is used where information on effects to occurrences is lacking due to the absence of field surveys and is useful for performing comparisons of alternatives by looking at gross acreage of potentially occupied rare plant habitat. However, because it is not known whether or not the rare plant habitat acreage is occupied, it is difficult to analyze effects to the species because the level of occupancy is unknown. Potential effects to the rarest species (those with the lowest Global and California Native Plant Society ranking), which are the most sensitive to the loss of a single occurrence, have the greatest potential significance.
3. Motor vehicle use is unlikely to impact certain rare plant habitats due to the steep or rocky nature of the surrounding terrain; motor vehicle use is more likely to impact other rare plant habitats, such as openings, which exist on gentle slopes or flat terrain with little or no vegetation or natural barriers to motor vehicles.
4. Without specific prevention and/or control measures, invasive non-native plants (weeds) will continue to spread along and within surfaced (e.g., paved or aggregate) and unsurfaced (e.g., native surface) motorized vehicle roads/trails/areas (for more detail, see weed section).
5. Effects from all vehicles are assumed to be equal; therefore, changes in vehicle class will have negligible impacts on rare plants or their associated habitats.
6. Effects from the following actions on routes currently on the NFTS will not affect rare botanical species and their associated habitats; co-locating motorized trails on NFTS closed roads, allowing mixed use on NFTS roads; changing vehicle class on NFTS roads; converting motorized trails to NFTS horse/foot trails. There are no direct or indirect effect of co-locating motorized trails on NFTTS closed roads, allowing mixed use on specified NFTS roads, changing vehicle class and converting NFTS motorized trails to NFTS horse/foot trails. The highly disturbed surfaces of existing NFTS roads and trails are no longer considered suitable habitat for rare botanical species nor are occurrences of these species known to occur within 100 feet of these routes.

3.8.2.3 Data Sources:

1. Route-specific botanical data (e.g., Threatened, Endangered, and Sensitive (TES) species, meadows, special aquatic features, habitats, etc.), including results of route-specific surveys of rare species.
2. Route inventories collected in Step 1 of Travel Management and associated tabular data sets.
3. GIS layers of the following data: routes, rare plant and Survey and Manage species, Research Natural Areas and Special Interest Area (Botanical Area) locations, and the Forest GIS vegetation coverage.
4. California Natural Diversity Database records (CDFG 2008), CNPS Electronic Inventory

5. CNPS 2008) and for Survey & Manage species the known sites database and the results of purposive and strategic surveys.

Botanical Resources Indicators:

The following indicator measures related to motor vehicle routes located in or near rare plant occurrences or potential suitable habitat were used to assess the impacts of the alternative.

- Acres of inventoried unauthorized routes open for motor vehicle use within core areas set aside to ensure rare plant species persistence.
- Acres of potentially occupied suitable habitat for rare plant species within or adjacent to inventoried unauthorized routes open for motor vehicle use.
- Miles of inventoried unauthorized routes within Botanical Areas.
- Miles of inventoried unauthorized routes with Research Natural Areas

Botanical Resources Methodology by Action:

1. Direct/indirect effects of the prohibition of cross-country motorized vehicle travel

Short-term timeframe: 1 year. Short term effects include immediate effects from changes in travel management that will be evident within the first year of implementation.
Long-term timeframe: 20 years. Climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this time frame speculative. These timeframes will apply for each action proposed in all alternatives.
Spatial boundary: Six Rivers National Forest Service lands on Lower Trinity Ranger District (LTRD) and Mad River Ranger District (MRRD) within 100 feet of inventoried unauthorized routes, excluding Wilderness Areas. Wilderness Areas are already closed to cross-country or any other motorized vehicle travel. It is understood that some areas are less vulnerable to unauthorized vehicle incursions due to limits on access provided by terrain and vegetation.
Indicator(s): (1) Acres of inventoried unauthorized routes open for motor vehicle use within core areas set aside to ensure rare plant species persistence. (2) Acres of potentially occupied suitable habitat for rare plant species within or adjacent to inventoried unauthorized routes open for motor vehicle use. (3) Miles of inventoried unauthorized routes within Botanical Areas. (4) Miles of inventoried unauthorized routes within Research Natural Areas.
Methodology: GIS analysis of existing unauthorized routes.

2. **Direct/Indirect Effects of adding inventoried unauthorized routes to the National Forest Transportation System (NFTS or system), including identifying seasons of use and vehicle class.**

Short-term timeframe: 1 year.
Long-term timeframe: 20 years.
Spatial boundary: Forest Service lands on LTRD and MRRD within 30 feet for direct effects and 30 to 100 feet for indirect effects of routes added to the NFTS.
Indicator(s): (1) Acres of inventoried unauthorized routes open for motor vehicle use within core areas set aside to ensure species persistence. (2) Acres of potentially occupied suitable habitat for rare plant species within or adjacent to inventoried unauthorized routes open for motor vehicle use. (3) Miles of inventoried unauthorized routes within Botanical Areas. (4) Miles of inventoried unauthorized routes within Research Natural Areas.

Methodology: GIS analysis of added routes and Sensitive and Survey and Manage species sites/habitat.

3. Changes to the existing NFTS, including changes in mitigation prior to designation; co-locating motorized trails on NFTS closed roads; allowing mixed use; changing vehicle class; converting motorized trails to NFTS horse/foot trails.

There are no differences in effects between alternatives on botanical resources due to actions proposed on NFTS routes. (see "Assumptions specific to botanical resources analysis", above).

4. Cumulative Effects

Short-term timeframe: not applicable; cumulative effects analysis will be done only for the long-term time frame.
Long-term timeframe: 20 years
Spatial boundary: SRNF.
Indicator(s): (1) Acres of inventoried unauthorized routes open for motor vehicle use within core areas set aside to ensure rare plant species persistence. (2) Acres of potentially occupied suitable habitat for rare plant species within or adjacent to inventoried unauthorized routes open for motor vehicle use. (3) Miles of inventoried unauthorized routes within Botanical Areas. (4) Miles of inventoried unauthorized routes within Research Natural Areas.

The cumulative effects analysis herein will not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one can not reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Third, public scoping for this project did not identify any public interest or need for detailed information on individual past actions. Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions."

The cumulative effects analysis in this EIS is also consistent with Forest Service National Environmental Policy Act (NEPA) Regulations (36 CFR 220.4(f)) (July 24, 2008), which state, in part:

> CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal for agency action or its alternatives will add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered (including past, present, and reasonable foreseeable future actions) on the affected environment. With respect to past actions, during the scoping process and subsequent preparation of the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some contexts be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decisionmaking. (40 CFR 1508.7)"

For these reasons, the analysis of past actions is based on current environmental conditions.

3.8.3 Affected Environment

The LTRD and MRRD on SRNF encompass a broad range of habitats and elevations, ranging from river basins at 500 feet elevation to red fir forests approaching 6,000 feet in elevation. Geology is varied, and includes granitic, sedimentary, and metamorphic types, including rock types with unique chemistry such as ultramafic that support several rare plant species. Eight Ecological Subsections (USDA 1997) converge on the LTRD and MRRD. All of these conditions contribute to a highly diverse flora, including endemic species (e.g. Mad River fleabane daisy (*Erigeron maniopotamicus*).

Habitat for the rare plant species carried forward in this analysis range from early seral habitats to those associated with mature forests. Early seral habitats occur throughout the project area and include lightly vegetated openings and disturbed areas such as road edges. False yellow lupine, California globe mallow, wayside aster and Howell's montia are examples of rare plant species associated with early seral habitats and are tolerant to some level of disturbance. The western-most grasslands of the MRRD provide potentially suitable habitat for beaked Tracyina and oak woodlands throughout this district intermixed with grasslands provide habitat for Tracy's sanicle. Disturbance in oak communities was primarily fire which maintained the oak-fescue component. Mature forests on both the LTRD and MRRD consist primarily of Douglas-fir and tanoak vegetation types with mixed evergreen associates and at higher elevations white fir dominated forests. These stands can exist as a mosaic with pockets of relatively younger trees to individual old-growth trees. Where not previously disturbed by logging, these mixed-aged stands are in part a result of a mixed fire regime. Mountain and fascicled lady's slipper are associated with mature conifer forests.

The existing or current condition of rare plant, lichen, bryophyte and fungi populations reflects all of the past human action on LTRD and MRRD on SRNF system lands and past and current climate conditions. Some of the past human actions on these Ranger Districts continue to impact rare botanical species. Cumulative findings from monitoring Tracy's sanicle occurrences indicate that of those occurrences monitored, 77% show signs of oak mortality from overtopping Douglas-fir or the presence of encroaching Douglas-fir saplings. Fire suppression is thought to play a role in fostering this encroachment. Presence (i.e. dung, bedding) of cattle was

noted at 20 of the 56 occurrences. Other impacts at Tracy sanicle occurrences include unauthorized off-highway vehicle use, past logging activities, or noxious weeds (specifically medusahead, yellow starthistle or tocolate). In the case of noxious weeds, the weeds were not located within occupied habitat but in grasslands outside of the habitat at 5 occurrences in the strategy.

Prior to 1998 there were 10 populations documented on Six Rivers National Forest of Mountain lady's slipper. These populations extended from the Orleans Ranger District to the Mad River Ranger District. In 1998 an attempt was made to relocate the historic sites to obtain current population and habitat status information. None of the historic populations were relocated. The inability to locate these populations could be due to the following: mapping error, habitat disturbance or mountain lady's slipper did not emerge that year. In regards to the disturbed habitat, road construction, log deck development, off-highway vehicle use or logging was noted at 7 of the 10 historic populations (McRae 2005). Logging related disturbance could have occurred during the 1980's when mountain lady's slipper was not on the Forest Sensitive species list and therefore not subject to pre-project surveys or protection.

Without the results of long term monitoring it is difficult to evaluate emphatically either trends or how vulnerable rare botanical species are to human actions. However, field observations of specific sites such as Lassics lupine and Lassics sandwort sites in the Lassics Botanical Area show that Sensitive plants have been impacted in the past by unauthorized motor vehicle use. Unique Sensitive and rare plant habitat, including that associated with wetlands near Red Lassic, have been impacted in the Lassics Botanical Area by motorized vehicles. A vernal pool adjacent to a dispersed camping site near Red Lassics, which contains the rare meadow sedge (*Carex* praticola – Global Rank G5, State Rank S2S3.3, CNPS List 2.2), has been impacted by motorized vehicles (see photograph below).

Figure 2: Red Lassic Vernal Pool Showing Motorized Vehicle Impacts

Many of the rare botanical species either known or suspected to occur on LTRD or MRRD require special management attention to ensure their continued viability, and they have been included on the Survey and Manage list or SRNF Sensitive plant list. Some of these species have been removed from this analysis for reasons indicated in Section 3.8.2 Effects Analysis Methodology.

Species Potentially Affected by Actions Proposed

There are a total of 11 rare plant species currently designated on the LTRD and MRRD that were carried forward in this analysis. Note that 3 of these species are managed as both Sensitive and Survey and Manage species (see table 3.8-4). Species with number of sites equal to 0 in the table are those that are not known to but could potentially occur in the analysis area as potential habitat may exist, and occurrences are found nearby. An occurrence refers to a relatively discreet group of individuals, separated from the next nearest group of the same species by at least ¼ mile.

The following section presents what is known about the rare plant species on the LTRD and the MRRD that may be affected by the proposed action and what is known about how motorized vehicle use impacts them.

Table 3.8-4 Rare Plant Species Analyzed on LTRD and MRRD

Scientific Name	Common Name	Status	Taxa Group	No. of Sites on LTRD	No. of Sites on MRRD	General Habitat
Calycadenia micrantha	small-flowered calycadenia	Sensitive	Vascular Plant	NA	4	Openings
Cypripedium fasciculatum	clustered lady's-slipper	Sensitive and Survey & Manage	Vascular Plant	3	8	Mature Forest
Cypripedium montanum	mountain lady's-slipper	Sensitive and Survey & Manage	Vascular Plant	6	16	Mature Forest
Erigeron maniopotamicus	Mad River fleabane daisy	Sensitive	Vascular Plant	NA	1	Openings
Eucephalis vialis	wayside aster	Sensitive and Survey & Manage	Vascular Plant	0	NA	Openings
Frasera umpquaensis	Umpqua green-gentian	Sensitive	Vascular Plant	NA	0	Mature Forest
Iliamna latibracteata	California globe mallow	Sensitive	Vascular Plant	11	2	Openings
Montia howellii	Howell's montia	Sensitive	Vascular Plant	3	NA	Openings
Sanicula tracyi	Tracy's sanicle	Sensitive	Vascular Plant	NA	56	Oakwoodland conifer interface
Thermopsis robusta	robust false lupine	Sensitive	Vascular Plant	0	NA	Openings
Tracyina	beaked	Sensitive	Vascular	NA	0	Openings

rostrata	tracyina		Plant			

The rarity ranking, abundance, range/distribution, trend and threats to rare plant species carried forward in this analysis are as follows. For definitions of global rank, state rank and CNPS listings see Appendix XXX.

small-flowered calycadenia (*Calycadenia micrantha*) Global Rank G2G3, State Rank S2S3.3, CNPS listing 1B.2

Abundance: Known from fewer than 20 occurrences.

Range/Distribution: Known only from California in Colusa, Lake, Monterey and Trinity Counties. Occurs on the Mendocino N.F. (9 occurrences) and Six Rivers N.F. (three occurrences in Trinity Co.).

Trend: Unknown

Threats: Vulnerable to motorized recreation where off route access is not limited by vegetation or topography. Competition from invasive weeds.

clustered lady's-slipper and (*Cypripedium fasciculatum*) Global Rank G4, State Rank S3.2, CNPS listing 4.2

Abundance: Six Rivers NF-16 documented occurrences, population size ranges from 2 to 60 plants, only three of the occurrences have been verified, the rest are historic or have not been relocated. Shasta-Trinity NF-29 occurrences, population size ranges from 1 to 50 (average 10 plants), only half of the occurrences have been verified.
Klamath NF- 97 occurrences, population size ranges from 1 to 141 plants (from KNF population records). Mendocino NF - 50 occurrences totaling <1400 stems. Lassen NF-1 occurrence, population size is about 50 plants. Plumas NF-101 occurrences, population size ranges from 2 plants to over 3,000. Tahoe NF- 8 occurrences (7 on NFS system lands, 1 private), population sizes ranges from 1 to over 300 plants.

Range/Distribution: Known from 8 states; in California from Del Norte County to Sierra County. Also Colorado, Idaho, Montana, Utah, Oregon, Washington, and Wyoming. The Tahoe NF supports the southern-most occurrences of CYFA's range.

Trend: Unknown but small population sizes with risk of local extirpation coupled with monitoring inconsistency and the fact that some of the populations have not been visited in over a decade, contributes to concerns for this species.

Threats: In addition to the direct effect of running over and crushing the plant motorized vehicle activities that disrupt the soil and alter the habitat requirements for associating mycorrhizal species increase the risk to the persistence of the species.

mountain lady's-slipper (Cypripedium montanum) Global Rank G4, State Rank S4.2, CNPS listing 4.2

Abundance: Six Rivers NF- 13 extant occurrences, population sizes vary from one to 70. Eleven of these occurrences have less than 7 individuals. Shasta-Trinity NF-18 known occurrences, population sizes range from 1-50 (average of 10). Klamath NF-81 known occurrences, populations sizes vary from <15 plants to 1000+. Mendocino NF: 9 known occurrences of unknown size. Sierra NF- 13 known occurrences, population sizes range from <10 to <50, most occurrences have not been recently visited.

Modoc NF-34 known occurrences, 31 of which have been visited since 2000; occurrence size averaging 13, ranging from 1 to 85. Lassen NF- 5 known occurrences (one possibly part of a land exchange), population sizes about 30 and 55 (including individuals on adjacent private land). Stanislaus NF-16 known occurrences, population sizes are small. Plumas NF-13 known occurrences, population sizes are small. Eldorado NF – 1 known occurrence.

Range/Distribution: Numerous counties throughout California from Del Norte to Madera County. Also occurs in 6 other western states. Populations are highly isolated.

Trend: Unknown. For some of the Forests mentioned above, populations have not been visited in many years so population health has not been tracked. It can be assumed that given the complicated life history of this species including the establishment of mycorrhizal relationships, limited establishment factors, apparent intolerance to intense disturbance and occurrence of this species on lands available for timber harvest that the trend is downward.

Threats: In addition to the direct effect of running over and crushing the plant motorized vehicle activities that disrupt the soil and alter the habitat requirements for associating mycorrhizal species increase the risk to the persistence of the species.

Mad River fleabane daisy (*Erigeron maniopotamicus*) Global Rank G1, State Rank S1.2, CNPS listing 1B.2

Abundance: One site on Six Rivers N. F. on Mad River Ranger District.

Range/Distribution: Known only from six occurrences in east-central Humboldt County and adjacent Trinity County.

Trend: Unknown.

Threats: Fire suppression, timber harvest, grazing and unmanaged motorized vehicle recreation.

wayside aster (*Eucephalis vialis*) Global Rank G3, State Rank S1.2, CNPS listing 1B.2

Abundance: Not known to occur on Six Rivers or Klamath National Forests but suitable habitat exists. It is probable that more sites exist but observations are lacking due to its "weedy" appearance.

Range/Distribution: In California it is known from one extant occurrence in Del Norte and one historic occurrence (1919) in Humboldt county. In Oregon it is known from 76 occurrences in two disjunct populations in Lane and Linn counties in central Oregon and in Jackson county in southwestern Oregon.

Trend: Unknown.

Threats: Competition from invasive weeds. Vulnerable to motorized recreation where off route access is not limited by vegetation or topography.

Umpqua green-gentian (*Frasera umpquaensis*) Global Rank G4?, State Rank S2.2, CNPS listing 2.2

Abundance: 13 occurrences in California. All on Shasta Trinity NF, on South Fork Mountain. One occurrence borders Six Rivers NF.

Range/Distribution: Restricted to SW Oregon and NW California .

Trend: Unknown

Threats: Limited to mesic Douglas-fir/white fir forest and meadow margins, increasing susceptibility to damage for motorized vehicles.

California globe mallow (*Iliamna latibracteata*) Global Rank G3, State Rank S2.2, CNPS listing 1B.2

Abundance: Six Rivers N.F. – 8 documented occurrences, population size ranges from 3 to 151 plants. Two extant occurrences, 5 historical occurrences that have not been revisited.

Shasta-Trinity N.F. – 2 documented occurrences with 1 individual and 35 individuals each.

Range/Distribution: SW Oregon and NW California. Extant occurrences in Humboldt and Trinity counties, California. Historic records from Del Norte and Siskiyou counties, California. Josephine, Curry and Coos counties in Oregon. Documentation of historic occurrences in Del Norte and Siskiyou counties is lacking.

Trend: Unknown

Threats: One occurrence on overgrown inventoried route, hence susceptible to direct effects from motorized vehicles.

Howell's montia (*Montia howellii*) Global Rank G3G4, State Rank S3, CNPS listing 2.2

Abundance: 61 total populations known from California, most on private. One population in FS campground on Six Rivers NF and two populations in FS campgrounds on Shasta Trinity NF. More abundant in Oregon and Washington.

Range/Distribution: Known from California, Oregon and Washington from approximately 61 occurrences. OR, WA, Brit.

Trend: Unknown

Threats: Roadside occurrences vulnerable to motorize vehicles traffic particularly when route surface is wet.

Tracy's sanicle (*Sanicula tracyi*) Global Rank G3, State Rank S3.2, CNPS listing 4.2

Abundance: 292 mapped sites in GIS (database includes point locations that do not reflect an "occurrence"). Population estimate is ca. 5,000 plants.

Range/Distribution: CNPS inventory lists this taxon in DNT, HUM, TRI, BUT, and TEH counties in California. The Del Norte location is a misidentification. Documentations in Butte and Tehama counties are believed to be a taxon other than *Sanicula tracyi*.

Trend:

Threats: Oak mortality from overtopping Douglas-fir or the presence of encroaching Douglas-fir saplings, cattle grazing, unauthorized motor vehicle use, timber harvest, noxious weeds (specifically medusahead, yellow starthistle or tocolate).

A Conservation Strategy (USDA 2008) has been developed for Tracy's sanicle to ensure for its long-term survival. The Strategy identified "core" sub-populations as representative of the population as a whole (the metapopulation) under the concept that a network of sub-populations will sustain the metapopulation over time and space. As a part of the conservation strategy, the core areas are to be managed as reserve and experimental areas; the latter allowing for an adaptive management approach whereby experimentation or studies are conducted to test potential habitat or population enhancing

measures (eg. prescribed burning). Another set of areas is considered as "managed," where activities not related to habitat or population interests are conducted and the effects on the sub-population are measured. Because Tracy's sanicle is managed under a strategy of maintaining "core" sub-populations, surveys were not performed for it within the project area.

robust false lupine (*Thermopsis robusta*) Global Rank G2Q, State Rank S2.2, CNPS listing 1B.2

Abundance: Seven to ten occurrences on Six Rivers NF, totalling,100 plants. Located in only two watersheds on the Orleans Ranger District: Bluff Creek and Slate Creek. Thirteen occurrences on Klamath NF, Ukonom and Happy Camp Ranger Districts, ranging in size from 5 to 50 plants, totaling approximately 300 plants.
Range/Distribution: Previously known from 12 occurrences in California in Humboldt and Siskiyou Counties. Oregon occurrences recorded in 1893 presumed to be in California, not Oregon.
Trend: Unknown
Threats: This species is an early seral colonizer, and seems to appear where disturbance has provided openings in the canopy, or along roads. Given its preference road edges, it is susceptible to impacts from motorized vehicles. Potential displacement of plants due to the spread of invasive species (e.g. Scotch and French broom) along roadsides, is also a concern.

beaked tracyina (*Tracyina rostrata*) Global Rank G1G2, State Rank S1S2.2, CNPS listing 1B.2

Abundance: Six Rivers N.F. – No documented occurrence but suitable habitat present on a limited part of the Forest. Mendocino N.F. – No documented occurrence but suitable habitat present on a limited part of the Forest.
Range/Distribution: Known only in California from the following counties: Humboldt, Lake, Mendocino (Hopland Field Station), and Sonoma. Historic occurrence sites in Humboldt County near Alderpoint have been revisited in the last 5 years with no findings. It is likely that given its habitat (grasslands) and the pressure on these grasslands from non-native and invasive species, that it has been extirpated from the area.
Trend: Unknown, but likely declining.
Threats: Competition from invasive weeds. Vulnerable to motorized recreation where off route access is not limited by vegetation or topography.

3.8.4 Environmental Consequences

See the effects methodology section above regarding how this analysis was conducted.

3.8.4.1 Alternative 1 – No action

Direct/Indirect Effects

1. Direct/Indirect Effects of continued travel off of designated NFTS roads and NFTS trails.

Short-term timeframe: 1 year. Short term effects in terms of the number of occurrences and acres of habitat affected would be the same as the current situation as use of existing unauthorized routes would continue. See analysis below.
Long-term timeframe: 20 years. Climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this time frame speculative. Over the long term, possible increases in use levels on existing routes and the potential establishment of new routes through unauthorized cross-country travel, could impact an undetermined number of occurrences, and cause more pervasive and severe impacts to potential habitat. See analysis below.

There are 11 rare plant species (see Table 3.8-4) within the analysis area that could potentially be affected by cross-country travel, including the continued use of all inventoried unauthorized routes, under this alternative. For analysis purposes, these 11 species were divided into 2 groups based on either gross habitat similarities or, as is the case with Tracy's sanicle, by management strategy. Due to the absence of field surveys of routes not associated with the proposed action, acres of potential habitat within 30 and 100 feet of the routes were used to analyze effects.

Tracy's sanicle is managed via a conservation strategy to ensure the species persistence by identifying three types of core areas, each with specific management direction. Reserve areas represent the backbone of the strategy. Experimental areas are those where specific management activities that increase the quality of the habit for Tracy's sanicle can be implemented. No new ground or vegetation disturbing activity and no motorized trail use designation is permitted in either Reserve or Experimental areas. Managed areas are those that have had human caused disturbance in the past. None of the inventoried routes impact Managed areas. The following sup-populations in Table 3.8-5 would be impacted by Alternative 1. Direct and indirect effects are quantified by acres of inventoried unauthorized routes open for motor vehicle use within core areas set aside to ensure species persistence. Direct effects within 30 feet of routes and indirect effects within 30 to 100 feet of routes are displayed in Table 3.8 – 5 below.

Table 3.8-5 Acres of Tracy's Sanicle Core Areas Affected by Alternative 1

Tracy's Sanicle Sub Population ID	Management Area	Route IDs	Acres within 30 ft	Acres within 100 ft
510400001	Experimental	JM749	0.8	2.6
510440017	Reserve	JM748	1.1	3.1
510440026	Experimental	TH115	0.3	0.9
510440013	Reserve	TH123	0.5	1.4
510440014	Experimental	TH125, TH128, TH129	4.6	11.9
510440047	Experimental	TH147	0.2	0.5
510440048	Reserve	TH159	0.4	1.4
510460010	Reserve	JM824, JM827, JM822, JM823, JM821	2.2	8.0
510460040	Experimental	JM859, PK700	2.2	5.3
510460037	Reserve	SS1	0.4	0.6

Tracy's Sanicle Sub Population ID	Management Area	Route IDs	Acres within 30 ft	Acres within 100 ft
510470020	Experimental	JM872, JM872x, JM873	1.8	5.3
510470023	Reserve	TH250x	0.2	0.4
510520023	Reserve	JM1049, TH1053	1.2	3.7
510510061	Reserve	JM2122, UAMR1004r	6.4	15.9
510510036	Experimental	TH038	0.2	0.5
510560007	Reserve	JM1033	0.0	0.3
510480013	Experimental	UAMR0035r	0.0	0.2
510480046	Reserve	JM1071	0.0	0.2
510520023	Reserve	JM1049	1.2	3.7
		Total Acreage	23.5	65.8

There are a total of 89.3 acres of Tracy's sanicle core habitat within the analysis area that could potentially be affected by cross-country travel, including the continued use of all unauthorized routes, under this alternative. Direct effects will potentially occur to approximately 23.5 acres. Indirect effects will potentially occur to approximately 65.8 acres. Because these areas were set aside to provide for persistence of the species and actions proposed under Alternative 1 will directly and indirectly affect 89.3 acres of core areas, it is my determination that implementing Alternative 1 may affect individuals, and is likely in the long term to result in a trend toward Federal listing or loss of viability for *Sanicula tracyi.*

The remaining 10 rare plant species analyzed occur in the 2 general habitat types as shown in Table 3.8-6. The following table displays potential direct effects and indirect effects (noted under "Assumptions specific to botanical resources analysis to habitat" earlier in this section) which are quantified by acres within 30 feet and 100 feet of the route respectively. Note that areas surveyed and acreage analyzed under Alternative 2 that were deemed not to be accessible off of proposed routes were not included in Table 3.8 – 6. There are a total of 1383 acres of rare plant habitat within the analysis area that could potentially be affected by cross-country travel, including the continued use of all unauthorized routes, under this alternative. Direct effects will potentially occur to approximately 303 acres. Indirect effects will potentially occur to approximately 1080 acres.

Table 3.8-6 Acres of Rare Plant Habitat Affected By Alternative 1

	Acres	Acres
	within 30 ft	within 100 ft
Mature Forest	166	612
Openings	137	468
Total	303	1080

Assuming occupancy (in the absence of field surveys) of the 468 acres of Openings that represent potential rare plant habitat within 100 feet of inventoried unauthorized routes by the very rare *Erigeron maniopotamicus*(G1, CNPS List 1B.2) and *Tracyina rostrata* (G2, CNPS

List 1.2), whose very restricted range and abundance raise heightened concern for their persistence, it is determined that implementing Alternative 1 may affect individuals, and is likely to result in a trend toward Federal listing or loss of viability for *Erigeron maniopotamicus* and *Tracyina rostrata*.

Assuming occupancy (in the absence of field surveys) of the 612 acres of mature forest and 468 acres of Openings that represent potential rare plant habitat within 100 feet of inventoried unauthorized routes by the remaining rare plant species with wider geographic ranges and greater abundance, it has been determined that implementing Alternative 1 may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability for *Calycadenia micrantha*, *Cypripedium fasciculatum*, *Cypripedium montanum*, *Eucephalis vialis*, *Frasera umpquaensis*, *Iliamna latibracteata*, *Montia howellii*, *Thermopsis robusta.* Note that *Cypripedium fasciculatum*, *Cypripedium montanum* and *Eucephalis vialis* are also managed as Survey and Manage species. Assuming occupancy and effects to individuals precludes providing for their persistence. Failure to do so is not in compliance with SRLRMP standards and guidelines for Survey and Manage species.

Of the rare plant species analyzed herein, one known occurrence is within 100 feet of an inventoried unauthorized routes included in Alternative 1. The Sensitive species, *Iliamna latibracteata,* is located in the middle of route PK807. Addition of this route to the NFTS would extirpate this occurrence which is represented by one plant. Extirpation of this one plant would not lead to a trend toward Federal listing.

Under this alternative there are 3.25 miles of inventoried unauthorized routes within the Horse Mountain Botanical Area and 5.64 miles of inventoried unauthorized routes within the Lassics Botanical Area. Direct effects within 30 feet of these routes by motorized vehicle to the distinctive serpentine vegetation found within is not compatible with the goal, set forth in the Special Interest Area Management Strategy (USDA 1998), of protecting the unique botanical features for which these botanical areas were established.

Approximately 0.14 miles of route PK758 are within the Soldier Research Natural Area (RNA). Continued use of this unauthorized route needs to be evaluated in terms of RNA standards and guidelines.

2. Direct/Indirect Effects of adding facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, including identifying seasons of use and vehicle class.

Under this alternative no facilities would be added to the NFTS, therefore the effects would be the same a discussed above.

3. Direct/Indirect Effects of co-locating motorized trails on NFTTS closed roads, allowing mixed use on specified NFTS roads, changing vehicle class and converting NFTS motorized trails to NFTS horse/foot trails.

Short-term timeframe: 1 year. None. See “assumptions specific to botanical resources analysis”.

Long-term timeframe: 20 years. None. See “assumptions specific to botanical resources analysis”.

4. Cumulative Effects:

Direct and indirect effects of current and foreseeable future projects involve: trampling or crushing plants; vegetation removal; soil disturbances; changes in hydrology; and changes in vegetation community composition and/or structure, including the introduction or spread of invasive plant species that may compete with rare plant species. The current and reasonably foreseeable future projects on Forest lands in the analysis area, and the nature and extent of their potential effects on botanical resources include:

Timber activities and fuel treatments – effects are variable based on treatment; prescribed burning – partial removal of vegetation in the short term, but retention of seed bank and root crown allowing for recovery; mowing – partial removal of canopy, change in vegetation community structure, low growing plants left intact; thinning – change in vegetation community structure; some crushing of vegetation associated with access and project implementation.

Wildland fire – wildland fire effects are similar to those described for prescribed burning, though in general wildland fires burn more intensely, potentially resulting in more severe effects on rare plant species, including a more likely increase in weed abundance.

Fire suppression – fire suppression effects, due primarily to fuel break, safety zone and staging area construction, are similar to timber activity and fuel treatment effects although the effects are potentially greater due the emergency nature of these events that preclude planning to avoid all rare plant and Survey & Manage plant occurrences.

Livestock grazing – direct trampling of plants; changes in vegetation community dynamics, e.g. more grazing-resistant species gaining dominance; impacts to soil resource; changes in hydrologic processes.

Road and trail development or improvement, and urbanization – removal of vegetation; soil disturbance, erosion; impacts to hydrologic function.

Utility, irrigation, and highway easements - removal of vegetation, and soil disturbance in immediate vicinity of pipelines, ditches, highways; changes in vegetation condition within the easement due to utility line/highway/ditch maintenance; changes in hydrologic processes.

These activities are considered in the cumulative effects analysis for rare plants because they may contribute to the overall impacts on botanical resources through the complete or partial removal of vegetation, or through habitat alteration, with similar effects to those discussed for the proposed action. These impacts could add cumulatively to the potential impacts associated with implementation of alternative 1, by damaging individual plants, or affecting habitat, including impacts to the soil and/or hydrologic resources integral to habitat suitability.

Note, however, that for present and future actions, where possible, projects are designed to avoid impacts to rare plant occurrences. Where avoidance is not practical, mitigations are designed to minimize the number of individuals impacted, the severity of the impact, and the number of occurrences affected. As a result, the long-term impacts of present and future projects, while they may impact individual plants, generally have design features built in to prevent a long-term loss of viability or trend to Federal listing for sensitive species. While new ground disturbing projects and repeated disturbance from ongoing activities are factors in the continuing impacts to individual plants, the overall impacts are generally reduced compared to activities where no mitigation measures are implemented. However, the potential exists for additional effects from current and future actions over the next 20 years to increase the number of acres of inventoried unauthorized routes open for motor vehicle use within core areas set aside to ensure rare plant species persistence, the number of acres of

occupied suitable habitat for rare plant species within or adjacent to inventoried unauthorized routes open for motor vehicle use, the number of miles of inventoried unauthorized routes within Botanical Areas and the number of miles of inventoried unauthorized routes with Research Natural Areas.

3.8.4.2 Alternative 2 – Proposed Action.

Direct/Indirect Effects

1. Direct/Indirect Effects of the prohibition of cross-country motor vehicle travel:

Short-term timeframe: 1 year. Short term direct/indirect effects in terms of the number of occurrences and acres of habitat affected would be beneficial as use of existing unauthorized routes would discontinue.

Long-term timeframe: 20 years. Over the long term, through de-compaction of substrate and the return of native vegetation, suitable habitat could return to some areas with the potential to support rare plant species.

2. Direct/Indirect Effects of adding facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, including identifying seasons of use and vehicle class.

Short-term timeframe: 1 year. See analysis below.

Long-term timeframe: 20 years. See analysis below.

Direct/Indirect Effects:

Of the 56.9 miles of inventoried unauthorized routes proposed for addition to the NFTS under Alternative 2, 25.9 miles were associated with suitable habitat for Sensitive species that could be affected and were surveyed. 31.0 miles were not surveyed because their highly disturbed routes surfaces did not represent suitable habitat and travel off these routes was not feasible due to steep topography, dense vegetation, boulders, or other natural barriers. System roads proposed for mixed use were not surveyed as their highly altered, engineered surfaces are not considered suitable habitat for Sensitive species nor are Sensitive species known to occur on these highly disturbed surfaces.

The following table displays routes surveyed where target species could be affected that are proposed for addition to the NFTS and their associated mileage.

Table 3.8-7 Routes Surveyed for Alternative 2

Route No	Miles
JM-2016s	0.26
JM-2079	3.14
JM-2085	0.89
JM-2087	1.18
JM-2090	1.97
JM-2095	1.67
JM-2096n	0.7

Route No	Miles
JM-2097e	2.23
JM-2097w	0.88
JM-2098	0.33
JM-2102	0.63
JM-2112	0.03
JM-2119	0.04
JM-2123	0.16
JM892	0.02
JM894	0.15
JM947	1.83
JM954	0.24
JM955	0.42
JM956	0.25
JM957	0.03
JM979	0.29
JM982	0.23
M811	0.2
MM790	0.64
MM791e	0.7
MM791w	0.13
MM816	0.3
MM817	0.82
MM828	0.47
MM830	0.35
MM832	0.17
MM833	0.13
PK813	0.04
PK815	0.1
PK817	0.01
PK821	0.63
PK822	0.68
PK857x	0.09
TH1011	0.08
TH1013	0.09
TH108	0.18
TH223	1.48
TH227	0.36
TH267	0.2

Route No	Miles
TH281	0.05
TH278	0.05
TH279	0.12
UAMR0034r	0.13
UAMR0034rl	0.11

Field surveys did not find rare plant species to be present. Hence, there are no short term or long term direct/indirect effects of adding facilities to the NFTS, including seasons of use and vehicle class under alternative 2.

Actions proposed under this alternative do not add acres of inventoried unauthorized routes open for motor vehicle use within core areas set aside to ensure persistence of rare plant species. Facilities added under this alternative are not within Tracy's sanicle core areas. However, individual plants outside of the core areas may be affected. Therefore it is my determination that implementing Alternative 1 may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability for *Sanicula tracyi.*

As a result of surveys showing absence it is my determination that implementing Alternative 1 will not affect *Erigeron maniopotamicus*, *Tracyina rostrata*, *Calycadenia micrantha*, *Cypripedium fasciculatum*, *Cypripedium montanum*, *Eucephalis vialis*, *Frasera umpquaensis*, *Iliamna latibracteata*, *Montia howellii*, or *Thermopsis robusta.*

There are no routes proposed within the Horse Mountain Botanical Area. However, actions proposed under this alternative do add 0.99 miles of inventoried unauthorized routes within the Lassics Botanical Area. Field surveys of potential suitable serpentine habitat within 100 feet of these inventoried unauthorized routes have been completed. The habitat was found not to be occupied by rare botanical species. Direct effects within 30 feet of these routes by motorized vehicle to the distinctive serpentine vegetation found within is not compatible with the goal, set forth in the Special Interest Area Management Strategy (USDA 1998) of protecting the unique botanical features for which the botanical area was established. However, these routes access dispersed camping sites that have a long history of use. The Special Interest Area Management Strategy (USDA 1998) has noted that past cross country travel has affected Sensitive and rare plants in the area and has identified as a possible management activity the use of signs to increase public awareness about the impacts of cross-country travel and nonconforming vehicular use of trails to the unique features for which the Lassics Botanical Area was established. To mitigate affects to botanical resources within the botanical area it is recommended that such signs be posted at dispersed camping areas associated with designated routes in the Lassics Botanical Area. Additionally, it is recommended that an "Entering Lassics Botanical Area" sign be placed where JM-2085 crosses the botanical area boundary.

Table 3.8-8 Unauthorized Routes Proposed for Addition to NFTS in Lassics Botanical Area Alternative 2

Route	Length Miles
JM-2085	0.22
JM-892	0.02
JM-894	0.15

Route	Length Miles
TH108	0.18
TH267	0.2
TH278	0.05
TH279	0.12
TH281	0.05

Routes proposed under this alternative do not enter Research Natural Areas, hence the number of miles of inventoried unauthorized routes added to the NFTS under this alternative is nil.

3. Direct/Indirect Effects of co-locating motorized trails on NFTTS closed roads, allowing mixed use on specified NFTS roads, changing vehicle class and converting NFTS motorized trails to NFTS horse/foot trails.

Short-term timeframe: 1 year. None. See "assumptions specific to botanical resources analysis".

Long-term timeframe: 20 years. None. See "assumptions specific to botanical resources analysis".

4. Cumulative Effects

Short-term timeframe: not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 20 years

Direct and indirect effects of current and foreseeable future projects involve: trampling or crushing plants; vegetation removal; soil disturbances; changes in hydrology; and changes in vegetation community composition and/or structure, including the introduction or spread of invasive plant species that may compete with rare plant species. The current and reasonably foreseeable future projects on Forest lands in the analysis area, and the nature and extent of their potential effects on botanical resources include:

Timber activities and fuel treatments – effects are variable based on treatment; prescribed burning – partial removal of vegetation in the short term, but retention of seed bank and root crown allowing for recovery; mowing – partial removal of canopy, change in vegetation community structure, low growing plants left intact; thinning – change in vegetation community structure; some crushing of vegetation associated with access and project implementation.

Wildland fire – wildland fire effects are similar to those described for prescribed burning, though in general wildland fires burn more intensely, potentially resulting in more severe effects on rare plant species, including a more likely increase in weed abundance.

Fire suppression – fire suppression effects, due primarily to fuel break, safety zone and staging area construction, are similar to timber activity and fuel treatment effects although the

effects are potentially greater due the emergency nature of these events that preclude planning to avoid all rare plant and Survey & Manage plant occurrences.

Livestock grazing – direct trampling of plants; changes in vegetation community dynamics, e.g. more grazing-resistant species gaining dominance; impacts to soil resource; changes in hydrologic processes.

Road and trail development or improvement, and urbanization – removal of vegetation; soil disturbance, erosion; impacts to hydrologic function.

Utility, irrigation, and highway easements - removal of vegetation, and soil disturbance in immediate vicinity of pipelines, ditches, highways; changes in vegetation condition within the easement due to utility line/highway/ditch maintenance; changes in hydrologic processes.

These activities are considered in the cumulative effects analysis for rare plants because they may contribute to the overall impacts on botanical resources through the complete or partial removal of vegetation, or through habitat alteration, with similar effects to those discussed for the proposed action. These impacts could add cumulatively to the potential impacts associated with implementation of alternative 1, by damaging individual plants, or affecting habitat, including impacts to the soil and/or hydrologic resources integral to habitat suitability.

Note, however, that for present and future actions, where possible, projects are designed to avoid impacts to rare plant occurrences. Where avoidance is not practical, mitigations are designed to minimize the number of individuals impacted, the severity of the impact, and the number of occurrences affected. As a result, the long-term impacts of present and future projects, while they may impact individual plants, generally have design features built in to prevent a long-term loss of viability or trend to Federal listing for sensitive species. While new ground disturbing projects and repeated disturbance from ongoing activities are factors in the continuing impacts to individual plants, the overall impacts are generally reduced compared to activities where no mitigation measures are implemented. Because of this and the fact that a relatively small number of acres of rare plant habitat are impacted under this alternative cumulative effects under alternative 2 are not expected to significantly increase either the number of acres of inventoried unauthorized routes open for motor vehicle use within core areas set aside to ensure rare plant species persistence, the number of acres of occupied suitable habitat for rare plant species within or adjacent to inventoried unauthorized routes open for motor vehicle use, the number of miles of inventoried unauthorized routes within Botanical Areas, nor the number of miles of inventoried unauthorized routes with Research Natural Areas.

3.8.4.3 Alternative 3 – Expanded Recreation.

Direct/Indirect Effects

1. Direct/Indirect Effects of the prohibition of cross-country motor vehicle travel:

Short-term timeframe: 1 year. Short term direct/indirect effects in terms of the number of occurrences and acres of habitat affected would be beneficial as use of existing unauthorized routes would discontinue.

Long-term timeframe: 20 years. Over the long term, through de-compaction of substrate and the return of native vegetation, suitable habitat could return to some areas with the potential to support rare plant species.

2. Direct/Indirect Effects of adding facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, including identifying seasons of use and vehicle class.

Short-term timeframe: 1 year. See analysis below.

Long-term timeframe: 20 years. See analysis below.

Alternative 3 proposes to add an additional 7.2 miles of inventoried unauthorized routes in addition to those analyzed under Alternative 2. Of these added routes 1.7 miles were surveyed. Surveys covered route surfaces, and route edges out to 100 feet on either side if suitable habitat was present and accessible and at dispersed camping sites associated with the routes surveyed. Field surveys did not find Sensitive plant species to be present on or adjacent to routes surveyed. Therefore, for those routes that were surveyed, there are no short term or long term direct/indirect effects of adding facilities to the NFTS, including seasons of use and vehicle class. The following table displays the additional routes that were surveyed under Alternative 3.

Table 3.8-9 Additional Routes Surveyed for Alternative 3

Route No	Miles
MM825	0.14
MM824	0.12
MM823	0.04
MM821	0.25
JM-2009	0.61
UALT0007r	0.50

Surveys were not performed 5.5 miles of inventoried unauthorized routes proposed for addition to the NFTS. A determination of effects on rare botanical species will be performed following completion of the surveys.

Field surveys were not performed for the following 5.49 miles of additional inventoried unauthorized routes that are proposed for addition under this alternative.

Table 3.8-10 Routes Not Surveyed Under Alternative 3

Route	Length Miles
JM-2023	0.16
JM-2051	0.71
JM-2053	0.65
JM722	0.34
PK751	1.07
PK843n	0.57
PK844	0.23
PK845	0.15
PK848s	0.05
PK850	0.09
PK851n	0.14
PK852	0.09
PK853	0.12

Route	Length Miles
PK854	0.10
PK855	0.05
PK856	0.61
PK857	0.36
Total Miles	5.49

Actions proposed under this alternative do not add acres of inventoried unauthorized routes open for motor vehicle use within core areas set aside to ensure persistence of rare plant species. Facilities added under this alternative are not within Tracy's sanicle core areas. However, individual plants outside of the core area may be affected. Therefore it is my determination that implementing Alternative 1 may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability for *Sanicula tracyi*.

The remaining 10 plant species analyzed occur in the 2 general habitat types as shown in Table 3.8-3. The following table displays potential direct effects and indirect effects (noted under "Assumptions specific to botanical resources analysis to habitat" earlier in this section) which are quantified by acres of potentially suitable habitat within 30 feet and 100 feet of the routes respectively. There are a total of 77.5 acres of rare plant habitat within the analysis area that could potentially be affected by cross-country travel, including the continued use of all unauthorized routes, under this alternative. Direct effects will potentially occur to approximately 16.7 acres. Indirect effects will potentially occur to approximately 60.8 acres.

Table 3.8-11 Acres of Rare Plant Habitat Affected By Alternative 3

	Acres within 30 ft	Acres within 100 ft
Mature Forest	14.2	53.3
Openings	2.5	7.5
Total	16.7	60.8

Field surveys of Openings and Mature Forest that represent potential Sensitive plant habitat will occur in late June to early July of 2009. The objective of the surveys will be to determine presence/absence of the Sensitive plant species shown in Table 3.8-3 – Sensitive and Survey & Manage Species Analyzed on LTRD and MRRD. If these species are found to be present, effects will be mitigated. If mitigation is not feasible, the routes will not be added to the NFTS if the action results in a loss of viability or a trend toward federal listing. If Survey & Manage species sites are found incidental to the Sensitive plant surveys, mitigations will be put into place that will assure species persistence at the site. If species persistence cannot be assured, the associated route will not be added to the NFTS.

There are no routes proposed within the Horse Mountain Botanical Area. The following 0.99 miles of inventoried unauthorized routes proposed for addition to the NFTS in this alternative are located in the Lassics Botanical Area. Field surveys of potential suitable Serpentine habitat within 100 feet of inventoried unauthorized routes have been completed. The habitat was found to be not be occupied by rare botanical species. Direct effects within 30 feet

of these routes by motorized vehicle to the distinctive serpentine vegetation found within is not compatible with the goal, set forth in the Special Interest Area Management Strategy (USDA 1998) of protecting the unique botanical features for which the botanical area was established. The Special Interest Area Management Strategy (USDA 1998) has noted that past cross country travel has affected Sensitive and rare plants in the area and has identified as a possible management activity the use of signs to increase public awareness about the impacts of cross-country travel and nonconforming vehicular use of trails to the unique features for which the Lassics Botanical Area was established. To mitigate affects to botanical resources within the botanical area it is recommended that such signs be posted at dispersed camping areas associated with designated routes in the Lassics Botanical Area. Additionally, it is recommended that an "Entering Lassics Botanical Area" sign be placed where JM-2085 crosses the botanical area boundary.

Table 3.8-12 Unauthorized Routes Proposed for Addition to NFTS in Lassics Botanical Area

Route	Length Miles
JM-2085	0.22
JM-892	0.02
JM-894	0.15
TH108	0.18
TH267	0.2
TH278	0.05
TH279	0.12
TH281	0.05

There are no known sites of rare botanical species within 100 feet of the inventoried routes. Routes proposed under this alternative do not enter Research Natural Areas, hence the number of miles of inventoried unauthorized routes added to the NFTS under this alternative is nil.

3. Direct/Indirect Effects of co-locating motorized trails on NFTS closed roads, allowing mixed use on specified NFTS roads, changing vehicle class and converting NFTS motorized trails to NFTS horse/foot trails.

Short-term timeframe: 1 year. None. See "assumptions specific to botanical resources analysis".

Long-term timeframe: 20 years. None. See "assumptions specific to botanical resources analysis".

4. Cumulative Effects

Short-term timeframe: not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 20 years

Direct and indirect effects of current and foreseeable future projects involve: trampling or crushing plants; vegetation removal; soil disturbances; changes in hydrology; and changes in vegetation community composition and/or structure, including the introduction or spread of invasive plant species that may compete with rare plant species. The current and reasonably foreseeable future projects on Forest lands in the analysis area, and the nature and extent of their potential effects on botanical resources include:

Timber activities and fuel treatments – effects are variable based on treatment; prescribed burning – partial removal of vegetation in the short term, but retention of seed bank and root crown allowing for recovery; mowing – partial removal of canopy, change in vegetation community structure, low growing plants left intact; thinning – change in vegetation community structure; some crushing of vegetation associated with access and project implementation.

Wildland fire – wildland fire effects are similar to those described for prescribed burning, though in general wildland fires burn more intensely, potentially resulting in more severe effects on rare plant species, including a more likely increase in weed abundance.

Fire suppression – fire suppression effects, due primarily to fuel break, safety zone and staging area construction, are similar to timber activity and fuel treatment effects although the effects are potentially greater due the emergency nature of these events that preclude planning to avoid all rare plant and Survey & Manage plant occurrences.

Livestock grazing – direct trampling of plants; changes in vegetation community dynamics, e.g. more grazing-resistant species gaining dominance; impacts to soil resource; changes in hydrologic processes.

Road and trail development or improvement, and urbanization – removal of vegetation; soil disturbance, erosion; impacts to hydrologic function.

Utility, irrigation, and highway easements - removal of vegetation, and soil disturbance in immediate vicinity of pipelines, ditches, highways; changes in vegetation condition within the easement due to utility line/highway/ditch maintenance; changes in hydrologic processes.

These activities are considered in the cumulative effects analysis for rare plants because they may contribute to the overall impacts on botanical resources through the complete or partial removal of vegetation, or through habitat alteration, with similar effects to those discussed for the proposed action. These impacts could add cumulatively to the potential impacts associated with implementation of alternative 1, by damaging individual plants, or affecting habitat, including impacts to the soil and/or hydrologic resources integral to habitat suitability.

Note, however, that for present and future actions, where possible, projects are designed to avoid impacts to rare plant occurrences. Where avoidance is not practical, mitigations are designed to minimize the number of individuals impacted, the severity of the impact, and the number of occurrences affected. As a result, the long-term impacts of present and future projects, while they may impact individual plants, generally have design features built in to prevent a long-term loss of viability or trend to Federal listing for sensitive species. While new ground disturbing projects and repeated disturbance from ongoing activities are factors in the continuing impacts to individual plants, the overall impacts are generally reduced compared to activities where no mitigation measures are implemented. Because of this and the fact that a relatively small number of acres of rare plant habitat are impacted under this alternative cumulative effects under alternative 3 are not expected to significantly increase either the number of acres of inventoried unauthorized routes open for motor vehicle use within core areas set aside to ensure rare plant species persistence, the number of acres of occupied suitable habitat for rare plant

species within or adjacent to inventoried unauthorized routes open for motor vehicle use, the number of miles of inventoried unauthorized routes within Botanical Areas, nor the number of miles of inventoried unauthorized routes with Research Natural Areas.

3.8.4.4 Alternative 4 – Prohibit Cross-Country Travel; Identify Current Seasonal Use and Vehicle Type; Block Wilderness Access.

Direct/Indirect Effects

1. Direct/Indirect Effects of the prohibition of cross-country motor vehicle travel;

Short-term timeframe: 1 year. Short term direct/indirect effects in terms of the number of occurrences and acres of habitat affected would be beneficial as use of existing unauthorized routes would discontinue.

Long-term timeframe: 20 years. Over the long term, through de-compaction of substrate and the return of native vegetation, suitable habitat could return to some areas with the potential to support rare plant species.

Spatial boundary: SRNF lands within 100 feet of inventoried unauthorized routes on Lower Trinity and Mad River Ranger Districts, excluding Wilderness Areas. Wilderness Areas are already closed to cross-country or any other motorized vehicles.

2. Direct/Indirect Effects of Identifying current seasonal use and vehicle type;

Short-term timeframe: 1 year. Over the short term direct/indirect there would likely be no effect, in terms of the number of occurrences and acres of habitat affected, by identifying current season of use. There are no short term effects from changing vehicle type because all vehicles are assumed to be equal.

Long-term timeframe: 20 years. Over the long term, effects in terms of the number of occurrences and acres of habitat affected by identifying current season of use could be beneficial as motorized vehicle use of unsurfaced roads, trails, and open areas increases sediment production and erosion which could negatively affect rare botanical species. Identifying a season of use potentially limits wet weather use of routes thereby reducing potential sedimentation over time.

3. Direct/Indirect effects of blocking wilderness access;

Short-term timeframe: 1 year. Over the short term direct/indirect there would likely be no effect, in terms of the number of occurrences and acres of habitat affected, by identifying blocking wilderness access.

Long-term timeframe: 20 years. Over the long term, through de-compaction of substrate and the return of native vegetation, suitable habitat could return to some areas with the potential to support rare plant species.

4. Cumulative Effects

Short-term timeframe: not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 20 years

Since there are no negative direct or indirect effects associated with alternative 4, only beneficial effects, there are no cumulative effects.

3.8.5 Summary of Effects Analysis Across All Alternatives

Table 3.8-13 Comparison of Effects to Botanical Resources

Indicators – Botanical Resources	Rankings of Alternatives for Each Indicator[1]			
	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Arces of inventoried unauthorized routes within or adjacent to occurrences or known sites of botanical species or within or adjacent to suitable habitat (if potential habitat has not been surveyed) for botanical species .	1	3	2	4
Number of occurrences or known sites of botanical species within or adjacent to inventoried unauthorized routes.	1	3	2	4
Acres of inventoried unauthorized routes within Botanical Areas.	1	3	2	4
Average for Botanical Resources	**1**	**3**	**2**	**4**

[1] A score of 4 indicates the alternative has the least impact for botanical resources related to the indicator; A score of 1 indicates the alternative has the most impact for botanical resources related to the indicator.

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3.9 Noxious Weeds

Motorized vehicles contribute to the introduction and spread of noxious weed species by creating suitable environmental conditions for establishment and by acting as a major vector for spread (Trombulak and Frissell 2000). Vehicle travel is a major factor/vector in the introduction and spread of noxious weeds, so this project affects the population and distribution of these species. Additionally, the Chief of the Forest Service has determined that invasive species are one of four significant threats to forests and rangelands. The presence of these invaders affects many other resources, such as soil, wildlife habitat, and sensitive plants, so it is important to analyze and understand the effects of the project on noxious weed populations.

3.9.1 Analysis Framework: Statute, Regulation, Forest Plan, and

Direction relevant to the proposed action that is relevant to the management and prevention of noxious weeds includes:

FSM 2081.03 requires that a weed risk assessment be conducted when any ground disturbing activity is proposed. Projects having moderate to high risk of introducing or spreading noxious weeds must identify noxious weed control measures that must be undertaken during project implementation.

Executive Order 13112 of Feb. 3, 1999, directs federal agencies to: prevent the introduction of invasive species; detect and respond rapidly to and control such species; not authorize, fund, or carry out actions that the agency believes are likely to cause or promote the introduction or spread of invasive species unless the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

3.9.2 Six Rivers Land and Resource Management Plan (LRMP)

The LRMP contains the following standards and guidelines for mitigating the introduction and spread of weeds:

- Invasive exotic species shall be prioritized and selected for management action based on their disruptive nature, distribution and the feasibility of successful control.
- 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.
- Off-site materials (i.e. mulch, imported soil, construction materials) shall be screened for the presence of invasive exotic plant materials. Materials known to be free of invasive exotics, such as rice straw mulch, should be used wherever practicable.
- Site treated to eradicate invasive exotic plant species shall receive follow-up monitoring.

In 2001 Six Rivers National Forest (SRNF) approved a standardized method for assessing the risk of introducing or spreading noxious weeds related to proposed actions. The major goal

of the noxious weed risk assessment is to serve as a first step in a strategy aimed at reducing management-related introduction and spread of noxious weeds on the Forest. Risk assessment is essential for implementing direction contained in Forest Service Manual 2081.03 which requires that a risk assessment for noxious weeds be completed for proposed actions that will result in ground disturbance.

The risk assessment uses five factors to analyze the risk of introducing or spreading weeds, and it includes a list of weeds that are of most concern on SRNF. Utilizing an interdisciplinary process, a written narrative is prepared, analyzing each factor in relation to the proposed action. The resulting document, which forms the basis of the assessment, is included as part of the NEPA documentation for the project. Analyses that result in a moderate to high risk shall include measures to mitigate the risk of introduction or spread.

3.9.3 Effects Analysis Methodology

Noxious weed species considered in this analysis are those that occur on the Lower Trinity Ranger District (LTRD) and the Mad River Ranger District (MRRD). They are listed in Table 3.9-1 below. The species being considered are invasive non-native plants that possess one or more of the characteristics of an invasive weed and are undesirable on national forest lands.

Based on Executive Order 13112, issued in 1999, a species is considered invasive if it: a) is nonnative to the ecosystem under consideration, and b) its introduction causes or is likely to cause economic or environmental harm or harm to human health. This analysis addresses invasive plant species from the California state agriculture department lists of noxious weeds (CDFA, NDA), and the California Invasive Plant Council list of invasive plants (CalIPC).

All of the weed species identified on the Forest are of concern with regard to their potential to spread and threaten native ecosystems; however, the Forest has prioritized weed species and infestations for treatment based on the aggressiveness of the weed species, whether or not the infestations are isolated satellite populations, the feasibility of control, and the degree of regional concern and cooperative efforts on Forest. Control of weeds on SRNF is achieved via hand pulling. One weed species, medusa head (‘*Taeniatherum caput-medusae*), was removed from this analysis because control is not feasible with these limited tools as it occupies extensive grassland habitat on the MRRD. Species that are rated ‘A’ or ‘B’ by CDFA, or CalIPC species with a rating of “High”, or species for which the Humboldt-Del Norte Weed Management Area have rated as high priority are rated as high priority species for the purposes of this analysis. The potential spread of these species would constitute a moderate or high risk with regard to the requirements of FSM 2081.03.

Treatment of high priority species adjacent to designated routes is required, and is included in the route-specific description of alternatives in this EIS. Control of all known infestations of lower priority species is not currently feasible, and they are likely to persist throughout the life of this project.3.8.3

3.9.3.1 Assumptions specific to the noxious weed analysis:

1. Actions proposed herein are ground disturbing activities requiring a weed risk assessment. This analysis constitutes the risk assessment.
2. Where no information on weed populations is available, it is assumed that the risk of spread is high.

3. For action alternatives vehicle use on unauthorized routes proposed for addition to the NFTS use will remain at current levels of light (less than 25 vehicle trips per week) or low (25 to 100 trips per week).
4. When completing this risk assessment, the following categories were assigned to individual routes to compare the effects of noxious weed spread or introduction from this project: high, medium, or low. These categories were assigned based on the following factors:
    - The risk of spread or introduction was considered high if the species is rated as highly invasive (see Table 3.8-1 - "Invasive Species Considered").
    - The risk of spread or introduction was classified as medium if the weed species is not listed as highly invasive (this includes species with lower ratings on CalIPC and state lists, or species that are already fairly well distributed).
    - The risk of introduction or spread from this project was considered low if existing inventories demonstrated that weed populations are not present along the route, or infestations are present, but the route is not proposed for designation.

5. In general, attempting to quantify effects associated with potential future cross-country travel is speculative at best because it is impossible to predict exactly where, when, or how such use would occur.

Table 3.9-1 Invasive Species Known to Occur on LTRD and MRRD

Scientific Name	Common Name	[3]CDFA Rating	[4]Cal-IPC Priority Rating	Weed Mgt. Area Priority Rating	Potential to Establish and Spread
Carduus acanthoides	plumeless thistle	A	Low	None	Low
Carduus pycnocephalus	Italian thistle	C	Medium	None	Low
Centaurea diffusa	white knapweed	A	Medium	High	High
Centaurea maculosa	spotted knapweed	A	High	High	High
Centaurea melitensis	Maltese star-thistle	None	Medium	High	High
Centaurea solstitialis	yellow star-thistle	C	High	High	High
Cirsium arvense	Canada thistle	A	Medium	Moderate	Medium
Cytisus scoparius	scotchbroom	C	High	High	High
Genista monspessulana	French broom	C	High	High	High

[3] See appendix F for definition of California Department of Food and Agriculture (CDFA) ratings.
[4] See appendix F for definition of California Invasive Plant Council (Cal-IPC) ratings.

Scientific Name	Common Name	[3]CDFA Rating	[4]Cal-IPC Priority Rating	Weed Mgt. Area Priority Rating	Potential to Establish and Spread
Hypericum perforatum	St. Johnswort	C	Medium	Moderate	Low
Linaria genistifolia ssp. dalmatica	dalmatian toadflax	A	Medium	High	High
Robinia pseudoacacia	black locust	None	Low	None	Low
Senecio jacobaea	stinking willie	B	Low	Low	Low
Spartium junceum	Spanish broom	None	High	None	Low

Impacts relevant to noxious weeds include:

1. Existing weed infestations will likely spread and the rate of spread will be increased by vehicular activity.
2. Infestations located along routes where vehicles drive will spread further along the route.
3. Motor vehicles will bring weed seeds and propagative parts from home areas and other areas where they traveled.

3.9.3.2 Data Sources:

1. Route specific weed data, including results of route-specific surveys for invasive species.
2. GIS layers and associated tabular data sets of the following data: routes, surveys, invasive species.
3. Forest invasive plant files.
4. NRIS TESP/Invasives database.

Noxious Weeds Indicators:

Risk of noxious weed spread.

Noxious Weed Methodology by Action:

1. **Direct/Indirect Effects of continued travel off of designated NFTS roads and NFTS trails.**

Short-term timeframe: 1 year. Short term effects in terms of the number of occurrences and acres of habitat affected would be the same as the current situation as use of existing unauthorized routes would continue.

Long-term timeframe: 20 years. Climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this time frame speculative. Over the long term, possible increases in use levels on existing routes and the potential establishment of new routes

through unauthorized cross-country travel, could impact an undetermined additional number of occurrences, and cause more pervasive and severe impacts to potential habitat.

Spatial boundary: : Forest Service lands on LTRD and MRRD within 100 feet of inventoried unauthorized routes on Lower Trinity and Mad River Ranger Districts, excluding Wilderness Areas. Wilderness Areas are already closed to cross-country or any other motorized vehicle travel.

Indicator(s): Risk of noxious weed spread.

Methodology: GIS analysis of existing unauthorized routes.

Rationale: The indicator addresses the potential for additional weed spread from existing propagule sources being transported by motorized vehicles traveling cross-country, and will serve to compare the risk of each alternative. The distance where the effects of vehicle travel related to the introduction and spread of weeds may occur is estimated to be approximately 100 feet from existing routes. Weed seeds or other propagules can be transported up to 100 feet away from the immediate road area by wind, gravity, water, etc. Weed occurrences further than 100 feet from designated routes are not likely to be spread by vehicles, nor will suitable weed habitat be created further than 100 feet from designated routes; these areas are therefore excluded from the spatial boundary for the analysis of effects of adding facilities.

2. **Direct/Indirect Effects of adding inventoried unauthorized routes to the National Forest Transportation System (NFTS or system), including identifying seasons of use and vehicle class.**

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Forest Service lands on LTRD and MRRD within 100 feet of inventoried unauthorized routes on Lower Trinity and Mad River Ranger Districts, excluding Wilderness Areas. Wilderness Areas are already closed to cross-country or any other motorized vehicle travel.

Indicator(s): Risk of noxious weed spread.

Methodology: GIS analysis of existing unauthorized routes.

Rationale: These indicators address the potential for additional weed spread from existing propagule sources being transported by motorized vehicles traveling cross-country, and will serve to quantitatively compare the risk of each alternative. The distance where the effects of vehicle travel related to the introduction and spread of weeds may occur is estimated to be approximately 100 feet from existing routes. Weed seeds or other propagules can be transported up to 100 feet away from the immediate road area by wind, gravity, water, etc. Weed occurrences further than 100 feet from designated routes are not likely to be spread by vehicles,

nor will suitable weed habitat be created further than 100 feet from designated routes; these areas are therefore excluded from the spatial boundary for the analysis of effects of adding facilities.

3. **Changes to the existing NFTS, including changes in mitigation prior to designation; co-locating motorized trails on NFTS closed roads; allowing mixed use; changing vehicle class; converting motorized trails to NFTS horse/foot trails.**

It is assumed that one vehicle is as likely as another to pick up weed propagules and spread them to other localities; therefore, there are no differences in effects on invasive species due to changes proposed to the existing NFTS under any of the alternatives, including season of use changes; therefore, this action will not be discussed further in this analysis.

4. **Prohibition of cross country travel**

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Forest Service lands on LTRD and MRRD within 100 feet of inventoried unauthorized routes on Lower Trinity and Mad River Ranger Districts, excluding Wilderness Areas. Wilderness Areas are already closed to cross-country or any other motorized vehicle travel.

Indicator(s): Risk of noxious weed spread.

Methodology: GIS analysis of existing unauthorized routes.

Rationale: These indicators address the potential for additional weed spread from existing propagule sources being transported by motorized vehicles traveling cross-country, and will serve to quantitatively compare the risk of each alternative. . The distance where the effects of vehicle travel related to the introduction and spread of weeds may occur is estimated to be approximately 100 feet from existing routes. Weed seeds or other propagules can be transported up to 100 feet away from the immediate road area by wind, gravity, water, etc. Weed occurrences further than 100 feet from designated routes are not likely to be spread by vehicles, nor will suitable weed habitat be created further than 100 feet from designated routes; these areas are therefore excluded from the spatial boundary for the analysis of effects of adding facilities

Cumulative Effects

Short-term timeframe: not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 20 years

Spatial boundary: Forest Service lands on LTRD and MRRD within 100 feet of inventoried unauthorized routes added to the NFTS.

Indicator(s): Risk of noxious weed spread.

Methodology: GIS analysis of weed occurrences, existing system roads, and unauthorized routes proposed for addition, buffered by appropriate distances.

Rationale: These indicators address the potential for additional weed spread from existing propagule sources being transported by motorized vehicles traveling cross-country, and will serve to quantitatively compare the risk of each alternative. The distance where the effects of vehicle travel related to the introduction and spread of weeds may occur is estimated to be approximately 100 feet from existing routes. Weed seeds or other propagules can be transported up to 100 feet away from the immediate road area by wind, gravity, water, etc. Weed occurrences further than 100 feet from designated routes are not likely to be spread by vehicles, nor will suitable weed habitat be created further than 100 feet from designated routes; these areas are therefore excluded from the spatial boundary for the analysis of effects of adding facilities

3.9.4 Affected Environment

Current knowledge of weed species on the LTRD and the MRRD on SRNF is based upon weed inventory and mapping that has occurred since 1999. With the exception of the open habitats on the Mad River Ranger District (e.g. grasslands), most of the weed infestations on the Forest are distributed along relatively well-traveled roads, along turn-outs, near developments, and other disturbed areas. The level of weed infestations associated with roads tends to be directly proportional to the level of use and weeds are most abundant along state highways (i.e. from south to north Highways 36, 299 and 96). Hence, in general, weed infestations tend to be encountered less frequently the farther one moves from major travel corridors. Infestations located away from these disturbance corridors represents the leading edge of their advance where efforts to stop the spread of weeds is most practical and where treatment should be the highest priority.

The table that follows show the current number of weed sites, by species, on Lower Trinity and Mad River Ranger Districts. Sites listed are distinct units. The number of sites typically does not include County roads, State Highways or occurrences on private lands.

Table 3.9-2 Number of Weed Sites on LTRD and MRRD By Species

Weed Species	Number of Sites	Potential to Establish and Spread
CAAC	1	Low
CAPY2	2	Low
CEDI3	25	High
CEMA4	8	High
CEME2	7	High
CESO3	191	High
CIAR4	23	Medium
CYSC4	24	High

Weed Species	Number of Sites	Potential to Establish and Spread
GEMO2	4	High
LIGED	2	High
ROPS	1	Low
SEJA	1	Low
SPJU2	1	Low
TACA8	97	N/A
Grand Total	**387**	

3.9.5 Environmental Consequences

A University of Wisconsin study (Rooney 2003) found that motorized vehicles did pick up and disperse weeds and that the probability of colonization increased with increasing traffic. They noted that many species have seed characteristics that predispose them for vehicular dispersal. The authors recommended removing exotic species from a trail every year to reduce both the spread of weeds along the trail and to reduce the inter-trail colonization rate.

Impacts to native plants and changes in habitat can lead to the eventual replacement of native plant species with non-native species more adapted to frequent disturbances and altered soil conditions, such as invasive non-native species (weeds). Many invasive species have life forms that are adapted to persist in disturbed habitats such as roadsides and areas with frequent vehicle use. Compaction by vehicles also contributes to roadside invasions of exotic plant species by reducing native plant vigor and creating areas of competition-free space that are open to invasion (Trombulak & Frissell 2000). Trombulak & Frissell (2000) report the spread of exotics by vehicles through habitat alteration and creation or maintenance of movement corridors. Vehicle use may also result in a reduction in the vigor of native species, which can lead to an increased competitive advantage for exotics. Once established, many invasive plants tend to form monocultures which exclude native plant species.

In heavily infested areas, weeds directly compete with native plants and can cause their local displacement. In addition, weeds can have a number of indirect effects. Potential impacts include alteration of disturbance regimes (including wildfire), loss of biodiversity, changes in the food base for wildlife species, soil erosion and loss of soil carbon storage, changes in soil moisture patterns, decreases in range or forest productivity, and altered recreational or aesthetic values. Weeds may also hybridize with native species altering native plant genetics. When native plants are replaced by weeds, the entire ecosystem can be impacted, including microbial flora and fauna and insect pollinators, all of which contribute to normal ecosystem function.

Effects from invasive species will continue to occur under all alternatives. Alternatives with fewer routes open for public wheeled motorized vehicle use, especially those that exclude routes that are currently weed infested, provide a reduced risk for vectoring of seeds by motorized vehicles, a reduction in habitats susceptible to weed invasion, and a reduced opportunity for the spread of weeds to uninfested areas of the forest.

3.9.5.1 Alternative 1 – No action

Direct/Indirect Effects:

1. **Direct/Indirect Effects of continued travel off of designated NFTS roads and NFTS trails.**

As per Table 3.8-2 (Number of Weed Sites on LTRD and MRRD by Species) of the 387 weed sites known to occur on LTRD and MRRD 259 of these sites have weed species with a high potential to be introduced and spread by cross-country motorized vehicle travel under this alternative. The entire analysis area could potentially be affected by cross-country travel, though some areas are more susceptible than others. Under this alternative, all existing weed occurrences within the analysis area may be susceptible to being spread further both within and beyond the analysis area. In addition, soil disturbance from motorized vehicles could become more widespread throughout the area in places where cross-country travel occurs, enhancing conditions for the establishment of new weed occurrences.

Continued weed spread and the introduction of new invasive species is most likely in those areas adjacent to or near existing unauthorized routes, as they will continue to receive use, and areas that are most susceptible to cross-country travel, e.g. those areas with sparse and/or low growing vegetation, or more gentle topography. Fifty-eight weed sites with high spread potential are within 100 feet of unauthorized routes(shown in Table 3.9-3 – Weed Sites Within 100 Feet of Unauthorized Routes with High Spread Potential). While all of the unauthorized routes would continue to receive use, none of them are proposed for designation under this alternative.

Table 3.9-3 Weed Sites Within 100 Feet of Unauthorized Routes with High Spread Potential

Route	Weed Species	Weed Site ID	Acres
JM-2079	yellow star-thistle	05105401PFB25 05105401PFB27 05105402PFB160 05105402PFB162 53CESO08NRM	4.0 6.3 1.5 0.7 0.1
JM-2080	diffuse knapweed	05105401PFB27	6.3
JM-2089	yellow star-thistle	53CESO08NRM022	0.1
JM-2090	yellow star-thistle	54CESO08NRM022 54CESO08NRM023 54CESO08NRM024 54CESO08NRM025	0.1 0.1 0.1 0.1
JM-2112	yellow star-thistle	05105498PFB57	1.0
JM-2123	yellow star-thistle	05105498PFB57	1.0
JM795	yellow star-thistle	05105402PFB162	0.7
JM858	yellow star-thistle	54CESO2006001	5.4
MM790	scotchbroom	53CYSC08NRM003 53CYSC09JDM02	0.2 0.1
MM791w	French broom	05105303CCS001	0.1
MM793	scotchbroom	53CYSC08NRM003	0.2
MM813	scotchbroom	53CYSC08NRM005	0.1
MM815	yellow star-thistle	05105301PFB52	1.0
MM817	scotchbroom yellow star-thistle French broom	53CYSC08NRM006A 53CESO08NRM006B 53GEMO08NRM007	0.1 0.1 0.1
MM833	French broom	53GEMO08NRM007	0.1
MM836	yellow star-thistle	53CESO08NRM009	0.1

Route	Weed Species	Weed Site ID	Acres
MM838	yellow star-thistle	05105398PFB18 53CESO08NRM09 53CESO08NRM010 53CESO08NRM011	0.2 0.1 0.1 0.1
MM839	yellow star-thistle	53CESO08NRM012 53CESO08NRM013 53CESO08NRM014 53CESO08NRM015	0.1 0.1 0.1 0.1
MM842	yellow star-thistle	53CESO08NRM016	0.1
MM843	yellow star-thistle	05105398PFB20	0.1
MM848	yellow star-thistle	05105398PFB20	0.6
MM849	yellow star-thistle	05105398PFB19	0.1
MM850	yellow star-thistle	53CESO08NRM018 05105398PFB19	0.0.2
MM852	yellow star-thistle	53CESO08NRM17	0.1
MM856	yellow star-thistle	53CESO08NRM19	0.2
PK804	scotchbroom	05105301PFB88 53CYSC08NRM004	0.2 0.1
PK816	yellow star-thistle	54CESO08NRM026	0.1
PK822	yellow star-thistle	53CESO08NRM001 53CESO08NRM002	0.1 0.1
PK851	diffuse knapweed	05105401PFB40	1.0
PK857x	yellow star-thistle	05105498PFB57	1.0
SS103	diffuse knapweed	05105403CCS001	0.5
TH128	diffuse knapweed	05105403CCS006B	32.7
TH129	diffuse knapweed	05105403CCS006B	32.7
TH137	yellow star-thistle	05105401PFB59	0.3
TH178	diffuse knapweed	051054CBC002	0.1
TH223	diffuse knapweed	05105401PFB62 05105498PFB63 05105498PFB64 05105498PFB66 05105403CLS001 05105404CCS002	0.8 0.8 1.4 1.3 0.6 0.6
TH227	diffuse knapweed	05105401PFB62 05105498PFB63 05105498PFB64 05105498PFB66 05105403CLS001 05105404CCS002	0.8 0.8 1.4 1.3 0.6 0.6
TH228	diffuse knapweed	05105401PFB63	0.5
TH349	yellow star-thistle	05105498PFB57	1.0

There is no mitigation recommended under the No Action alternative, so the only weed control that would occur would be completed under other program objectives, and not according to any timeline associated with travel management. As a result, over the long term, existing weed infestations in the analysis area are more likely to continue to spread via motorized vehicle use, and new weeds are more likely to be introduced to the area under this alternative, as compared to any of the action alternatives. In the short term, the effects of this alternative are similar to the condition described in the Affected Environment section of this document.

2. **Direct/indirect effects of adding unauthorized routes to the NFTS:**

There will be no facilities added under the No Action alternative. Existing unauthorized routes will continue to receive use under this alternative; resulting effects are addressed by the

management indicators above in the "prohibition of cross-country travel" section. The total number of high risk routes is equal to the number of inventoried unauthorized routes and, as such, the risk rating for spreading weeds under this alternative is high.

3. **Cumulative Effects:**

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one can not reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Third, public scoping for this project did not identify any public interest or need for detailed information on individual past actions. Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions."

The cumulative effects analysis in this EIS is also consistent with Forest Service National Environmental Policy Act (NEPA) Regulations (36 CFR 220.4(f)) (July 24, 2008), which state, in part:

> CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal for agency action or its alternatives will add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered (including past, present, and reasonable foreseeable future actions) on the affected environment. With respect to past actions, during the scoping process and subsequent preparation of the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some contexts be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decisionmaking. (40 CFR 1508.7)

For these reasons, the analysis of past actions in this section is based on current and reasonably foreseeable future environmental conditions. The current and reasonably foreseeable future projects on Forest lands in the analysis area, and the nature and extent of their potential effects on introducing and spreading noxious weeds include:

Timber activities and fuel treatments – effects are variable based on treatment; prescribed burning – partial removal of vegetation in the short term; mowing – partial removal of canopy, change in vegetation community structure, low growing plants left intact; thinning – change in vegetation community structure; some crushing of vegetation associated with access and project implementation.

Wildland fire – wildland fire effects are similar to those described for prescribed burning, though in general wildland fires burn more intensely, potentially resulting in a more likely increase in weed abundance.

Fire suppression – fire suppression effects, due primarily to fuel break, safety zone and staging area construction, are similar to timber activity and fuel treatment effects although the effects are potentially greater due the emergency nature of these events that preclude planning to treat infestation prior to action.

Livestock grazing – direct trampling of plants; changes in vegetation community dynamics, e.g. more grazing-resistant species gaining dominance; impacts to soil resource; changes in hydrologic processes, movement of propagules internally and externally.

Road and trail development or improvement, and urbanization – removal of vegetation; soil disturbance, erosion; impacts to hydrologic function, weeds predisposal for vehicular dispersal, creation of movement corridors.

Utility, irrigation, and highway easements - removal of vegetation, and soil disturbance in immediate vicinity of pipelines, ditches, highways; changes in vegetation condition within the easement due to utility line/highway/ditch maintenance; changes in hydrologic processes.

These activities are considered in the cumulative effects analysis because they may contribute to the overall spread of noxious weeds with similar effects to those discussed for Alternative 1. Because the risk of introducing and spreading weeds under Alternative 1 is at the highest risk rating, cumulative effects from other actions would only contribute to and not elevate the high risk of introducing or spreading noxious weeds under this alternative.

3.9.5.2 Alternative 2 – Proposed Action.

Direct/Indirect Effects

1. Direct/Indirect Effects of the prohibition of cross-country motor vehicle travel:

Compared to the no action alternative, the prohibition of cross-country motorized vehicle travel under this alternative would result in a reduced incidence of weed introductions and a reduced risk of the spread of weed propagules from existing weed occurrences along those inventoried unauthorized routes that would not be added to the NFTS and therefore would not be available for public use. The transport of weed propagules and the corresponding expansion of populations, and creation of suitable weed habitat would not result from motor vehicle use on these routes. This would result in an equivalent reduction in the potential impact to native ecosystems over the long term compared to the no action alternative. Short term effects include an immediate reduced risk of introducing new and/or spreading existing weed occurrences.

2. **Direct/Indirect Effects of adding facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, including identifying seasons of use and vehicle class.**

Field surveys were conducted in those areas where weed species had the greatest potential to occur (i.e. near existing infestations or in open non forested habitats). The following table displays inventoried unauthorized routes surveyed that are proposed for designation and their associated mileage.

Table 3.9-4 Routes Surveyed for Alternative 2

Route No	Miles
TH223	1.48
TH227	0.36
JM-2079	3.14
JM-2087	1.18
JM-2085	0.89
JM954	0.24
JM955	0.42
JM956	0.25
JM979	0.29
JM982	0.23
JM-2090	1.97
JM-2095	1.67
JM-2096n	0.70
JM-2097	2.23
JM-2097	0.88
JM-2098	0.33
UAMR0034r	0.11
UAMR0034r	0.13
JM957	0.03
PK857	0.09
JM-2102	0.63
JM-2123	0.16
JM-2016	0.26
JM-2112	0.03
JM-2119	0.04
PK815	0.10
TH1011	0.08
TH1013	0.09
PK817	0.01
JM947	1.83
MM790	0.64
MM791	0.70
M811	0.20
MM816	0.30
MM817	0.82
MM828	0.47
MM830	0.35
MM832	0.17

Route No	Miles
MM833	0.13
PK813	0.04
PK821	0.63
PK822	0.68
MM791	0.13

The following table shows inventoried unauthorized routes that were found to have occurrences of weeds with high spread potential.

Table 3.9-5 Inventoried Unauthorized Routes on LTRD and MRRD with High Priority Weeds

Route ID	Weed Species	Weed Site ID	Acres
JM-2079	yellow star-thistle	53CESO08NRM 05105401PFB25 05105401PFB27 05105402PFB162 05105402PFB160	0.1 4.0 6.3 1.5 0.7
JM-2080	diffuse knapweed	05105401PFB27	6.3
JM-2090	yellow star-thistle	53CESO08NRM022 53CESO08NRM023 53CESO08NRM024 53CESO08NRM025	0.1 0.1 0.1 0.1
JM-2112	yellow star-thistle	05105498PFB57	1.0
JM-2123	yellow star-thistle	05105498PFB57	1.0
JM858	yellow star-thistle	54CESO2006001	5.4
MM790	scotchbroom	53CYSC08NRM003 53CYSC09JDM02	0.2 0.1
MM791w	French broom	05105303CCS001	0.1
MM813	scotchbroom	53CYSC08NRM005	0.1
MM815	yellow star-thistle	05105301PFB52	1.0
MM817	French broom scotchbroom yellow star-thistle	53GEMO08NRM007 53CYSC08NRM00a 53CESO08NRM006b	0.1 0.1 0.1
MM833	French broom	53GEMO08NRM007	0.1
MM836	yellow star-thistle	53CESO08NRM009	0.1
MM838	yellow star-thistle	05105398PFB18 53CESO08NRM09 53CESO08NRM010 53CESO08NRM011	0.2 0.1 0.1 0.1
MM839	yellow star-thistle	53CESO08NRM012 53CESO08NRM013 53CESO08NRM014 53CESO08NRM015	0.1 0.1 0.1 0.1
MM842	yellow star-thistle	53CESO08NRM016	0.1
MM850	yellow star-thistle	53CESO08NRM018 05105398PFB19	0.1 0.2
MM852	yellow star-thistle	05105398PFB17	0.1
PK804	scotchbroom	05105301PFB88 53CYSC08NRM004	0.2 0.1

Route ID	Weed Species	Weed Site ID	Acres
PK857x	yellow star-thistle	05105498PFB57	1.0
TH227	diffuse knapweed	05105401PFB62 05105401PFB63 05105401PFB64 05105401PFB66 05105403CLS001 05105404CCS002	0.8 0.8 1.4 1.3 0.6 0.6
TH223	diffuse knapweed	05105401PFB62 05105498PFB63 05105498PFB64 05105498PFB66 05105403CLS001 05105404CCS002	0.8 0.8 1.4 1.3 0.6 0.6
TH349	yellow star-thistle	05105498PFB57	1.0

These routes with high priority rated known weed infestations pose the greatest threat from the continued spread of the most invasive species in the short term. It is recommended that the following mitigations in Table 3.8-6 be incorporated as project design features to reduce the risk of spread of these weeds from a high to a low risk.

Table 3.9-6 Mitigations to Reduce the Risk of Spread of Weeds

Weed Species	Mitigation/Treatment
French broom	Remove all plants in their entirety from travel way and turnouts at all sites associated with each infested route year one before placing route on the Motor Vehicle Use Map in year two. Treatment shall occur twice during the year, once early before seed set and a second time to capture any seedlings emerging later in the season.
scotchbroom	Remove all plants in their entirety from travel way and turnouts at all sites associated with each infested route year one before placing on the Motor Vehicle Use Map in year two. Treatment shall occur twice during the year, once early before seed set and a second time to capture any seedlings emerging later in the season.
diffuse knapweed	Remove all plants in their entirety from travel way and turnouts at all sites associated with each infested route in year one. Treatment shall occur twice during the year, once early before seed set and a second time to capture any seedlings emerging later in the season. Travel way and turnouts must be field verified as weed free at the end of the growing season in year two with effective treatment (no diffuse knapweed the year after last treatment) before placing associated routes on the Motor Vehicle Use Map.
yellow star-thistle	Remove all plants in their entirety from travel way and turnouts at all sites associated with each infested route. Treatment shall occur twice during the year, once early before seed set and a second time to capture any seedlings emerging later in the season. Travel way and turnouts must be field verified as weed free at the end of the growing season year two with effective treatment (no yellow star-thistle the year after last treatment) before placing associated routes on the Motor Vehicle Use Map.

These mitigations are to be implemented for each site noted in Table 3.8-5 - Inventoried Unauthorized Routes on LTRD and MRRD with High Priority Weeds before placing the routes on the Motor Vehicle Use Map. The goal is control of the weed species at the site prior to allowing use. In order to prevent the spread of seed during treatment, treatment should begin in late May early June, before weed species set seed. Control of yellow star-thistle and diffuse knapweed cannot be accomplished with a single treatment or in a single year, hence the

mitigation requires several years of treatment prior to placing the inventoried unauthorized route on the Motor Vehicle Use Map. Repeat treatments during the year, both to treat plants missed the first time and to treat plants that germinate after rainfall is required to effectively control occurrences.

Over the long term, the risk of continued spread of the current high priority infestations would be reduced to low. Routes with weed infestations and no mitigation would continue to be a contributing factor in the spread of existing weeds, and all designated routes (196 miles in this alternative) will provide an avenue for the introduction of new invasive species, and the dispersal of any newly established infestations along those routes. With implementation of the mitigations noted Alternative 2 has the lowest risk for the introduction of new weed species and the spread of existing infestations to un-infested areas of the Forest of all the action alternatives.

3. **Direct/Indirect Effects of co-locating motorized trails on NFTTS closed roads, allowing mixed use on specified NFTS roads, changing vehicle class and converting NFTS motorized trails to NFTS horse/foot trails.**

There are no effects associated with the following changes to the existing NFTS routes including allowing mixed use, changing vehicle class, identifying season of use and converting NFTS motorized trails to NFTS horse/foot trails. These changes to routes already in use do not substantially increase the risk of spreading weeds.

Co-locating motorized trails on NFTTS closed roads could potentially spread weeds on existing NFTS roads that have been closed to public use. These roads were surveyed and high priority weeds were found on the following roads shown in Table 3.9-7 – Roads Proposed for Co-located Use with High Priority Weeds;

Table 3.9-7 Roads Proposed for Co-located Use with High Priority Weeds

Road Number	Weed Species	Weed Site IDs
7N16	scotchbroom yellow star-thistle	53CYSC08NRM003a 53CESO09JDM02
7N15	yellow star-thistle	53CESO09JDM01

Opening these roads to public use without mitigation creates a high risk of spreading of yellow-star. Mitigations shown in Table 3.8-6 - Mitigations to Reduce the Risk of Spread of Weeds need to be implemented prior to placing these roads on the Motor Vehicle Use Map in order to change the risk to low.

Cumulative Effects:

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental

impacts of individual past actions, and one can not reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Third, public scoping for this project did not identify any public interest or need for detailed information on individual past actions. Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions."

The cumulative effects analysis in this EIS is also consistent with Forest Service National Environmental Policy Act (NEPA) Regulations (36 CFR 220.4(f)) (July 24, 2008), which state, in part:

> CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal for agency action or its alternatives will add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered (including past, present, and reasonable foreseeable future actions) on the affected environment. With respect to past actions, during the scoping process and subsequent preparation of the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some contexts be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decisionmaking. (40 CFR 1508.7)

For these reasons, the analysis of past actions in this section is based on current and reasonably foreseeable future environmental conditions. The current and reasonably foreseeable future projects on Forest lands in the analysis area, and the nature and extent of their potential effects on introducing and spreading noxious weeds include:

Timber activities and fuel treatments – effects are variable based on treatment; prescribed burning – partial removal of vegetation in the short term; mowing – partial removal of canopy, change in vegetation community structure, low growing plants left intact; thinning – change in vegetation community structure; some crushing of vegetation associated with access and project implementation.

Wildland fire – wildland fire effects are similar to those described for prescribed burning, though in general wildland fires burn more intensely, potentially resulting in a more likely increase in weed abundance.

Fire suppression – fire suppression effects, due primarily to fuel break, safety zone and staging area construction, are similar to timber activity and fuel treatment effects although the effects are potentially greater due the emergency nature of these events that preclude planning to treat infestation prior to action.

Livestock grazing – direct trampling of plants; changes in vegetation community dynamics, e.g. more grazing-resistant species gaining dominance; impacts to soil resource; changes in hydrologic processes, movement of propagules internally and externally.

Road and trail development or improvement, and urbanization – removal of vegetation; soil disturbance, erosion; impacts to hydrologic function, weeds predisposal for vehicular dispersal, creation of movement corridors.

Utility, irrigation, and highway easements - removal of vegetation, and soil disturbance in immediate vicinity of pipelines, ditches, highways; changes in vegetation condition within the easement due to utility line/highway/ditch maintenance; changes in hydrologic processes.

These activities are considered in the cumulative effects analysis because they may contribute to the overall spread of noxious weeds with similar effects to those discussed for the proposed action. These impacts could add cumulatively to the potential impacts associated with implementation of alternative 2, by increasing the risk of spreading noxious weeds. However, for present and future actions, where possible, projects are suppose to have a Noxious Weed Risk Assessment completed which would require that moderate to high risks of introduction and spread be mitigated, through project design features, to a low risk. Ideally most current and future projects are mitigated to a low risk of introduction and spread. Potentially the long-term impacts of present and future projects generally would have design features built in to prevent long-term increases in introduction and spread of noxious weeds. While new ground disturbing projects and repeated disturbance from ongoing activities are factors in promoting weed introduction and spread, the overall impacts are generally reduced compared to activities where no mitigation measures are implemented. Because of this and the fact that effects of introducing and spreading weeds under Alternative 2 would be mitigated to low, cumulative effects are not expected to significantly increase the direct and indirect effects arising from the implementation of alternative 2.

3.9.5.3 Alternative 3

Direct/Indirect Effects:

1. Direct/Indirect Effects of the prohibition of cross-country motor vehicle travel:

See effects analysis for prohibiting cross-country motor vehicle travel under Alternative

2. **Direct/Indirect Effects of adding facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, including identifying seasons of use and vehicle class.**

Field surveys were not performed for the following 5.50 miles of additional inventoried unauthorized routes that are proposed for addition under this alternative.

Table 3.9-8 Additional Routes Not Surveyed Under Alternative 3

Route	Length (Miles)
JM-2023	0.16
JM-2051	0.71
JM-2053	0.65
JM722	0.34
PK751	1.07
PK843n	0.57
PK844	0.23
PK845	0.15
PK848s	0.05
PK850	0.09
PK851n	0.14
PK852	0.09
PK853	0.13
PK854	0.10
PK855	0.05
PK856	0.61
PK857	0.36
Total Additional Miles Added in Alt. 3 Not Surveyed	5.50

None of these un-surveyed routes are within 100 feet of known weed infestations, however, in the absence of surveys it is possible that they harbor weed infestations. Since surveys have not been performed the risk of spreading weeds by the addition of these routes to the NFTS is high. In order to reduce the high risk rating, field surveys need to be performed during project implementation and weed occurrences found will need to be mitigated as described in Table 3.9-6. If noxious weed occurrences are found as a result of the field surveys the routes will not be placed on the Motor Vehicle Use Map until the mitigations are complete.

3. **Direct/Indirect Effects of co-locating motorized trails on NFTTS closed roads, allowing mixed use on specified NFTS roads, changing vehicle class and converting NFTS motorized trails to NFTS horse/foot trails.**

The effects of these actions under Alternative 3 are the same as those for Alternative 2.

Cumulative Effects:

The cumulative effects discussion for Alternative 3 is the same as Alternative 2 in terms of current and future actions. In both cases the risk of introducing and spreading weeds will be mitigated to low which should be the case for most current and future projects.

3.9.5.4 Alternative 4

Direct/Indirect Effects:

1. Direct/Indirect Effects of the prohibition of cross-country motor vehicle travel;

The prohibition of cross-country motorized vehicle travel under this alternative would result in a reduced incidence of weed introductions and a reduced risk of the spread of weed propagules from existing weed occurrences along those inventoried unauthorized routes that would not be added to the NFTS and therefore would not be available for public use. The

transport of weed propagules and the corresponding expansion of populations, and creation of suitable weed habitat would not result from motor vehicle use on these routes. This would result in an equivalent reduction in the potential impact to native ecosystems over the long term compared to the no action alternative. Short term effects include an immediate reduced risk of introducing new and/or spreading existing weed occurrences.

2. **Direct/Indirect Effects of Identifying current seasonal use and vehicle type;**

There are no direct or indirect effects from identifying current seasonal use or vehicle type.

3. **Direct/Indirect effects of blocking wilderness access;**

There are potential beneficial effects from blocking wilderness access as vehicles would be prevented from dispersing weeds and creating weed promoting disturbance in the wilderness.

Cumulative Effects:

Since there are no negative direct or indirect effects associated with alternative 4, only beneficial effects, there are no cumulative effects.

3.9.6 Summary of Effects Analysis Across All Alternatives

Table 3.9-9 Comparison of Effects to Spread of Noxious Weeds

Indicators – Noxious Weeds	Rankings of Alternatives for Each Indicator[1]			
	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Risk of weed spread.	1	3	2	4
Average for Control of noxious weeds	**1**	**3**	**2**	**4**

[1] A score of 4 indicates the alternative has the least impact for botanical resources related to the indicator; A score of 1 indicates the alternative has the most impact for botanical resources related to the indicator.

3.10 Port Orford Cedar

Management activities on National Forest System (NFS) lands must be planned and implemented to protect forest watersheds, ecosystems and natural resources. Port-Orford cedar (*Chamaecyparis lawsoniana;* POC) is an important trees species found on the Forest. The use of roads, trails, and other areas on national forests for public operation of motor vehicles has the potential to affect POC with the introduction and spread of *Phytophthora lateralis* (PL), a root disease that infects and kills Port-Orford-cedar. Management decisions to eliminate cross-county motor vehicle travel, add new routes to the National Forest Transportation System (NFTS), and make changes to the existing NFTS must consider effects to POC plant communities.

Port-Orford cedar is an ecologically, economically, and socially important tree species. Its natural range is limited to northwestern California and southwestern Oregon, but within that area, it grows over a broad environmental range and has some of the most diverse plant types within the region (Jimerson and Creasy 1991). On the Six Rivers National Forest, from north to south, the species occurs on Smith River National Recreation Area, the Orleans Ranger District, and the Lower Trinity Ranger District (LTRD). Approximately 34,000 acres of mapped Port-Orford-cedar occur on the Six Rivers National Forest (Jimerson, McGee and Jones 1999), and of this there are 949 acres on the Lower Trinity Ranger District, which represent 2.2% of all mapped Port-Orford-cedar stands within federal lands in California.

Phytophthora lateralis has spread throughout much of Port-Orford-cedars' native range. The disease spreads by the movement of spores in water (down slope), in mud from infected sites, or by root-to-root contact (Roth et al. 1987). The primary way the disease spreads is through vehicle use, driving from infested sites into un-infested areas, often during road construction or maintenance, mining, logging and traffic flow on forest roads. Spread of PL occurs during wet soil conditions, primarily in the late fall through early spring. Currently there are no known infected POC stands that are on the LTRD.

3.10.1 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

Directions relevant to the proposed action as it affects Port-Orford cedar include:

1995 **Record of Decision (ROD) and Land and Resource Management Plan** (LRMP) for the Six Rivers National Forest:

- Trees with Special Management Considerations (pages II-7 and III-16)
- Standards and Guidelines (pgs IV-51 and IV-53)
- Management Area 11 – Special Regeneration (pg IV-54)
- Forest-Wide Direction – Pest Management (pg IV-129, pg IV-130, pg V-20)
- Appendix H (pg H-9) and Appendix K (pgs K-4 – K-7)

2005 **Decision Notice for the Six Rivers National Forest Plan Amendment for Port-Orford-Cedar Management During Fire Suppression**.

Though not considered a sensitive plant, per se, POC is a species of concern, and current policy for Sensitive plants as stated in the **Forest Service Manual** include the following elements:

- Maintain viable populations of all native and desired non-native 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 (FSM 2670.32)

While not regulatory, the following documents give guidance to the management of Port-Orford cedar.

2004**, POC ROD and LRMP Amendment for Management of Port-Orford-cedar in Southwest Oregon, Siskiyou National Forest**

2007, **Managing for Healthy Port-Orford Cedar in the Pacific Southwest Region**, a summary of the status of POC root disease in the Region and the integrated strategies that should be considered to improve POC survival in California's forests. It provides updated best management practices that forest managers may consider incorporating into project level planning and/or Forest Plan amendments and revisions.

In 2007, **Port-Orford-cedar Program Status Report** was prepared as part of the Region 6 Action Plan in response to the 2006 Washington Office (WO) Review of Region 6's Forest Health Protection program. At the request of the WO, the Status Report included POC management in Region 5. One recommendation of the Status Report was to manage POC under a single management strategy on all Forest Service administered lands. The recommendation was that direction from the POC ROD and LRMP Amendment for Management of Port-Orford-cedar in Southwest Oregon, Siskiyou National Forest should be adopted by all other forests with POC at the time their LRMPs are revised (or earlier if convenient).

3.10.2 Effects Analysis Methodology

A previous landscape level range-wide risk assessment for POC plant associations was done for watersheds containing POC on the Lower Trinity Ranger District (Jimerson and Jones, 2002). This risk analysis rated individual OHV routes and the potential for each route to infect POC stands. There are no known POC on the Mad River Ranger District so the analysis was restricted to the LTRD.

3.10.2.1 Assumptions specific to POC and POC root disease.

1. Primary method of introducing PL into un-infested watershed is PL infested mud on undercarriage, wheels or mud flaps of vehicles entering watershed.

2. If infested mud is present, the risk that POC will be infected depends on several factors listed on page 131 in A Range-Wide Assessment of Port-Orford-Cedar (*Chamaecyparis lawsoniana*) on Federal Lands – BLM, USDA Forest Service, 2003).
3. Of the factors referenced above, the following were used to evaluate and determine risk ratings for routes within a watershed containing POC *:
   a. Distance to POC
   b. Proximity to stream or water source
   c. Slope position

* Though not directly related to rating a route's risk, POC plant associations were considered as a risk factor in the effects analysis. Gates or seasonal closures were not considered in rating a route's risk but were used as a risk factor in the effects analysis.

1. Routes crossing streams with POC downstream of crossing had the highest risk.
2. Roads passing through or terminating in POC stands had the second highest risk.
3. The closer roads were to mapped POC stands, the higher the risks.
4. Once the root disease was established in a POC stand, the disease would either work its way downstream infecting adjacent POC stands immediately next to the watercourse or infect nearby stands from root-to-root contact.

3.10.2.2 Data Sources

The two types of data sources used, spatial and tabular, are listed in Table 3.10-1.

Table 3.10-1: Spatial and tabular data used for the analysis and a brief description of each data set.

Spatial Data	
Layer Name	**Description**
combo_lt_dec11pa_Merge.shp	Unauthorized routes
lt_poc2	POC polygon coverage for Region 5
lt_huc7	Seventh field watersheds
lt_cont_10m	10 meter contours
lt_streams	All order sreams
lt_geology	Bedrock geology
lt_trvl_routes	System Roads
Tabular Data	
Data Source	**Description**
PA_and_Alt_Tables_lb_Feb2609.xls	Routes and alternatives spreadsheet

POC Resource Indicators

- Presence of POC in 7th field watersheds.
- If PL infection present in watershed, proximity of route to nearest infestation site.

Landscape position of routes in general (ridge, upper 1/3, middle 1/3, lower 1/3).

- Proximity (slope distance) of routes to mapped POC.
- Proximity of streams or water sources to route with POC downstream.
- Relative position of route to POC (up slope, down slope)

- Season of use (year round, wet weather closure)

3.10.2.3 Port-Orford cedar Methodology by Action:

1. **Direct/indirect effects of the prohibition of cross-country motor vehicle travel.**

The primary method for the spread of PL on the Forest is through infected mud on motor vehicles traveling on Forest roads and routes, both authorized or unauthorized. The type of road surface composition affects the risk of spread. Paved roads have the lowest risk of spreading the disease, while native surface (i.e., dirt) roads have the highest risk. Vehicles carrying infected mud and traveling cross-country have the greatest risk of introducing PL into uninfested POC stands. The major direct effect of continued use of unauthorized routes is the unmanaged risk of introducing PL into POC communities and watershed. Prohibiting unauthorized cross-country travel eliminates unmanaged risk and reduces the chances of introducing PL into areas beyond management control. Unmanaged cross-country travel in the short term will increase the risk of introducing PL into areas beyond management control. This reduces the ability for early detection of the disease, which is critical to its control. In the long term, depending on site characteristics, even if signs of PL are detected early, it may be impossible to stop further spread of the disease. The prohibition of cross-country travel in the short term will better give the ability to monitor high risk POC sites and take appropriate action if signs of PL are present. In the long term, depending on site characteristics, it may be possible to restrict PL spread and keep the infestation from spreading.

Short-term timeframe: 1 year.

Long-term timeframe: > 5 years.

Spatial boundary: Lower Trinity Ranger District

Indicator(s): (1) Number of route-stream crossings above POC stands (2) Proximity of route to POC (distance) (3) Relative slope position of route to POC.

Methodology: Only inventoried unauthorized routes within watersheds that contained mapped Port-Orford-cedar stands were analyzed. Most of the unauthorized route locations were identified with a GPS (global positioning system) by Forest Service Employees. Unauthorized routes were determined by identifying those used by some type of motor vehicle or had evidence of recent use and not currently on the NFTS. Each route was analyzed in ArcGIS (ESRI 2006) Geographic Information System (GIS) to determine the proximity of OHV routes to mapped POC stands. Additionally, each route was checked visually for proximity to POC. The analysis determined that there were six 7th field watersheds containing POC on the Lower Trinity Ranger District. The analysis looked for a route's proximity to POC stands, proximity to nearby water sources near POC stands, and topographic relationship to POC. A risk rating was given to each route (high, moderate, low) depending on the routes slope position, proximity to POC, and if the route crossed water sources adjacent to or upstream to POC (Jones, 2006). Table 3-47 lists general characteristics of each risk category.

Table 3.10-2: POC risk category assumptions for unauthorized routes.

Routes on ridges, upper and mid-slope landscape positions with little risk of transporting potential root disease spores downstream into POC. Route > 500' upslope or downslope of POC	Routes near mapped POC stands but do not cross into or pass through mapped POC stands. Route 50' - 500', and upslope of POC	Routes pass through or terminate in POC stand. Roads that cross watercourse and has POC Route within 50' upslope or within 25' downslope of POC (Route > 25' and downslope of POC is low risk)

Additional risk factors include POC stand density and presence of root disease in watershed (Jules et al. 2002).

2. **Direct/Indirect effects of adding facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, including identifying seasons of use and vehicle class.**

Unauthorized routes classified as Low Risk of introducing PL into POC stands would have similar short term and long term effects, whether added to the NFTM or not. These routes would have a very low probability of infecting POC stands. Generally speaking, adding unauthorized routes to the NFTS would allow greater control in reducing risks of PL infestation into POC stands. The effects of adding proposed action routes to the NFTS would vary greatly depending on the individual route.

Low Risk Routes: As mentioned, routes classified as Low Risk to introducing PL would have similar short term and long term effects. PL infestation would be unlikely to occur for these routes.

Moderate Risk Routes: There was only one route classified as Moderate Risk to introducing PL. There would be a low probability of introducing PL into the nearest POC stand because of its landscape position to the stand. The short term effect, if the disease did manage to get into the stand would be small. Smaller trees would show signs of the disease, while larger trees could take several years to show signs of PL infection. Long term effects would depend on the local conditions at the site of infection. The nearest POC plant association to the route was a POC-white fir/huckleberry oak type, which grows under drier environmental conditions compared to most POC plant associations (Jimerson and Daniel, 1994). This might slow the rate of spread enough to allow for a site specific treatment (sanitation) and localize the infestation. Left untreated, the infestation would work its way into a stream course, rapidly work its way down stream, and kill almost all POC within the riparian zone within 5 years. This would alter ecosystem dynamics along the stream course and surrounding riparian zone. Snag recruitment would increase dramatically, creating a huge pulse of course woody debris into the stream channel as these snags decayed and fell. In-channel bank instability would increase from the loss of stabilizing root mass from living trees, resulting in higher soil erosion rates. Water temperature would rise due to increased solar insolation. POC root disease allowed to spread would greatly increase the chances of infecting other streams within the watershed and introducing PL into nearby watersheds.

High Risk Routes: One route was classified as High Risk to introducing PL. Short term effects would be similar to that of Moderate Risk if PL infection occurred. Small trees would show signs of infection, while it would take several years for larger trees. Long term effects would be similar as described above once the disease got into a water course and worked its way downstream. However, local site conditions may aid in managing the spread of the disease before this occurred. The POC plant association near this route was classified as a POC-white fir/Herb type, which typically grows on gently sloped sites (Jimerson and Daniel, 1994). This plant association is not associated with flowing water so treatment may be possible before PL got into the stream course. The seral stage of this stand had been mapped as early mature, a younger stand that would exhibit signs of PL infection sooner, possibly allowing for early detection of the disease.

Short-term timeframe: 1 year.

Long-term timeframe: > 5 years.

Spatial boundary: Lower Trinity Ranger District

Indicator(s): (1) Miles of routes within POC watersheds (2) Number of route-stream crossings above POC stands (3) Proximity of route to POC (distance) (4) Relative slope position of route to POC.

Methodology: Unauthorized routes in the proposed action and located within watersheds containing POC were analyzed. Six 7th field watersheds on the Lower Trinity R.D. contained POC. Of these, only one watershed, the East Fork of Willow Creek, contained ten routes listed in the proposed action. A GIS analysis was done for these routes assigning risk categories based on the assumptions listed above. Eight routes were within the low risk category. The assumption was made that the low risk category indicated a very low probability of introducing PL into POC stands, and no further analysis was made on these routes. One route was in the moderate risk category because of distance to POC. Further analysis revealed that this route was on a ridge top position, and PL would have to travel laterally across the slope and around the ridge. The nearest POC plant association to this route was on the dry end of POC environmental gradients. One route was in the high risk category because it passed through a POC stand. This route was further analyzed in a GIS to determine the potential acres that would infested POC, based on item 7 of assumptions above, i.e., once the disease is introduced, it will spread downstream and into adjacent stands. The total acres potentially infested were calculated assuming a small time frame of about five years (a comparison of POC with year 1985 and year 1990 air photos, representing the same locations, showed significant POC die-back during this period). Table 3.10-3 lists the proposed action routes, environmental considerations and risk rating.

Table 3.10-3: Unauthorized routes, relative slope position, distance to nearest POC and risk rating.

Route ID	slope position	slope distance to nearest POC stand (feet)	POC Risk Rating
TH03	near ridge top	3800	Low
JM703	ridge top	2100	Low
JM706	near ridge top	200	Moderate
TH02	near ridge top	900	Low
JM-2024	near ridge top	2500	Low
JM-2025	ridge top	2500	Low
JM-2026	ridge top	2000	Low
JM714	ridge top	1125	Low
JM-2023	ridge top	900	Low
JM722	mid/bottom	0	High

3. **Direct/Indirect effects of identifying vehicle class and season of use on the NFTS.**

Vehicle use in general has the potential to introduce PL infection, regardless of the vehicle class designation. Limiting vehicle class size on some routes might reduce the chances of introducing PL into POC stand simply by reducing the available surface area available for infested mud. Changing from motorized use to non-motorized use would reduce the risk of PL infection into POC stands. Foot and horse traffic would have the potential to introduce the disease, but the chances of doing so would be small. The current use of seasonal POC gate closures on system roads excludes vehicle use near POC stands during the wet months of the year. This applies to system roads and unauthorized routes. Failure to limit vehicle use during the wet season on roads and routes near POC stands would have a potentially great impact. Short term effects of doing so would be minimal, similar to those described in previous action and non-action scenarios. The long term effect would be the increased likelihood that PL is introduced into a POC stand. There would be a higher probability of transporting infested mud from infected areas as far north as southern Oregon during unrestricted wet weather use.

Short-term timeframe: 1 year.

Long-term timeframe: > 5 years.

Spatial boundary: Northwest California and Southwest Oregon

Indicator(s): (1) Miles of motorized routes having changed vehicle class or changed to non-motorized use (2) Total miles co-located on existing NFTS roads (3) seasonal closure gates at access points to POC stands.

Methodology and Assumptions: It is assumed that changes to the existing NFTS will not have additional impacts to POC, except for the case where motorized use has been changed to non-motorized use. Wet weather use of roads that access POC stands would be the single greatest risk of introducing PL into POC stands. It is assumed that a vehicle driving in PL infested mud will pick up and accrue mud beneath the undercarriage and/or mud flaps of the vehicle. PL spores remain viable in infested moist mud for up to 6 months (Ostrofsky et al. 1977). The closest

infestation site is less than a two hour drive, on the Klamath River, and an infested vehicle coming from southern Oregon could take only 3 to 4 hours.

Cumulative Effects

The cumulative effect to the above action would be a slightly elevated risk of introducing PL into non-infested watersheds.

Short-term time frame: not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 20 years.

Spatial boundary: Region 5 POC range.

Indicator(s): (1) Number of route-stream crossings above POC stands (2) Proximity of route to POC (distance) (3) Relative slope position of route to POC.

Methodology and Assumptions: The following factors were used to ascertain cumulative effects: (1) unauthorized routes designated as High Risk (2) POC plant associations within potentially affected watersheds on the LTRD (table 3-49) and (3) infection status of current Region 5 POC stands, by National Forest and by watershed . Additionally, a comparison was done on the seral stage acres for POC and for all vegetation in potentially affected watersheds (Table 3-50).

Table 3.10-4: POC plant association on the Lower Trinity R.D. and percentage of Region 5 component

Plant Associations (PA) Containing POC	Acres	% of Region 5
Tanoak-POC/Evergreen huckleberry-western azalea	1.1	0.1%
Tanoak-POC/Evergreen huckleberry	41.6	1.3%
Tanoak-POC/Dwarf Oregon grape-twinberry	112.3	23.9%
Tanoak-POC/Red alder/Riparian	403.9	7.4%
Tanoak-POC/Red huckleberry	1.5	5.3%
Tanoak-POC/Salal	74.2	2.0%
POC/Western azalea	56.4	4.1%
POC-White fir/Huckleberry oak	39.5	4.2%
POC-White fir/Herb	96.0	5.7%
POC-Douglas-fir/Huckleberry oak	20.5	1.0%
POC-Western white pine/Huckleberry oak	92.3	4.9%
POC-Western white pine/Western azalea-dwarf tanbark-Labrador tea	10.0	1.3%

Table 3.10-5: Seral stage distribution for POC and late seral vegetation component for all 7th field watersheds containing POC

POC Seral Stage Lower Trinity Ranger District		
Seral Stage	acres	% in POC watersheds
Shrub/Forb	4.0	0.4%
Pole	112.0	12.0%
Early Mature	158.0	17.0%
Mid-Mature	101.0	10.8%
Late Mature/Old Growth	556.0	59.7%
All Vegetation Late Seral Acres and % of POC Watersheds		
Seral Stage	acres	% of watershed
Late Mature/Old Growth	5781	16%

3.10.3 Affected Environment

There are 41,018 acres of mapped Port-Orford-cedar on federal lands (Jimerson, McGee and Jones 1999) in Region 5 comprising 35 separate plant associations. The Six Rivers National Forest contains 30, 773 acres, and of these 949 acres occur on the Lower Trinity Ranger District (LTRD).

There are about 4000 acres of Port-Orford-cedar infected with PL root disease in Region 5, roughly ten percent of the California range. The Smith River watershed on the Six Rivers National Forest has the highest percentage of infested acres (> 90% of infested acres) within California. Small pockets of infestation exist in the Klamath and Sacramento watersheds. The nearest infestation site from the analysis area is about 32 miles away, on the Klamath River. Currently the Trinity River watershed has no infestation.

A landscape level risk assessment of Port-Orford-cedar plant associations has shown that all watersheds on the LTRD containing POC are at moderate risk (Jimerson and Jones, 2002). This Travel Management site specific POC risk assessment identifies routes at risk of spreading the disease. Since vehicle traffic is the primary vector for Port-Orford-cedar root disease, this analysis will help decrease the chance of introducing PL into the Trinity River watershed and help reduce the overall spread of the disease.

3.10.4 Environmental Consequences

See the effects methodology section above regarding how this analysis was conducted.

3.10.4.1 Alternative 1 – No action.

The potential effects of this alternative to POC would depend on the risk of PL getting into the watersheds, and several unauthorized routes could increase this risk. Currently there are 50 known unauthorized routes located within six 7th field watersheds that contain POC on the LTRD. Thirty-seven of these routes were categorized as Low Risk to spreading PL and pose little risk. However, thirteen of these routes were categorized as Moderate or High, located

within three of the watersheds. Five routes were rated at Moderate Risk and 8 routes rated at High Risk (Table 3.10-6).

Table 3.10-6: Unauthorized routes and POC risk rating by watershed for the Lower Trinity Ranger District

Watershed	Route	POC Risk Rating
Upper Willow Creek	JM-2033	High
	JM-2034	High
	JM-2035	Moderate
	JM-2036	Moderate
	JM-2037	Moderate
	JM-2038	High
East Fork Willow Creek	JM706	Moderate
	JM714x	Moderate
	JM712	High
	JM722	High
	JM-2031	High
	JM-2032	High
Campbell Creek	UALT0054t	High

System roads that have access to POC have been operating under a seasonal POC wet weather closure, which is designed to minimize the spread of PL. In Campbell Creek and East Fork Willow Creek (EFWC), all unauthorized routes with High Risk ratings have been accessed via system roads currently under a POC wet weather closure, along with one Moderate Risk route. The other Moderate Risk route in the EFWC is over 300’ away from the nearest POC stand so has a lower risk within this category. In the Upper Willow Creek drainage, JM-2038, which accesses most of the other routes listed in Table 6 for this watershed, could be accessed by system road 6N66. System road 6N66 does not have a POC wet weather closure gate. This could be the greatest risk to POC in this drainage if continued to be used. Other risks with this alternative would be a failure to close gates prior to wet weather conditions or illegal vehicle access around gates after closure is implemented.

An indirect effect of this alternative would be the possible introduction of PL via moderate or high risk routes into a watershed containing POC. Introducing POC root disease into the watershed would have major ecological impacts. At the watershed scale, introduction of PL could result in a major loss of POC habitat, almost 60% of which is late successional. This would reduce overall late seral habitat in these watersheds by up to 16%, reducing habitat for old growth dependent species. Loss of old growth POC along riparian zones would result in a slight increase to water temperature locally, but cumulatively could increase water temperature downstream, especially if other streams in the watershed become infected. This could affect potential habitat for some aquatic species, like some anadromous fish species that need cooler water to live, such as the Coho salmon (*Oncorhynchus kisutch*). Early seral species, such as willows, grasses and alders, which decay more readily, would replace longer lived, decay resistant POC. This would decrease the available coarse woody debris recruitment into streams and rivers, an important component to fish habitat. Many of the POC plant associations within this watershed are associated with serpentine or ultramafic soils. POC is one of the few tree

species that grows well on these soils. Loss of these trees in the serpentine riparian zone might dramatically change ecosystem dynamics because there are few tree species that would provide similar ecological functions. Several Threatened and Endangered listed plant species are associated with serpentine related POC stands. Loss of POC in these areas might reduce available habitat for these species.

At the district and regional scale, currently there is no PL infection within the Trinity River basin, and introducing the disease into the Willow Creek watersheds would create a new PL source, making it much easier to infect POC growing on non-federal lands in the upper reaches of Three Creeks, in the main stem of Willow Creek, and in Redwood Creek to the west. Long term presence of the disease could reduce by 4% to 7%, five POC plant associations located in Region 5 and reduce one plant association by almost 24%. This could reduce the genetic diversity of the POC and the species diversity associated with these communities

Direct/Indirect Effects

(1) Number of route-stream crossings above POC stands (2) Proximity of route to POC (distance) (3) Relative slope position of route to POC (4) Seasonal POC gate closure.

Cumulative Effects

Only long term cumulative effects will be evaluated. Cumulative effects would be based on PL being introduced into a POC stand. No introduction of POC root disease would result in no cumulative effects.

The current management strategy requires seasonal POC wet weather closures of system roads in watersheds of concern. Long term cumulative effects related to use of authorized roads and trails would be predicated on the effectiveness of this strategy, and effective seasonal POC gate closures for these routes would greatly reduce risks of PL infection, increasing the chance that there would be no long term effects. The long term, cumulative effects of unauthorized routes outside of management authority would be based on the risks of PL infestation associated with cross-country travel near POC stands. There would be an elevated risk of PL infestation with uncontrolled cross-country travel. Thirteen of the unauthorized routes were identified as having a risk rating greater than Low, and of these one route, JM-2038, has the greatest risk to introducing PL into the watershed. The cumulative effect would be a slightly elevated risk of introducing PL into non-infested watersheds.

3.10.4.2 Alternative 2 – Proposed Action.

This alternative proposes adding currently unauthorized routes to the NFTS and placing a prohibition on cross-country travel in the project area. The prohibition would include all unauthorized routes and any newly created or unmapped routes. The three actions analyzed in this alternative are summarized below.

Direct/Indirect Effects

Indicators: (1) Number of route-stream crossings above POC stands (2) Proximity of route to POC (distance) (3) Relative slope position of route to POC.

1. **Cross-country travel:** A prohibition of motorized cross-country travel would be established. Motorized use would be limited to designated routes only. Motorized cross-country travel would be prohibited including use of inventoried unauthorized, as well as any unmapped or newly created routes.

2. **Routes added to the existing NFTS:** Approximately 57 miles of motorized routes would be added to the NFTS. Seasonal restrictions would prohibit motorized use of NFTS routes (36 miles) during periods of wet weather and critical wildlife breeding times in the project area.
3. **Changes to NFTS:** Approximately 6 miles of existing NFTS routes would be changed to a non-motorized designation. Use on 25.5 miles of existing NFTS roads would be changed to include dual or mixed motorized use. Motorized use on 4 miles of existing NFTS motorized trail would be changed from motorcycle use only to include vehicles 50 inches or less in width (ATV's).

Cross-Country Travel

Alternative 2 would prohibit motorized cross-country use including unauthorized routes and any unmapped or newly created routes.

Both short term and long term effects are based on PL being introduced into a POC stand. The greatest effect in cross-country travel prohibition is altering the risk of PL introduction. Presently, short term risks remain low and would remain low, since POC infection is based on the chance probability that an OHV was infested with PL, crossed into or above a POC stand and infected a host (also because the nearest PL infection site is greater than 30 miles away). Without cross-country travel prohibition, long term risk would increase with time since it would be a matter of time before conditions were right for the introduction of the disease. Prohibition of cross-country travel would decrease long term risks. An effective ban, coupled with effective POC wet weather closure would offer the least risk.

Routes added to the NFTS

Eight of the unauthorized routes described in Alternative 2 would be located in a drainage containing POC, the East Fork Willow Creek watershed, and none of these were classified as High Risk to introducing PL into POC stands (Table 3.10-7).

Table 3.10-7: Routes located in watersheds with POC added to NFTS under Alternative 2 and associated POC risk rating

Route ID	POC Risk Rating
JM703	Low
JM706	Moderate
JM714	Low
JM722	High
JM-2023	Low
JM-2024	Low
JM-2025	Low
JM-2026	Low
TH02	Low
TH03	Low

Seven of the routes had Low Risk ratings, and one route, JM 706, in the East Fork Willow Creek watershed, was the only route classified as moderate risk due to proximity to POC < 500'. However, its landscape position in relation to the nearest POC stand decreases the risk to low because PL spores would have to travel laterally across slope and around the ridge to infect the nearest POC stand. Additionally, the nearest POC plant association is a POC/white-fir/huckleberry oak type, a dry site association, which has less available surface water that would help carry spores to a POC host.

Changes to existing NFTS

Alternative 2 also proposes to change the class of vehicle use of three motorized system trails to non-motorized use only (5.8 miles), change one trail class of vehicle use from motorcycle only to vehicles < 50 inches (3.9 miles) and permit mixed use (highway legal and non-highway legal) on existing NFTS roads (25.4 miles). There would be no short term or long term direct/indirect effects because the routes described are not in proximity to POC.

Cumulative Effects

Cumulative effects would be based on the risk of PL being introduced into a POC stand. If there is no introduction of POC root disease then there would be no cumulative effects. The current management strategy requires seasonal POC wet weather closures of system roads that access watersheds of concern. Long term cumulative effects related to use of NFTS roads and trails would be predicated on the effectiveness of this strategy, and effective seasonal POC gate closures accessing these routes would greatly reduce risks of PL infection, reducing the risk of long term effects. If the disease got into POC, and its spread could not be stopped, then cumulative effects would be similar to those listed under **alternative 1**.

3.10.4.3 Alternative 3 – Expanded Recreation

This alternative will add approximately 65 miles of unauthorized routes to the NFTS. These routes include all of the routes proposed for addition in Alternative 2, plus 7 additional miles of unauthorized routes. The three actions analyzed in this alternative are summarized below.

Direct/Indirect Effects

Indicators: (1) Number of route-stream crossings above POC stands (2) Proximity of route to POC (distance) (3) Relative slope position of route to POC.

1. **Cross-country travel:** A prohibition of motorized cross-country travel would be established. Motorized use would be limited to designated routes only. Cross country motorized travel would be prohibited including the use of 186 miles of inventoried unauthorized routes, as well as any unmapped or newly created routes.
2. **Routes added to the existing NFTS:** Approximately 65 miles of motorized routes would be added to the NFTS. Seasonal restrictions would prohibit motorized use of NFTS routes (29 miles) during periods of wet weather and critical wildlife breeding times in the project area.
3. **Changes to NFTS:** Approximately 6 miles of existing NFTS motorized routes would be changed to a non-motorized designation. Use on 25.5 miles of existing NFTS roads would be changed to include mixed motorized use. Motorized use on 4 miles

of existing NFTS motorized trail would be changed from motorcycle use only to include vehicles 50 inches or less in width (ATV's).

Cross-Country Travel

Alternative 3 would prohibit motorized cross-country travel including use of unauthorized routes and any unmapped or newly created routes.

Both short term and long term effects are based on PL being introduced into a POC stand. The greatest effect in cross-country travel prohibition is altering the risk of PL introduction. Presently, short term risks remain low and would remain low, since POC infection is based on the chance probability that an OHV was infested with PL, crossed into or above a POC stand, and infected a host (also because the nearest PL infection site is greater than 30 miles away). Without a cross-country travel prohibition, long term risk would increase with time since it would be a matter of time before conditions were right for the introduction of the disease. Prohibition of cross-country travel would decrease long term risks. An effective ban, coupled with effective POC wet weather closure would offer the least risk.

Routes added to the NFTS

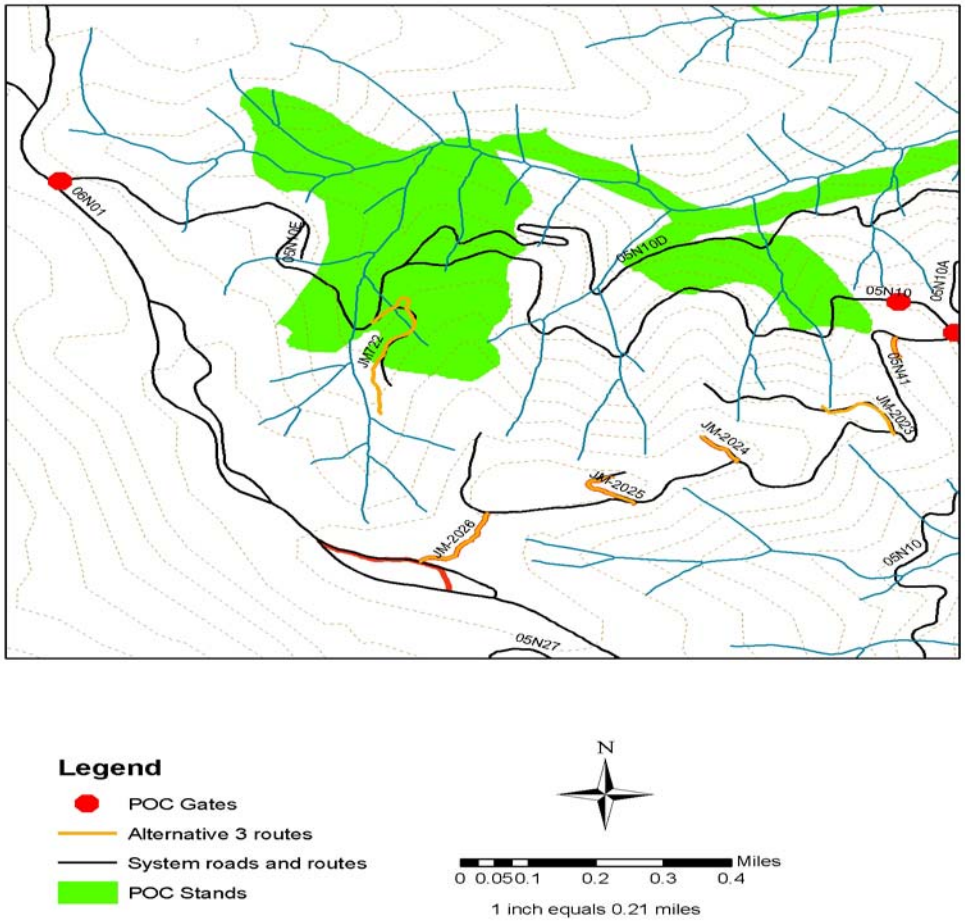
Alternative 3 would be very similar to alternative 2, except in this alternative two additional unauthorized routes would be added within the East Fork Willow Creek watershed, a total of 10 routes that have some risk of introducing PL into POC stands, Table 3.10-8.

Table 3.10-8: Unauthorized routes for alternative 3 having a potential risk to POC and associate risk rating

Route ID	POC Risk Rating
TH03	Low
JM703	Low
JM706	Moderate
TH02	Low
JM-2024	Low
JM-2025	Low
JM-2026	Low
JM714	Low
JM-2023	Low
JM722	High

Eight of the ten routes had low risk ratings and had minimal risks of introduction PL into POC stands. Route JM706 had been addressed in alternative 2. Route JM722 had a high risk rating because it terminates within a POC stand. This route was accessed via Forest road 5N10, which is currently operated with POC seasonal wet weather closures. Under current management conditions, short term risks would be low with seasonal POC closures. Adding this route under alternative 3 would not change the short term risk. Long term risks are dependent on the timely implementation of seasonal closures and not on the presence of the route itself (Fig. 2).

Figure 3: Route JM722 in relation to POC, seasonal gates and access road



Changes to existing NFTS

There would be no short term or long term direct and indirect effects because the routes described are not in proximity to POC.

Cumulative Effects

Cumulative effects would be very similar to those described in alternatives 1 and 2, i.e., an increased risk of PL introduction into watersheds containing POC.

3.10.4.4 Alternative 4: Prohibit Cross-Country Travel; Identify Current Seasonal Use; Block Wilderness Access on TH1062

Under Alternative 4, current management plans would continue to guide management of the project area. No changes would be made to the current NFTS and a complete cross-country

travel prohibition would be put into place. The three actions analyzed in this alternative are listed below.

1. **Cross Country Travel:** For Alternative 4, a prohibition would be established for all motorized vehicle travel off designated NFS roads, NFS trails and areas by the public. Motor vehicle travel would be limited to NFTS routes.
2. **Routes Added to the Existing NFTS:** No new NFTS facilities would be added. None of the 255 miles of inventoried, unauthorized motorized trails would be placed on the NFTS.
3. **Changes to the existing NFTS: Class of Vehicle/Season of Use:** For Alternative 4, approximately 6 miles of existing NFTS motorized trails would no longer be accessible to motorized users.

Direct/Indirect Effects

(1) Number of route-stream crossings above POC stands (2) Proximity of route to POC (distance) (3) Relative slope position of route to POC.

Under this alternative, the direct and indirect effects to POC due to a cross country travel prohibition would be the same as describe in Alternatives 2 and 3.

Cumulative Effects

Under Alternative 4, there is a long-term benefit to reducing the risk of PL introduction into watersheds on the LTRD that contain POC. Eliminating cross-country travel will reduce risks of infecting POC stands. The existing NFTS routes can be better monitored for signs of PL if the disease was present, allowing for quicker treatment to stands that may help reduce, slow or stop the spread of the disease from that site.

3.10.5 Summary of Effects Analysis Across All Alternatives

Table 3.10-9: Summary of Effects Analysis Across All Alternatives, POC root disease

Indicator - POC root disease	Rankings of Alternatives for each indicator[1]			
	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Route stream crossings with POC down stream	1	4	3	4
Proximity of routes to POC (> 500', < 500', adjacent)	2	3	3	4
Relative slope position of route to POC	1	4	1	4
[1]A score of 4 indicates least risk to POC. A score of 1 indicates most risk to POC.				

3.10.6 Compliance with the Forest Plan and Other Direction

All standards and Guidelines related to POC management apply. Specifically, this report meets the standards for completing a risk analysis for watersheds containing POC and for projects proposed in areas where the disease is not present. Additionally, this document evaluates the risks to POC through potential changes in the transportation plan and identifies high risk areas where pro-active disease prevention measures can be implemented if necessary.

3.11 Cultural Resources

This chapter provides a brief summary of the principal laws, regulations, and direction that sets forth how federal government agencies are mandated to manage and protect cultural resources on National Forest lands. There is also description of the current condition of Cultural Resources, a review of the potential environmental consequences, and an analysis of the various proposed alternatives and their potential effects to cultural resources located on the Mad River and Lower Trinity Ranger Districts.

Cultural resources provide information about past human behavior and activities. They are found in a wide variety of physical forms including historical sites, prehistoric archaeological sites, historic trails, and cultural landscapes. Cultural resources also include artifacts, records, and remains that are related to such properties, as well as properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meet the National Register criteria for listing as a Traditional Cultural Property (36 CFR §800.16(l)(1)).

Cultural resources located on National Forest system lands frequently consist of historic and prehistoric artifacts, features, and sites linked to Native American cultures, as well as material remains related to historical land-use activities such as grazing, mining and homesteading. Many cultural resources properties are fragile and cannot be repaired or replaced. They are susceptible to destruction from both natural causes like aging and weathering and from human land-use activities including increased erosion, artifact theft, and vandalism.

The first actions taken by the federal government to preserve and protect cultural resources on public lands were as a result of the passage of the *Antiques Act* in 1906. In 1966, Congress passed the most significant federal legislation concerning the management and preservation of cultural resources the *National Historic Preservation Act* declaring that it is national policy to "administer federally owned, administered, or controlled prehistoric and historic resources in a spirit of stewardship for the inspiration and benefit of present and future generations." The Travel Management rule requires that the effects on cultural resources be considered, with the objective of minimizing damage, when designating roads and trails for motor vehicles use on national forest system lands (36 CFR 212.55(a), 212.55(b)(1)).

3.11.1 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

Direction relevant and specific to the proposed action as it affects cultural resources includes:

The Forest Service is directed to identify, evaluate, treat, protect, and manage historic properties under several federal laws, regulations, and Executive Orders. The most relevant for this undertaking are:

The National Historic Preservation Act (NHPA) of 1966, as amended **(*16 U.S.C. 470 et seq.*):** This law provides comprehensive direction to federal agencies about their historic preservation responsibilities. The NHPA extends the policy contained in the Historic Sites Act of 1935 (49 Stat. 666; 16 U.S.C. 461-467) to include resources that are of state and local significance, expands the National Register of Historic Places (NRHP), and establishes the Advisory Council on Historic Preservation and State Historic Preservation Officers. The Advisory Council on Historic Preservation (ACHP) regulations (36 CFR 800) implementing the NHPA set forth the

inventory, nomination, protection, and preservation responsibilities for Federally-owned historic properties .

Executive Order 11593: The *Protection and Enhancement of the Cultural Environment E.O.*, issued May 13, 1971, directs Federal agencies to inventory cultural resources under their jurisdiction, to nominate to the National Register of Historic Places all Federally owned properties that meet the criteria, to use due caution until the inventory and nomination processes are completed, and to assure that Federal plans and programs contribute to preservation and enhancement of non-Federally owned properties.

Under the ACHP's implementing regulations, *Protection of Historic Properties* (36 CFR Part 800), Section 106 requires that all federal agencies take into account the effects of their undertakings (actions, financial support, and authorizations) on historic properties listed on or eligible for the National Register of Historic Places and that agencies provide the ACHP with an opportunity to comment on those undertakings. The Travel Management rule, found in the Federal Register, requires that the effects on cultural resources be considered, with the objective of minimizing damage when designating roads, trails, and areas for motor vehicle use on National Forest lands (36 CFR 212.55(a), 212.55(b)(1)).

The Forest Service policy for compliance with Section 106 of the NHPA in travel management with respect to route designation for motor vehicle use was issued in 2005: *USDA Forest Service Policy for Section 106 of the NHPA Compliance in Travel Management*: Designated Routes for Motor Vehicle Use (*project record*). This policy was developed in consultation with the Advisory Council on Historic Preservation. It outlines minimal requirements for considering possible effects to historic properties that may be associated with designating routes and areas as part of a national forest's transportation system

This policy statement recognizes that forests with programmatic agreements for compliance with Section 106 of the NHPA will follow the terms of those agreements. Programmatic agreements (36 CFR 800.14(b)) provide alternative procedures for complying with 36 CFR 800. Region 5 has such an agreement: *Programmatic Agreement among the USDA Forest Service, Pacific Southwest Region, USDA Forest Service, Intermountain Region's Humboldt-Toiyabe National Forest, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Designating Motor Vehicle Routes and Managing Motorized Recreation on the National Forests in California* (Motorized Recreation Programmatic Agreement (2006) (project record).

This agreement defines the Area of Potential Effects (APE) (36 CFR 800.4(a)(1)) and includes a strategy outlining the requirements for cultural resource inventory, evaluation of historic properties, and effect determinations; it also includes protection and resource management measures that may be used where effects may occur.

The Six Rivers National Forest cultural resource specific *Standards and Guidelines* are outlined below.

- A cultural resources inventory will be completed for any proposed activity that could affect cultural resources. Results of these inventories will be documented in a project specific Cultural Resources Inventory Report (CRIR). A certified archaeological surveyor, archaeologist, or historian will conduct the cultural resource inventory.

- The significance of and effects on inventoried sites will be evaluated by an archaeologist or historian. Consultation with the California State Historic Preservation Officer and the Advisory Council on Historic Preservation will take place as required
- Identified cultural resources will be protected from disturbance and artifact theft through the implementation procedures outlined for the National Preservation Act and the Archaeological Resources Protection Act.
- Proposed projects with potential to affect local Native American cultural values or contemporary uses, or in location known as traditional Native American spiritual use area, will be discussed with a cross section if the local Indian population and Tribal Governments. These discussions will take place in the early stages of planning and environmental analysis to identify possible mitigation opportunities or alternatives.

3.11.2 Affected Environment

The objective of this section is to review the most current information available regarding the scale, nature, and condition of cultural resources identified within the project area. These data provide a baseline for the comparison of effects reported in the subsequent Environmental Consequences section.

Cultural resources are archaeological, cultural, and historical artifacts and features from our past that are more than 50 years old. Cultural resource information, combined with environmental data, can illuminate past relationships between people and the land. Cultural-ecological relationships, the result of both natural processes and over 8,000 years of human interaction in the North Coast Range and Klamath Provinces, are key topics in this region's anthropological, archaeological, and historical research.

The two Ranger Districts have, to date, recorded approximately 688 prehistoric and historic archaeological sites (cultural resources). The vast majority of these recorded sites represent prehistoric Native American activities and ethnographic land use. These include seasonal villages, temporary camps, tool stone quarries, and sensitive religious and cultural locations including areas used for the collection of traditional botanical resources. Today, Native Americans from a number of Indian tribes including the Hupa, Tsnungwe, Wintu, Wiyot, and Wailaki still actively use the Lower Trinity and Mad River Ranger Districts for gathering traditional food and medicinal plants, basket weaving materials, for hunting, and conducting ceremonies. Sites representing historic land use activities recorded on the two Ranger Districts include trails, historic cabins, roads, bridges, lumber or mining complexes and camps, ditches, homesteads, and Forest Service administrative buildings and compounds. All of the historic sites found on the two Districts, date from about 1849 to the present. Historic sites provide many opportunities for interpretation and public appreciation. In addition, numerous sites have been recorded that have both prehistoric and historic components.

For this analysis, all cultural resources within the Area of Potential Effect (APE) are considered historic properties, regardless of whether or not they have been formally evaluated using NRHP criteria (36 CFR §60.4). Exceptions are made for those resources that have been formally determined not eligible for the NRHP in consultation with the State Historic Preservation Officer (SHPO) through regulatory procedures (36 CFR §60.4; 36 CFR §800).

In order for the Forest to determine the potential effects of the proposed action on historic properties, it is first necessary to identify the Area of Potential Effect (APE). The 36 CFR §800 regulations define an APE as:

> … the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. (36 CFR §800.16(d))

The APE for the cultural resources component of the Travel Management project is specifically defined in the Motorized Recreation Programmatic Agreement:

1. APEs include vehicular use areas, such as roads, trails, routes, corridors, stopping points, trailheads, off-route use areas, or other associated areas where maintenance for and motorized recreation occur, or, that are considered for designation. For most undertakings, APEs may be restricted to 30m wide corridors centered on linear motor vehicle features (i.e., roads, trails, corridors, routes) and 30m wide buffer zones around nonlinear features (e.g., stopping points, specifically defined open areas, trailheads, etc.). Roads and trails used to access favorite hunting areas, for example, would be considered part of APEs; hunting camps within 30 meter buffer zones of routes would be part of APEs, but hunting grounds which are closed to cross-country vehicular travel would not be considered part of APEs.
2. Inventory of associated areas included in APEs, such as stopping points, trailheads, or vista points, should include the immediate surroundings that can generally be limited to a radius of 30 meters centered on point-specific locations (i.e., stopping points, vista points), or 30-meter wide buffer areas surrounding larger areas (e.g., trailheads). (USDA Forest Service 2006b:8).

The following assessment of the affected environment for cultural resources properties is based on the APE as defined above.

3.11.2.1 Current Conditions

Extensive field surveys were conducted to identify historic properties within the APE that might be affected by the proposed undertaking and in order to collect information on their current condition. Cultural resources specialists conducted field surveys during the fall of 2008. They also reviewed existing archaeological, historic, and ethnographic literature in the Forest's Heritage Program files. The results of the cultural resources surveys and information from the Forest's Heritage Program files were used in the following analysis.

A Cultural Resources Inventory Report (CRIR 05-10-1032) has been completed. This CRIR includes all archaeological survey and site data collected for this project. The report includes a site-specific analysis of the cultural resources associated with all routes being considered for addition to the National Forest Transportation System (NFTS) under the proposed action. A total of four previously unidentified cultural resource sites was located and formally recorded during the field inventory; documentation included the completion of site records. In addition, 35 previously recorded sites within or adjacent to the APE were visited during the course of the field work in order to determine potential effects from implementation of the project. The CRIR provides background information, outlines the methodologies employed, describes the condition of cultural resources sites, describes results and recommendations, and includes relevant cultural resources site records.

Subsequent to completion of the CRIR a number of potential routes surveyed for the project affecting cultural resources values (totaling 20 sites) were dropped from further consideration from the proposed project. These sites are within or adjacent to unauthorized

routes that will not be added to the NFTS under all of the proposed Action Alternatives. These routes were dropped for reasons not related to cultural resources values; for example sensitive plant species or hydrological concerns. Route specific survey coverage, cultural resources site locations, and selected cultural resource data from the CRIR will be entered into the Forest's digital Geographic Information Software (GIS) files.

The primary objectives of this project have been to identify historic properties within the APE that may be affected by the undertaking and to collect information on their current condition. Surveys consisted of pedestrian transects conducted according to methods and standards mandated in the Motorized Recreation Programmatic Agreement. The data compiled and reported in this section describe current conditions as reflected by the No Action alternative. The Motorized Recreation Programmatic Agreement includes a strategy outlining cultural resource inventory requirements for most routes and areas considered for addition to the National Forest Transportation System. On the Lower Trinity and Mad River Ranger Districts all travel routes regardless of use-level that were identified for analysis were inventoried.

A summary of the cultural resource field survey coverage is tabulated in Table 3.11-1. The Forest currently calculates that 255 miles of unauthorized routes were considered during the project development as potential additions to the NFTS. For this study 64 miles of unauthorized routes are being analyzed as potential additions to the NFTS under the action alternatives. The Cultural Resources Inventory for this project includes survey coverage for all 64 miles of these routes with approximately 17.0 miles of these covered routes having been previously surveyed in conjunction with other unrelated Forest undertakings. A data gap exists for 3.4 miles of the 7.0 miles of proposed routes added for Alternative 3 regarding the potential impacts to recorded cultural resources sites in order to determine if they are in immediate threat of damage within the APE of the proposed routes; further field review of the 3.4 miles is needed to determine if cultural resources are located in the APE. The remaining 3.6 miles of these additional routes have been surveyed previously.

Table 3.11-1: Status of Cultural Resources Survey within APE

Miles of Routes Surveyed Mad River Ranger District	49
Miles of routes Surveyed Lower Trinity Ranger District	21.6
Miles of Alternative 3 Routes needing additional field review	3.4
Miles of Unauthorized Routes (Total)	64.0

The existing condition of cultural resources identified within the APE provides baseline information with which to assess potential effects of adding routes to the NFTS. The first-order indicator of existing conditions is the total number of historic properties located within the project APE—regardless of effects. Currently, 19 cultural resource sites have been identified within the APE for the Lower Trinity and Mad River Ranger Districts. The sum includes all properties where any segment of an unauthorized route bisects or approaches the boundary of a cultural resource, regardless of scale or impact.

A second, more important indicator of existing conditions is the number of at-risk historic properties currently identified within the project APE. This group is a subset of the 19 total properties cited in the last paragraph. An "at-risk historic property" is defined in the Motorized Recreation PA as "…a property that the Forest Heritage Resources Manager (HRM) identifies as

susceptible to being adversely affected as a result of designating a motor vehicle OHV route or specifically defined area, or using or maintaining the designated motorized recreation OHV system. An at risk historic property is identified based on property characteristics and proximity to designated OHV routes or specifically defined areas (e.g., trail corridor, trail head, vista point)" (USDA Forest Service 2006:1.J).

The number of historic properties determined to be "at risk" is therefore based on their condition, proximity to the APE, and use-level (light, low, moderate, heavy) of the particular route. The "at risk" category used in subsequent analysis consists of cultural resource sites with identified or potential direct, indirect, or cumulative effects. The nature of any identified or potential effects to "at risk" cultural resources were identified and recorded. In addition to guidance in the Motorized Recreation Programmatic Agreement addressing potential effects, the integrity measures listed in the adverse effect criteria at 36 CFR 800.5(a) were used to characterize the severity of any identified effects:

Criteria of adverse effect. An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's **location, design, setting, materials, workmanship, feeling, or association**.[emphasis added] Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative. (36 CFR §800.5(a)(1))

Different disturbance agents can combine in a variety of ways to create a potential threat to cultural resources. The results of the field survey indicated the potential for an "adverse effect" to cultural resources should certain routes be added to the NFTS. The analysis documented both direct effects **(**caused by the action and that occur at the same time and place) as well as indirect (caused by the action may be later in time or are farther removed in distance, but are still reasonably foreseeable). The more common threats identified are summarized in following table. The list is not exhaustive. Other disturbances have been noted, but those threats specified in the table below constitute the most common disturbances documented.

Table 3.11-2: Examples of Site Disturbance Documented within Project APE

Indirect Effects	Direct Effects
• Driving off-established routes on cultural sites • Ground disturbance activities associated with motorized vehicle camping within boundaries of cultural resource sites that contain significant cultural features. • Motorized vehicle camping on a cultural resource site where campers looted or otherwise disturbed archaeological sites. • Vandalism to historic mine sites accessed by motorized vehicle, e.g., bullet holes, theft, and structural damage. • Evidence of vandalism or illicit digging activity within prehistoric cultural resource sites accessed by motorized vehicles.	• Routes bisect a primary locus in a prehistoric cultural resource site. • Routes cross and disburb features at cultural resource sites.

Potential Effects to Cultural Resources

To date 19 cultural resources sites identified within the APE for the proposed action Alternatives have been assessed for potential effects. A field visit and a review of the existing data was accomplished for each cultural resources site in order to determine whether the proposed addition of any route to the NFTS would diminish the integrity of the property's NRHP values, i.e., *location, design, setting, materials, workmanship, feeling, or association.* An additional eight sites located within the Pilot Ridge National Register District require evaluation for potential impacts as a result of the addition of Forest Route One to Alternative 3. For purposes of this analysis those sites not yet evaluated are considered to have potentially adverse impacts for cultural resources values.

Table 3.11-3 summarizes the quantity and risk assessment for all cultural resources identified within the APE. Of the extant cultural resource sites identified, 19 sites would be directly and/or indirectly affected by adding a respective route to the NFTS.

Table 3.11-3: Quantity and Assessment of Cultural Resources Properties Identified within APE

Total “Not At-Risk” Properties Identified within APE	11
Total “At-Risk” Properties Identified within APE	11
Total Properties Not Eligible for the National Register of Historic Places	5
Total Properties Identified within APE	**27**

All cultural resource sites that have not been determined eligible for the NRHP are considered eligible for the purposes of this undertaking unless they have previously been

determined to be not eligible (Motorized Recreation PA). Consequently, "at risk" properties (see above table) include all cultural resource sites where direct, indirect or cumulative effects have been identified, except for those formally determined not eligible for the NRHP. Measures needed to identify and mitigate potential effects are applicable to all other properties regardless of National Register status.

The process of completing evaluations of significance for the NRHP is a time consuming and expensive undertaking. For that reason not all cultural resources sites have formally been evaluated. The current NRHP status of all sites located within the APE are reported in the table below.

Table 3.11-4: National Register of Historic Places Status of Cultural Resources Sites within APE

Unevaluated	Eligible	Not Eligible	Total
11	11	5	**27**

A simple calculation of the number of at-risk cultural resources properties provides only general information about potential effects. It does not sufficiently disclose the scale and severity of potential effects on any given property, nor does it address the type of mitigation measures that might be necessary to eliminate or mitigate direct and indirect effects. The magnitude of effect to a historic property's integrity determines the severity of any direct, indirect, or cumulative effects. The following effects analysis identifies the scale and severity of identified or potential effects. Severity of effect is classified based on a professional assessment of the data available to date. The effect categories are: no/negligible, minor, moderate, and major. These categories represent a progressive scale that provides a qualitative assessment of the severity of any direct, indirect, or cumulative effects to the integrity of a cultural resource site.

Working definitions for the four severity categories are provided in Table 3.11-5. The four categories represent relative as opposed to absolute units based on professional assessments.

Table 3.11-5: Categories for identified or potential effects

Effect Categories	Working Definition	Explanatory Notes
No Effect Negligible	Route bisects or closely passes by some portion of a cultural resource site, but the effect on NRHP values is insignificant.	If the effect on integrity measures are determined to be "negligible," there is essentially no measurable effect on the cultural resource; therefore no mitigation measures are prescribed. No distinction is made between "no" disturbance and "negligible" disturbance. Therefore it is more appropriate to describe the most innocuous effects as "negligible" as opposed to "none." In either case, no mitigation measures are necessary, so the outcome is identical.
Minor	Effects on cultural resources are relatively minor, but not insignificant. Integrity of the NRHP values may diminish if measures are not taken to alleviate the potential effect.	If the severity of effect is determined to be "minor," some type of mitigation measure may be required. In most cases the preferred method of protection will be the erection of signs with wording to the effect that there are critical resource concerns in the area and certain activities (for example, camping) may be prohibited in localized areas. Most minor problems consist of indirect effects. In some cases, where appropriate,monitoring is prescribed to ensure that the minor degree of disturbance (or potential for disturbance) initially noted does not increase in severity over time. If Monitoring indicates that signs do not curtail any potential impacts to the site, more aggressive measures will be taken. Barriers are sometimes prescribed for minor threats when it appears as though the action responsible for the disturbance is well entrenched and not likely to be curtailed by the simple installation of a sign. The threshold between a "minor" and "moderate" threat is therefore more subjective than others.
Moderate	Effects on cultural resources are either localized or noted in multiple areas. Materials associated with NRHP values	If the severity of effect is determined to be "moderate," some type of mitigation measure is required. In most cases the preferred method will be to erect a barrier large enough to prohibit vehicle traffic off the designated route, thereby eliminating the potential for effects to cultural resources. Sites will continue to be

Effect Categories	Working Definition	Explanatory Notes
	exhibit some degree of damage or alteration, but NRHP integrity can be retained or improved if the detrimental activity is curtailed.	monitored to insure protection measures are effective
Major	Effects on cultural resources are severe. If that particular route is added to the system without mitigation measures, the action would result in adverse effects to the NRHP values.	If the effect is determined to be "major," more complex and potentially costly mitigation measures are required to prevent direct, adverse effects to the resource. In most cases, the only viable option may be re-routing the road/trail around the resource. Other mitigation measures may necessitate scientific data recovery which can be expensive and requires additional consulation under 36 CFR §800.

A severity rating of "negligible" indicates that there is essentially no measurable effect to the cultural resource; therefore the site is not "At Risk" and no mitigation measures are prescribed. A severity rating of "minor" indicates that some relatively minor disturbance has been noted within the boundaries of a cultural resource site. A "minor" value indicates that, if present patterns of use are indicative of future trends, direct and indirect effects can most likely be avoided by employing the simplest of protection measures. In most cases this will consist of installing signage in strategic locations informing the public of the presence of sensitive forest resources.

In some locations, it may be necessary to prohibit motorized vehicle camping or use to eliminate the threat.

If a cultural resources site is "moderately" susceptible to direct, indirect or cumulative effects, more extensive site disturbance has been noted. In this case, mitigation measures to avoid or minimize identified effects are required. Prescribed mitigation measures for moderate severity effects will most often take the form of physical barriers that prohibit off-route travel that could adversely affect cultural resources. Materials used may consist of timber, boulders, vegetation, or other materials or a combination thereof. The construction of barrier fences constitutes an additional option. A number of alternative mitigation measures could be employed, many of which are expressly described in Appendix B of the Motorized Recreation Programmatic Agreement.

An effect severity rating of "major" indicates that the integrity of cultural resource site values would be affected in a significant way unless appropriate mitigation measures are implemented. A "major" value is reserved for those cases where a cultural resource site exhibits evidence of an adverse effect associated with past activities either directly or indirectly associated with the motorized use of an unauthorized route and these adverse effects will continue or increase if the route or area is added to the NFTS. Mitigation measures associated

with direct or indirect effects of "major" severity require a substantial investment of time and resources to implement.

The following table provides a summary of the sites whose integrity would be affected based on this analysis. The data categorize current severity of effects if no action is taken to avoid adverse effects.

Table 3.11-6: Cultural Resources Effect Severity

Unknown	Negligible	Minor	Moderate	Major	Total
8	11	2	1	0	22

The mitigation measures initially prescribed qualify as the minimal actions necessary to alleviate potential adverse effects. If monitoring demonstrates that mitigation measures initially prescribed prove ineffective, additional protection measures available in the Motorized Recreation Programmatic Agreement will be applied to treat effects.

In the event that mitigation treatments listed in the Motorized Recreation Programmatic Agreement are inadequate or untenable and will no longer apply, compliance with 36 CFR §800 regulations will be necessary (USDA Forest Service 2006: Section III.E.4). Where such cases arise, the Forest will consult directly with the appropriate SHPO(s) and Indian Tribe(s) in order to develop and implement appropriate protection and mitigation measures.

A total of 64 miles of unauthorized routes have been identified on the Mad River and Lower Trinity Ranger Districts. A cultural resources risk assessment for the respective Ranger Districts is presented in the following table. The risk factors reported in the table below are broken down according to Ranger District. The table provides a comprehensive list of all cultural resources identified within the APE. It also organizes cultural resources sites according Ranger District and discloses risks (where applicable), proposed mitigation measures, and the status of each site according to alternative.

Table 3.11-7: Number of Cultural Resources and Risk Severity According to Ranger District

	SitesAt Risk	Sites Not At Risk	Unknown Risk	Sites Total
Mad River R.D.	3	11	0	14
Lower Trinity R.D.	0	5	6	11
Totals	3	16	6	27

3.11.3 Effects Analysis Methodology

Assumptions specific to cultural resources analysis:

1. Unauthorized routes and areas have already affected historic properties within route/area prisms.

2. Under the action alternatives, use will continue at current levels or increase over time on the designated system with the prohibition of cross-country motorized travel.
3. There is no measurable difference in potential impact to cultural resources, given identical environmental variables, between that generated by different vehicle classes, i.e., full-size four-wheel drive vehicles, off-road vehicles, and motorcycles.
4. According to the Motorized Recreation Programmatic Agreement, all cultural resources identified within the APE for all alternatives adding facilities to the National Forest Transportation System are considered historic properties for the purposes of this undertaking, unless they already have been determined not eligible in consultation with the SHPO or through other agreed on procedures (36 CFR 60.4; 36 CFR 800).

3.11.3.1 Data Sources

1. Site-specific cultural resource inventories. The Forest conducted cultural resource field surveys for this undertaking throughout the fall of 2008. The primary objective of these surveys was to identify historic properties within the APE that may be affected by the undertaking and to collect information on their current condition. A Cultural Resources Inventory Report documenting the results of the survey is on file with the Forest's Heritage Program (CRIR 05-10-1032).
2. Existing information was also utilized from sources including but not limited to cultural resource records, historic archives, maps, and GIS spatial layers on file with the Forest's Heritage Program.

3.11.3.2 Cultural Resources Indicators:

- Degree to which the integrity of historic property values are diminished.
- Number of historic properties within unauthorized routes at risk from ongoing use.
- Average number of historic properties per acre at risk if new routes or areas are created.

Cultural Resources Methodology by Management Action

1. Direct/indirect effects of the prohibition of cross-country motorized vehicle travel.

Short-term timeframe: 1 year

Long-term timeframe: 20 years.

Spatial boundary: District-wide where motor vehicle use is not already prohibited by law (e.g., wilderness, etc.).

Indicators: (1) Number of historic properties within unauthorized routes at risk from ongoing use; and (2) Average number of historic properties per acre at risk if new routes or areas are created.

Methodology: GIS analysis of site-specific cultural resource inventories and cultural resource records to identify: (1) the number of historic properties at risk within existing unauthorized routes (estimate of on-going direct/indirect effects curtailed); and (2) the average number of

historic properties per acre that would be protected from any new routes created in the future without a prohibition (estimate of indirect effects).

Rationale: Motorized Recreation Programmatic Agreement (PA).

2. **Direct/Indirect Effects of adding facilities (presently unauthorized roads, trails) to the NFTS, including identifying seasons of use and vehicle class.**

Short-term timeframe: 1 year

Long-term timeframe: 20 years.

Spatial boundary: Location of historic property.

Indicator(s): Degree to which the integrity of historic property values are diminished, related to: location, design, setting, materials, workmanship, feeling, or association.

Methodology: Use existing data from cultural resource site atlas, historic archives, maps, site record files, and GIS spatial layers, and information obtained from archaeological inventories of unauthorized routes, to identify cultural resources in the APE that may have direct or indirect effects.

Rationale: Motorized Recreation PA.

3. **Changes to the existing National Forest Transportation System in vehicle class and season of use.**

This type of action is not considered an undertaking subject to NHPA Section 106 compliance (USDA Forest Service Policy for Section 106 of the NHPA Compliance in Travel Management: Designated Routes for Motor Vehicle Use (2005b)). Motorized vehicles can already use NFTS roads. Allowing or prohibiting use of those roads by different types of vehicles will have no direct, indirect, or cumulative effect on cultural resources.

4. **Cumulative Effects**

Short-term timeframe: not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 20 years

Spatial boundary: Ranger District administrative boundary (outside of designated wilderness).

Indicator(s): Degree to which the integrity of historic property values are diminished, related to: location, design, setting, materials, workmanship, feeling, or association.

Methodology: Due to the relatively static boundaries of cultural resources sites, effects are limited to either direct/indirect in all of the action alternatives. Both types of effects have been identified during the analytical phase and mitigation measures have been prescribed to eliminate any potential for an adverse effect to NRHP values. Cumulative effects are not anticipated under

any action alternative because cross-country travel is prohibited and mitigation measures will be prescribed to eliminate the potential for an adverse effect to NRHP values. Cumulative effects would be expected under the no-action alternative because cross-country travel would not be prohibited**.** Existing data from cultural resource site atlases, historic archives, maps, site record files, and GIS spatial layers, and information obtained from archaeological inventories of unauthorized routes will be used to identify cumulative effects.

Rationale: Motorized Recreation Programmatic Agreement.

3.11.4 Environmental Consequences

The Affected Environment outlined in the previous section reflects the status of cultural resources under the No Action alternative (Alternative 1) in the short term. The calculations presented in that section provide baseline data used to form the scientific and analytic basis for the comparisons of the alternatives outlined in the Environmental Consequences section. In this section, the data are broken down and evaluated in more precise detail to determine the effects that each of the three action alternatives (Alternatives 2–4) will have on cultural resources. The disclosure of specific data related to the location or character of a historic property is regulated pursuant to stipulations in 36 CFR 800.11(c) and Section 304 of the NHPA when disclosure may cause a significant risk. Maintaining confidentiality of cultural resource site locations is also specifically directed in the LRMP (see Analysis Framework section above).

Accordingly, cultural resources sites are grouped and analyzed according to their location on the Mad River or Lower Trinity Ranger Districts. Route-specific cultural resource data (site records and the evaluation of potential site impacts, however, are included in the Motorized Travel Management Plan Cultural Resources Inventory Report (05-10-1032).

Direct and Indirect Effects of the Alternatives on Cultural Resources

As outlined above, three discreet management actions are common to each action alternative: (1) The prohibition of cross-country motorized vehicle travel, (2) The addition of unauthorized routes to the NFTS. and (3) Changes to the existing NFTS (for example, altering the vehicle class that will be permitted on any given system route). To minimize redundancy, management actions one and three are addressed collectively in the following section for all three of the action alternatives. The second action—the addition of roads, trails, and/or areas to the NFTS—will be addressed individually under each alternative discussion below.

Effects of the Prohibition on Cross Country Travel and Changes to the Existing NFTS

For the action alternatives, the prohibition of motor vehicle use off designated transportation systems and areas would have a beneficial effect on cultural resources throughout the forest in the short and long terms. It would curtail the on-going potential for adverse effects and reduce the threat to cultural and historic properties that would occur if use were to continue on all unauthorized roads and trails. It would also help eliminate potential effects resulting from the creation of any new routes and trails if cross-country motorized vehicle use was not prohibited. Under this prohibition, most if not all future permitted or other authorized motorized vehicle travel off designated NFTS roads will be subject to NHPA Section 106 compliance and potential effects to cultural and historic properties can be identified at that time.

Proposed changes to the existing NFTS are minimal (see Chapter 2, “Alternatives Considered in Detail”). The most common modification proposed to existing system routes is a

change in permitted vehicle class. For purposes of this cultural resource assessment there is no measurable difference in the scale of potential damage to cultural resources, regardless of vehicle size or type.

Effects of Adding Routes to the NFTS

In each of the action alternatives described below, the assumptions stated in the last two paragraphs apply and no further analysis of those actions is attempted. All subsequent analyses focuses on effects associated with each alternative concerning the addition of unauthorized routes to the NFTS. The Effects Analysis Methodology section below provides a summary of how the analyses were conducted. The data differentiate between direct and indirect effects. The definitions for each are provided in NEPA implementing regulations. Effects on cultural resources can take the form of:

5. **Direct effects**, which are caused by the action and occur at the same time and place.
6. **Indirect effects**, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. (40 CFR §1508.8)

Cumulative effects are also addressed:

"**Cumulative impact**" is the impact on the environment [historic properties in this case] which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR §1508.7)

The NEPA regulations state that “effects” and “impacts” as used in the 40 CFR §1500 regulations are synonymous (40 CFR §1508.8).

3.11.4.1 Alternative 1 – No Action.

Direct/Indirect Effects:

General effects of the No Action Alternative on cultural resources have been addressed in the Affected Environment section above.

At present, adverse effects to at least 47 cultural resources properties would continue if no management action is taken. Additional cultural resources properties located adjacent to a number of the unauthorized routes not analyzed for this project might also be at risk of adverse effects. To summarize, selection of the No Action Alternative would result in the on-going potential for adverse effects to at least 19 at-risk historic properties on 255 miles of unauthorized routes. New routes would be created, increasing the potential for adverse effects to additional cultural properties if the prohibition of cross country travel is not established. Adverse effects to cultural properties may alter, directly or indirectly, the characteristics that qualify the property for inclusion to the National Register of Historic Places in a manor that would diminish the integrity of the cultural property’s original location, design, setting, materials, workmanship, feeling, or association. Various disturbance agents can combine in ways that create potential threats to cultural resources. Disturbing effects caused by an undertaking may occur later in time and be reasonably foreseeable.

Implementation of Alternatives 2-4 would reduce the threat to cultural and historic properties that would occur if use were to continue. Consequently, the discussion here is limited to distinguishing between direct and indirect effects. Three cultural resources sites identified

within the APE will be directly or indirectly affected (or *at risk*) if no action is taken to manage vehicle use. Table 3.11-8 provides a breakdown of the potential direct and indirect effects. Additional sites surveyed under CRIR 05-10-1032 within the APE of existing routes not included in the Action Alternatives would also be affected under this Alternative. Cultural sites would be left unprotected and new routes would be created that would affect them through various disturbance agents. This alternative would have the greatest damaging effect on historic properties. There are an estimated 39 at-risk sites within the APE where effects are unknown.

Table 3.11-8:At-Risk Sites within APE Tabulated According to Indirect/Direct Effects

Unknown	Direct	Indirect	Direct & Indirect	Total
39	1	0	2	42

Cumulative Effects:

The geographic scope of the cumulative effects analysis is limited to the Forest's administrative boundary because impacts to cultural resources accumulate at their specific location, irrespective of actions in surrounding areas. The cumulative effects analysis excludes designated wilderness, proposed wilderness, and Research Natural Area (RNAs) where motorized uses are currently prohibited.

The data reported in Appendix Table C-18 indicate that the No Action alternative would have unmitigated, long-term adverse effects on cultural resources. A minimum of 3 historic properties would be adversely affected if no mitigation action was taken. Another 36 sites identified within the APE of existing unauthorized routes could potentially be affected in the absence of any long-term management actions (a total of five sites identified during the survey have been determined ineligible for the National Register therefore not considered at risk).

Cross-country travel is more likely to continue under Alternative 1 than the action alternatives, which would simplify enforcement by prohibiting any motorized use off of NFTS roads, trails, and areas. As a result, cumulative effects would likely occur under Alternative 1. An estimated 15% of all Forest lands within the two Ranger Districts have been surveyed for cultural resources. To date, approximately 688 cultural resources sites have been recorded. Therefore, additional cultural resources not yet identified exist in those areas not yet surveyed. Any further attempts to quantify cumulative effects, however, would be highly speculative.

3.11.4.2 Alternative 2 – Proposed Action.

Direct/Indirect Effects:

Alternate 2 would add 64 miles of unauthorized routes to the NFTS. In addition a total of 25 miles existing mixed-use routes, would be added system under this alternative. A total of 19 cultural resources sites have been identified within the APE for Alternative 2. Table 3.11-9 provides a risk assessment of Alternative 2 with the historic properties grouped according to Ranger District. A total of three cultural resources sites exhibit either direct and/or indirect effects requiring mitigation measures.

Table 3.11-9 Risk Assessment of Cultural Resources Properties Associated with Alternative 2

		Mad River	Lower Trinity	Totals
Risk Factor	Not at Risk	15	1	16
	At Risk	3	0	3
	Undetermined	0	0	0
Totals		**18**	**1**	**19**

Table 3.11-9 provides a more detailed assessment of potential risks to the three historic properties susceptible to direct and/or indirect impacts under Alternative 2. The table quantifies the type of effect, severity of effect, and mitigation measures prescribed to eliminate the potential effects.

The data are presented by Ranger District as they were in the previous table. A combination of direct/indirect effects was noted at two locations on the Mad River Ranger District. Direct effects were identified for one site located on the Mad River Ranger District. Severity of risk has been collectively determined to be negligible, minor, and/or moderate for all of the historic properties. Where potential threats (for example light use) have been assessed as "negligible", cultural resources are not considered at risk. Consequently, that category is eliminated from consideration in Table 3.11-10. Signage is proposed at one location to curtail various activities that have the potential to diminish National Register of Historic Places values. Protective barriers will be used at one location to safeguard historic properties from impacts resulting from vehicle use. The three at-risk properties will be monitored closely to assess direct/indirect effects due to specific activities that have been identified as potentially destructive if sustained over a period of time.

Cumulative Effects:

Cumulative effects are not anticipated under Alternative 2 because the NFTS would be well defined and all potential adverse effects (both direct and indirect) will be mitigated. This assertion presupposes the assumptions listed in the Management Actions and Effects Analysis Methodology sections above.

Table 3.11-10 Effects and Mitigations for At Risk Cultural Resources Associated with Alternative 2

		Mad River	Lower Trinity	Totals
Total Sites At Risk		**3**	**0**	**3**
Type of Effects	Direct	1	0	**1**
	Indirect	0	0	**0**
	Direct/Indirect	2	0	**2**
	Totals[1]	**3**	**0**	**3**
Severity of Effects[2]	Minor	2	0	**2**
	Moderate	1	0	**1**
	Severe	0	0	**0**
	Totals	**3**	**0**	**3**
Mitigation Measures	Monitor	3	0	**3**
	Signage	1	0	**1**
	Barriers	1	0	**1**
	Reroute	0	0	**0**
	Totals	**5**	**0**	**5**

[1]The effects reported in this subset sometimes have a many-to-one relationship with heritage properties. For example, multiple routes sometimes bisect a single site and different types of effects may have been documented for different routes. Consequently, the totals reported in this table will, on occasion, exceed the actual number of at-risk properties.

[2]Where potential threats have been assessed as "negligible", cultural resources are not considered at risk. Consequently, that category is eliminated from consideration in this table.

3.11.4.3 Alternative 3

Alternative 3 responds to the issue of access and motorized recreational opportunities on the two Ranger Districts and was formulated as a result of public input. It includes all actions identified for Proposed Action Alternative 2. It also includes additional inventoried unauthorized routes to the NFTS as companion trails along Forest Route 1 and along 07N31 on Lone Pine Ridge in the Horse L into area. It also adds short spurs for area access at Titlow Hill, and adds a tie-through from NFTS road 2S30 and the Old Willburn Ranch. Finally, Alternative 3 expands season of use for trails subject to wet weather closure and/or accessed by NFTS roads subject to wet weather closure, allowed season of use is May 1 to Nov 15.

Direct/Indirect Effects:

Alternative 3 would add 72 miles of routes to the NFTS. In addition a total of 25 miles existing mixed-use routes, would be added system under this alternative. A total of 27 cultural resources sites have been identified within the APE for Alternative 3. The following table provides a risk assessment of Alternative 3 with the cultural resources properties grouped according by Ranger District. Proposed routes with a total of three cultural resources sites that

are subject to either direct and/or indirect effects requiring mitigation measures have been evaluated.

Site record documentation and location data for six cultural resource sites indicate that a number of these sites located within the Pilot Ridge National Register District are adjacent to or within the APE of various sections of the companion trails paralleling Forest Route 1. The Pilot Ridge Archaeological/Historical National Register District has been determined eligible for the National Register of Historic Places. These sites have not yet been field checked and no site specific analysis has been completed to evaluate potential effects. It is assumed for this analysis that the routes proposed for addition to the NFTS in this area are likely to adversely affect cultural resources. Mitigation measures will fall within the Standard Resource Protection Measures outlined in the Programmatic Agreement and are assumed to include placement of geo-textile, over-filled with natural geological materials (SRPM 1E.) No further consultation with the SHPO will be required. It has been estimated by the Forest Cultural Resources Program Manager that mitigation measures, including application of site protective materials and follow-up archeological monitoring for condition assessment to protect significant archaeological data would amount to approximately $45,000.

Table 3.11-11 Risk Assessment of Cultural Resources Properties Associated with Alternative 3

		Mad River	Lower Trinity	Totals
Risk Factor	Not at Risk	15	1	16
	At Risk	3	6	9
Totals		18	7	25

Table 3.11-11 provides a more detailed assessment effects to the cultural resources properties susceptible to adverse effects under Alternative 3. The table quantifies the type of effect, severity of effect, and mitigation measures prescribed to eliminate or lessen these effects. The data are parsed according to focus area as they were in the previous table.

Direct effects have been identified at one cultural resource site associated with Alternative 3. Direct effects are a product of motor vehicle contact with some component of a cultural resource site. A combination of direct/indirect effects was noted at two additional properties. Severity of effects has been collectively determined to be negligible, minor, or moderate for all of the historic properties. Where potential threats have been assessed as “negligible”, cultural resources are not considered at risk. Consequently this category is eliminated from consideration in these tables.

Signage is proposed at three locations to curtail various activities that have the potential to diminish NRHP values. Protective barriers will be used at one location to safeguard cultural resources properties from vehicle activity. The three at-risk properties will be monitored closely to assess direct/indirect effects due to specific activities that have been identified as potentially destructive if sustained over a period of time.

Cumulative Effects:

Cumulative effects are not anticipated under Alternative 3 because the NFTS would be well defined and all potential adverse effects (both direct and indirect) will be mitigated. This

assertion presupposes the assumptions listed under the Management Actions and Effects Analysis Methodology sections above.

Table 3.11-12 Effects and Mitigations for At Risk Cultural Resources Associated with Alternative 3

		Mad River	Lower Trinity	Totals
Total Sites At Risk		3	6	**9**
Type of Effects	Unknown	0	6	**6**
	Direct	1	0	**1**
	Direct/Indirect	2	0	**2**
	Totals[1]	**3**	**6**	**9**
Severity of Effects[2]	Minor	2	0	**2**
	Moderate	1	0	**1**
	Major	0	0	**0**
	Totals	**3**	**0**	**3**
Mitigation Measures	Monitor	3	0	**3**
	Signage	1	0	**1**
	Barriers	1	0	**1**
	Reroute	0	0	**0**
	Totals	**5**	**0**	**5**

[1]The effects reported in this subset sometimes have a many-to-one relationship with heritage properties. For example, multiple routes sometimes bisect a single site and different types of effects may have been documented for different routes. Consequently, the totals reported in this table will, on rare occasions, exceed the actual number of at-risk properties.

[2]Where potential threats have been assessed as "negligible", cultural resources are not considered at risk. Consequently, that category is eliminated from consideration in this table.

3.11.4.4 Alternative 4

Direct and Indirect Effects:

Alternative 4 would retain the current NFTS system. No additional routes or areas would be added to the NFTS. The alternative also prohibits cross-country travel. The Motorized Travel PA clearly states that:

> Procedures in the Heritage Resources Motor Vehicle Route Strategy generally do not apply to routes in the APE that previously were designated part of Forest systems and not subject to review pursuant to Section 106 of the NHPA and its implementing regulations (36 CFR 800) (USDA Forest Service 2006).

Based on these criteria, no cultural properties would be affected under Alternative 4. At least 47 cultural resources would be protected from further damaging effects associated with cross-country travel. Additional cultural resource properties located adjacent to a number of the

unauthorized routes not analyzed for this project will also be protected from adverse effects. This alternative eliminates potential ongoing effects associated with any of those noted for cultural resource sites on the 255 miles of NFTS. Driving off established routes and creating ground disturbance on cultural sites will be eliminated. Historic structures will be protected from campers who may use materials for building fires, and cultural sites from graffiti damage, vandalism and illegal digging. The integrity of cultural sites will not be further compromised or damaged, historic properties will retain their elements of significance associated with National Register criteria and maintain their existing *in situ* location, design, setting, materials, workmanship, feeling, or association.

Cumulative Effects:

Likewise, cumulative effects are not anticipated under Alternative 4 because no routes would be added to the Forest's system. This assertion presupposes the assumptions listed under the Management Actions and Effects Analysis Methodology sections above.

3.11.5 Summary of Effects Analysis for All Alternatives

The quantity of cultural resource sites within the APE and the effects on those resources vary among the four alternatives. Table 3.11-15 provides a comprehensive list of all cultural resource sites identified in the APE. Effect assessments and proposed mitigations are provided for each property according to individual alternatives.

Cross-country travel is more likely to continue under Alternative 1 because it would not be prohibited. Cross country travel occurring under Alternative 1 would cause unmitigated impacts to cultural resources and the loss of NRHP values. The No Action alternative is the only alternative where adverse effects to cultural resources would continue without prescribing and implementing mitigation measures. At present, adverse effects to at least 47 cultural resources properties would continue if no management action is taken. Additional cultural resources properties located adjacent to a number of the unauthorized routes not analyzed for this project might also be at risk of adverse effects.

Alternative 4, in sharp contrast to Alternative 1, would have the least impact on cultural resources of the four alternatives. No unauthorized routes would be added to the NFTS under Alternative 4. The alternative also prohibits cross-country travel, as does Alternatives 2 and 3. Because no historic properties would be affected under Alternative 4, no mitigation measures would be required.

Of the action alternatives, Alternative 2 is designed to have the second least impact on cultural resources. The number of at-risk cultural resource sites identified in Alternative 2 (n=3) is significantly less than the number reported in Alternative 3 (n=8)—which is designed to enhance motorized recreation opportunities.

Mitigation measures prescribed for each alternative are designed to reduce or eliminate effects based on the nature of the impact to the cultural resources property and their severity. Alternative 3 requires the most intensive mitigation measures. Conversely, Alternative 4 requires the fewest mitigation actions. Signage is most often prescribed to reduce or eliminate indirect effects, such as activities associated with motorized vehicle camping within the boundaries of a site. The strategic placement of barriers is another protective measure. Monitoring is prescribed where there is uncertainty regarding the risk to historic properties or where it is unclear whether the disturbances affecting site integrity may continue.

In summary, potential adverse effects to cultural resources would vary according to alternative, demonstrating a tri-modal distribution when quantified. On one extreme, Alternative 1 would pose the greatest threat to cultural resources because no management actions would be taken to curb threats or current effects to NRHP values. In contrast, Alternative 4 would eliminate adverse effects to cultural resources within the APE because no routes would be added to the NFTS and cross-country travel would be prohibited. The remaining two action alternatives cluster between the two outliers. Organized from the least direct and indirect effects on cultural resources to the greatest, the order would be Alternatives 2 and 3.

Table 3.11-13 Summary of Effects and Mitigations for all Alternatives

			Alt. 1	Alt. 2	Alt. 3	Alt. 4
Sites Not At Risk			5	16	16	0
Sites At Risk			42	3	8	0
Sites in APE			**47**	**19**	**24**	**0**
Sites At Risk	**Type of Effect**	Direct	1	1	1	0
		Indirect	0	0	0	0
		Direct/Indirect	2	2	2	0
		Totals[1]	**3**	**3**	**3**	**0**
	Severity of Effects[2]	Minor	2	2	2	0
		Moderate	1	1	1	0
		Major	0	0	0	0
		Totals	**3**	**3**	**3**	**0**
	Mitigation Measures[3]	Monitor	0	3	3	0
		Signage	0	1	1	0
		Barriers	0	1	1	0
		Reroute	0	0	0	0
		Totals	**0**	**5**	**5**	**0**

[1]The effects reported in this subset sometimes have a many-to-one relationship with heritage properties. For example, multiple routes sometimes bisect a single site and different types of effects may have been documented for different routes. Consequently, the totals reported in this table will, on rare occasions, exceed the actual number of at-risk properties.

[2]Where potential threats have been assessed as "negligible", cultural resources are not considered at risk. Consequently, that category is eliminated from consideration in this table.

[3]No mitigation measures would be implemented if Alternative 1 was selected.

3.11.6 Compliance with the Forest Plan and Other Direction

The Six Rivers National Forest Land and Resource Management Plan (USDA Forest Service 1988) (LRMP) outlines the conditions to be retained throughout the Forest in order to ensure resource protection and enhancement. The LRMP standards and guidelines that govern management of cultural resources on the Forest are listed in the form of four bullet statements in the Introduction section above. In this section the four alternatives are analyzed in the context of the LRMP to determine whether and how they comply with LRMP standards and guidelines.

If the No Action alternative is selected, many of the LRMP cultural resources standards and guidelines would be compromised. To date, no formal action has been taken by the Forest to promote or otherwise encourage cross-country travel; therefore, there was no formal undertaking by which to consider LRMP standards and guidelines. Should the No Action alternative be selected, however, the decision would formally constitute an undertaking. Selecting the No Action alternative would result in a failure to conduct adequate consultation with SHPOs and/or American Indian groups in addition to insufficient inventory, evaluation, and protection of historic properties. The lack of adequate management plans would be expected to result in sustained and extensive adverse effects to historic properties. Because the Forest would formally be electing to take no action to manage or protect cultural resources, the Forest would be in non-compliance with the LRMP. It would also fail to comply with Section 106 mandates outlined in the Analysis Framework section above.

Alternative 4 would retain the present NFTS and no new routes or areas would be added to the NFTS. Under this option, the Forest would maintain compliance with the LRMP and other applicable laws and regulations. The effects of future undertakings associated with the maintenance, modification, or expansion of the NFTS would be assessed separately and applicable regulatory requirements (e.g., NEPA and NHPA) would be applied as appropriate to protect cultural resources and other resources.

Table 3.11-14 Comparison of Effects to Cultural Resources

Indicators – Cultural Resources	Rankings of Alternatives for each Indicator[1]			
	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Degree to which the integrity of historic property values are diminished	1	3	2	4
Number of historic properties within unauthorized routes at risk from ongoing use	1	3	2	4
Average number of historic properties per acre protected from creation of new routes	1	3	2	4
Average for Cultural Resources	**1**	**3**	**2**	**4**

[1] A score of 4 indicates the alternative has the least impact for cultural resources related to the indicator; A score of 1 indicates the alternative has the most impact for cultural resources related to the indicator.

See Cultural Resource Template - There are 3 measurement indicators and "Threat to cultural resources, sites at risk" are not included; all three should be listed.

1. Degree to which the integrity of historic property values are diminished.
2. Number of historic properties within unauthorized routes at risk from ongoing use.
3. Average number of historic properties per acre at risk if new routes or areas are created.

The Travel Management EIS includes two action alternatives: Alternatives 2 and 3 where LRMP standards and guidelines would be met provided the stipulations outlined in the Motorized Recreation PA are met.

In summary, Alternative 1 is the only alternative that would deviate from LRMP direction and applicable cultural resource laws and implementing regulations. Compliance with all relevant laws, regulations, and policies could be maintained in Alternatives 2–4, although resource investments and the complexity of mitigation measures associated with each alternative vary.

Table 3.11-15 Condition Assessments of Extant Cultural Resources Sites within Area of Potential Effect

Ranger District	FS Site#		At Risk?	Eligible for National Register	Nature of Effect	Severity of Effect	Effect Type	Standard Protection Measure /Mitigation	Alt 1	Alt 2	Alt 3	Alt 4
LT	05105300268		No	Not Eligible	N/A	N/A	Unknown	None	Y	N	N	N
MR	05105400017		Yes	Unevaluated	ground disturbance / erosion	Minor	Direct & Indirect	Signage / Monitoring	Y	Y	[illegible]	N
MR	05105400350		No	Unevaluated	ground disturbance & looting	Negligible	Cumulative & Direct	Physical Barrier & Monitoring	Y	N	N	N
MR	05105400348		No	Eligible	N/A	Negligible	None	None	Y	N	N	N
MR	05105400218		No	Unevaluated	erosion	Negligible	Cumulative & Direct	Monitoring	Y	N	N	N
MR	05105400071		No	Unevaluated	looting	Negligible	Indirect	None	Y	N	N	N
MR	05105400070		No	Unevaluated	N/A	Negligible	Unknown	None	Y	N	N	N
MR	05105400124	*	No	Unevaluated	N/A	Negligible	Unknown	None	Y	N	N	N
MR	05105400124	*	No	Unevaluated	N/A	Negligible	Unknown	None	Y	N	N	N
MR	05105400024		No	Not Eligible	N/A	N/A	None	None	Y	N	N	N
MR	05105400063		No	Unevaluated	N/A	Negligible	Unknown	None	Y	N	N	N
MR	05105400100		No	Unevaluated	N/A	Negligible	Unknown	None	Y	N	N	N
MR	05105400215		No	Not Eligible	N/A	N/A	None	None	Y	N	N	N
MR	000FN080304		No	Not Eligible	N/A	N/A	None	None	Y	N	N	N
MR	00000HTMR12		No	Not Eligible	N/A	N/A	None	None	Y	N	N	N
MR	05105400027		Yes	Unevaluated	ground disturbance	Moderate	Direct & Indirect	Physical Barrier & Monitoring	Y	Y	Y	N
MR	05105300197		No	Eligible	N/A	Negligible	None	None	Y	N	N	N
MR	05105300199		No	Eligible	N/A	Negligible	None	Previously Applied Arch Padding	Y	N	N	N
MR	000FN080302		Yes	Unevaluated	ground disturbance / erosion	Minor	Direct	Monitoring	Y	Y	[illegible]	N
MR	05105400142		Yes	Eligible	ground disturbance	Negligible	Indirect	Monitoring	Y	N	Y	N
LT	05105300035		No	Eligible	N/A	Negligible	Indirect	Avoidance	Y	N	Y	N
LT	05105300043		No	Eligible	N/A	Negligible	Indirect	Avoidance	Y	N	Y	N
LT	05105300044		No	Eligible	N/A	Negligible	Indirect	Avoidance	Y	N	Y	N
LT	05105300046		No	Eligible	N/A	Negligible	Indirect	Avoidance	Y	N	Y	N
LT	05105300048		No	Eligible	N/A	Negligible	Indirect	Avoidance	Y	N	Y	N
LT	05105300053		No	Eligible	N/A	Negligible	Indirect	Avoidance	Y	N	Y	N
LT	05105300054		No	Eligible	N/A	Negligible	Indirect	Avoidance	Y	N	Y	N
LT	05105300047		Yes	Eligible	N/A	Negligible	Indirect	Arch Padding & Monitoring	Y	N	Y	N

* Site #05105400124 is within the APE of two different OHV routes
Where potential threats have been assessed as “negligible” cultural resources are not considered at risk.
Unknown indicates where field examination is needed and pending.

3.12 Air Quality

This section describes the affected environment and environmental consequences for air quality.

It describes the area potentially affected by the alternatives and existing resource conditions within that area. Measurement indicators are used to describe the existing conditions for the forest. The measurement indicators will be used in the analysis to quantify and describe how well the proposed action and alternatives meet the project objectives and address resource concerns.

3.12.1 Analysis Framework: Statute, Regulation, Forest Plan and Other Direction

Air quality is managed through a series of federal, state, and local laws and regulations designed to assure compliance with the Clean Air Act. A summary of how the regulations apply to this project is provided here.

Federal Clean Air Act

The Federal Clean Air Act (CAA) is the federal law passed in 1970, and last amended in 1990, (42 U.S.C. §7401 et seq.) which is the basis for national control of air pollution.

Regional Haze Rule (1990 Clean Air Act Amendments), 40 CFR Part 51

The Regional Haze Rule requires states to demonstrate “reasonable progress” toward improving visibility in each Class I area over a sixty-year period (to 2064), during which time visibility should be returned to natural conditions. Class I areas include wilderness areas or National Parks greater than 5000 acres which existed on August 7, 1977.

General Conformity Rule (1990 Clean Air Act Amendments) (Section 176 (c) of the Clean Air Act (part 51, subpart W, and part 93, subpart B.)

U.S. EPA passed the final General Conformity Rule in 1993. Under this rule, federal agencies must work with State and local governments in a non-attainment or maintenance area to ensure that federal actions conform to the initiatives established in the applicable state implementation plan (U.S. EPA, 2008).

California Clean Air Act (H&S §§ 39660 et seq.)

California adopted the California Clean Air Act (CCAA) in 1988. The Act provides the basis for air quality planning and regulation in California, independent of federal regulations, and establishes ambient air quality standards for the same criteria pollutants as the federal clean air legislation (CARB, 2007).

CARB Off-Road Recreational Vehicle Emissions Standards Rulemaking

In 1994, the CARB approved new off-highway recreational vehicle regulations (since amended in 1998). The rulemaking established emission standards for off-highway vehicles (OHVs) including off-road motorcycles (dirt bikes) and all-terrain vehicles (ATVs) (CARB, 2006). OHV registration became contingent on vehicle compliance to California emissions standards. Dirt bikes and ATVs that meet emission standards are eligible for OHV Green Sticker

registration and have a year-round operating period, while noncompliant vehicles fall under the OHV Red Sticker program which has a limited operational season.

Air Quality Management District

The North Coast Unified Air Quality Management District (NCUAQMD) covers the Six Rivers National Forest. The NCUAQMD has published rules and regulations that are used to manage air quality within their District. In addition to following these rules and regulations, the Ranger Districts prepare Smoke Management Plans which contain specific measures that are designed to minimize smoke emissions during prescribed burns.

3.12.2 Six Rivers Land and Resources Management Plan (LRMP)

The LRMP includes the following direction related to air quality management:

- National Forest activities will be designed and managed to maintain air quality at levels which meet State and/or local government standards and regulations
- Proper dust abatement measures will be taken prior to any activity that will result in the sustained generation of dust
- Yolla Bolly-Middle Eel Wilderness – meet or exceed air quality standards for a Class I airshed
- Trinity Alps Wilderness - maintain wilderness air quality to meet state Class II air quality standards at a minimum

3.12.3 Affected Environment

Topography and weather patterns determine the extent to which airborne particulate matter accumulates within a given area. Weather patterns strongly influence air quality through pollutant dispersion. The primary weather conditions that affect dispersion are atmospheric stability, mixing height and transport wind speed. Atmospheric stability refers to the tendency for air to mix vertically through the atmosphere. Mixing height is the vertical distance through which air is able to mix. The transport wind speed is a measure of the ability to carry emissions away from a source horizontally. These factors determine the ability of the atmosphere to disperse and dilute the released emissions.

The general climate of the Six Rivers National Forest varies considerably with elevation and proximity to the coast. The Gasquet and northern Orleans Ranger Districts have a maritime climate, with cool to mild, and wet winters, with much drier, but still mild summers. At the other extreme, the southern portion of the Forest, the Mad River District climate varies from temperate to Mediterranean, being generally removed from the cool ocean effects. Most precipitation is connected with winter storms that move inland from the Pacific. The moist air ascends as it moves across the coastal mountains, and associated orthographic lifting results in a considerable increase in rainfall and intensity.

In general, winds in the river drainages are associated with daily diurnal winds and sea breezes are channeled inland by the topography and add to the local upcanyon winds. These winds are strongest in mid-to-late summer in the major river drainages, with 12-16 mph upcanyon winds during the late afternoons and in the evening on a daily basis.

3.12.3.1 Existing Conditions Forest-wide

Air quality across the Forest is generally considered good to excellent due to low population density and the remote nature of the Forest. Air quality can be and has been severely impacted by particulate matter (PM) and other pollutants during large wildfire events on the Forest. A State of Emergency was declared due to smoke impacts both during the Megram Fire (1999) and the 2008 wildfire events.

Except during these extreme events, all Federal standards of air quality are consistently achieved across the entire Forest (including those for ozone, carbon monoxide, particulate matter [PM 2.5 and PM 10], and nitrogen dioxide). The overall area is considered to be in "attainment" by Federal standards, and it has previously met and currently meets ambient air quality standards.

Visibility across the Forest is also considered good, except during major wildfires. During the Megram Fire (1999) and the fires of 2008, visibility was often reduced down to 20-feet. Several times during this fire, imaging and suppression aircraft were prevented from flying due to dense smoke. The clear visibility of the Trinity Alps Wilderness was severely degraded throughout the duration of these two large fire events. The Mad River Ranger District contains a portion of the Yolla Bolly Middle-Eel Wilderness, which is a Class I Wilderness. Visibility was also degraded for this wilderness during the 2008 fire season.

Fugitive Dust

Atmospheric dust arises from the mechanical disturbance of granular material exposed to the air.

Dust generated from these open sources is termed "fugitive" because it is not discharged to the atmosphere in a confined flow stream. Common sources of fugitive dust include native surface roads, agricultural tilling operations, aggregate storage piles, and heavy construction operations. In the project area, native surface roads are the most common source of fugitive dust.

Fugitive road dust is a result of motor vehicle use when road surfaces are dry; the force of wheels moving across the native surfaces causes pulverization of surface material. Dust is lofted by the rolling wheels as well as by the turbulence caused by the vehicle itself. This air turbulence can persist for a period of time after the vehicle passes.

The quantity of dust emissions from a given segment of native surface road varies linearly with the volume of traffic. Variables which influence the amount of dust produced include the average vehicle speed, the average vehicle weight, the average number of wheels per vehicle, the road surface texture, the fraction of road surface material which is classified as silt (particles less than 75 microns in diameter), and the moisture content of the road surface (US EPA 2002).

The impact of a fugitive dust source on air quality depends on the quantity and drift potential of the dust particles injected into the atmosphere. In addition to large dust particles that settle out near the source, considerable amounts of fine particles also are emitted and dispersed over much greater distances from the source. Theoretical drift distance, as a function of particle diameter and mean wind speed, has been computed for fugitive dust emissions. Results indicate that, for a typical mean wind speed of 10 mph, particles larger than about 100 microns in aerodynamic diameter are likely to settle out within 20 to 30 feet from the edge of the route or other point of emission. Particles that are 30 to 100 microns in diameter are likely to undergo impeded settling. These particles, depending upon the extent of atmospheric turbulence, are likely to settle within a few hundred feet of the route. Smaller particles have much slower

gravitational settling velocities and are much more likely to have their settling rate retarded by atmospheric turbulence.

Naturally Occurring Asbestos

Naturally Occurring Asbestos (NOA) is commonly found in serpentine and other ultramafic rock formations. When asbestos containing rocks are crushed or broken through weathering and ground disturbing activities (including driving over unpaved roads, trails, or soils), asbestos-containing dust can be generated. Once airborne, these asbestos fibers can be inhaled and can pose a potential health risk. Forests will implement measures to make the public and employees aware of the potential hazards of NOA.

Particulate Matter (PM10 and PM2.5)

Sources of PM10 emissions include wood burning stoves from residential areas; smoke from pile burning, broadcast burning, and wildfires; and re-suspended road dust and cinders. The finer particles of PM2.5 primarily come from: car, truck, bus and off-road vehicle (e.g., construction equipment, snowmobile, locomotive) exhaust;, other operations that involve the burning of fuels such as wood, heating oil or coal; and natural sources such as forest and grass fires.

The Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) regulate these particles to protect visibility and human health. The federal 24-hour ambient air quality standard is 150 micrograms/m3 for PM10 and 35 micrograms/m3 for PM2.5 (US EPA 2008). The entire Six Rivers National Forest is in attainment for Federal standards of both PM10 and PM2.5.

Outdoor air levels of fine particles (PM 2.5) and inhalable coarse particles (PM10) increase during periods of stagnant air (very little wind and air mixing), when the particles are not carried away by wind, or when winds bring polluted air into the area from outside sources. In general, as the levels of PM2.5 in outdoor air increase, the air appears hazy and visibility is reduced. These conditions are similar in appearance to high humidity or fog.

Ozone

Ozone is a secondary pollutant formed by complex photochemical reactions of nitrogen oxides (NOx) and volatile organic compounds (VOC) in the presence of sunlight. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents as well as natural sources emit NOx and VOC that help form ozone. Currently the Ozone - eight hour federal standard is .075 ppm. The entire Forest is currently in attainment for the Ozone - eight hour standard (US EPA 2008).

3.12.3.2 Existing Conditions in Class I Airsheds

The Clean Air Act Amendments of 1977 require that a program be established to prevent degradation of air quality in pristine areas and protect Air Quality Related Values (AQRVs) of Class I areas. Designation as a Class I area allows only very small increments of new pollution above already existing air pollution levels. Class I areas include National Wilderness Areas greater than 5,000 acres in existence on August 7, 1977, when the amendments were signed into law. The Yolla Bolly – Middle Eel Wilderness (a Class I wilderness) is within and adjacent to the southern portion of the Mad River Ranger District. Within Class I areas, visibility is the AQRV that is most affected, especially by fugitive dust. Particulates that remain suspended in

the atmosphere are efficient light scatterers, and therefore, contribute to regional haze. The AQRV of visibility is considered good to excellent most of the time in these Classes I airsheds, except during major wildfires.

3.12.4 Environmental Consequences

The Affected Environment outlined in the previous section reflects the current air quality conditions for the Six Rivers National Forest air basins, including those being considered in this analysis. In the Environmental Consequences section, the effects of the alternatives are analyzed to determine the potential for public motor vehicle travel to cause or contribute to violations of National Ambient Air Quality standards (NAAQs), degrade air quality, affect Class I areas, or to cause or contribute to visibility impairment beyond the existing conditions.

3.12.4.1 Effects Analysis Methodology

As described in Chapter 2, the action alternatives include proposals to prohibit cross-country vehicle travel, make limited changes to the existing NFTS, and add new facilities (presently unauthorized routes) to the NFTS. The following section describes the analysis methods used to assess the effects of the alternatives on air quality.

Measurement Indicators: The following indicators are used to evaluate the direct, indirect, and cumulative effects of prohibiting cross-country travel and adding facilities (presently unauthorized routes) to the NFTS.

1. Miles of native surface routes available for public motorized use within one mile of Class I Airsheds – Yolla Bolly – Middle Eel Wilderness
2. Miles of native surface routes available for public motorized use within one mile of Class II Airsheds – Trinity Alps Wilderness
3. Miles of proposed NFTS routes with the potential for NOA

Rationale: Motor vehicles generate dust (particulate matter) and ozone-forming emissions. Miles of native surface unauthorized routes within or adjacent to a Class I and Class II wildernesses is used to compare the dust-production potential of each alternative to existing levels.

Proposed changes to the existing NFTS (such as changes in vehicle class and season of use) will not be considered further in this analysis. Motorized vehicles can already use NFTS roads. Allowing or prohibiting use of those roads by different types of vehicles will have no direct, indirect, or cumulative effect on air quality.

Direct and Indirect Effects of the Alternatives on Air Quality

The number of vehicle miles traveled annually by forest users is not expected to change in any of the alternatives through the prohibition of cross-country travel and the redirection of motorized use onto a designated system of roads and trails. As a result, adverse effects to air quality (i.e., effects that would cause or significantly contribute to air quality impairment beyond the existing conditions) are not anticipated for any of the alternatives. This determination is based on the following:

- Emissions from unpaved roads are not a primary source of PM10 or PM2.5 in the study area.

- None of the alternatives propose routes, areas or terminal facilities that would result in a significant increase or change in concentration of use. Use levels for the vast majority of unauthorized routes are light (<25 trips/week) to low (25-100 trips/week, mainly during hunting season). In addition, many of these routes are short spurs off of existing NFTS roads. Since many of the routes do not provide through access and receive very low use, reductions in the miles of routes available for motorized use are not expected to result in major changes in use levels on designated routes.

Adjacent to Class I and Class II airsheds, motorized vehicle use of native surface unauthorized routes would continue to produce dust and emissions at or below current levels. Less than one mile of routes would be added for motorized use within one mile of either a Class 1 or Class II airshed for Alternatives 2 and 3. In the existing condition, less than 1% of the total unauthorized routes on the Forest are located within 1 mile of a Class I airshed. Fugitive dust generated from unauthorized routes impacting visibility in Class 1 airsheds is of very low concern. The relative contribution of any of the alternatives to visibility concerns within Class I airsheds is expected to be negligible.

Unauthorized route mileage across the Forest is low (255 miles in the existing condition) and their use is also light to low, so use of these routes would not cause the Forest to be in non-attainment for ozone production. Recreational travel on the unauthorized routes will not cause or significantly contribute to violations of the NAAQs in the existing condition or the action alternatives. For all of the alternatives, direct and indirect effects of vehicle emissions on air quality would not result in measurable variations from current conditions.

The potential exposure to asbestos from dust generated by motorized vehicle traffic does exist for these existing and proposed routes. See Table 3.13-1 for the miles of the proposed routes that pass through serpentine soils with the potential for NOA.

Table 3.12-1: Miles of existing and additional miles with the potential for NOA

	Alternative			
	1	**2**	**3**	**4**
Total Existing (same as No Action alternative)	4.42	4.42	4.42	4.42
Added miles within potential NOA	0	1.23	1.23	0

Effects of Mitigation Measures

Mitigation measures proposed to reduce or eliminate effects on forest resources are summarized in Chapter 2, and listed by route in Appendix A. All proposed mitigation measures are not expected to create dust above that generated through motorized use of the route itself. This is because the other mitigations do not involve new ground disturbance, disturbance is confined to the existing road prism, and/or ground disturbance is very limited in scope.

Cumulative Effects

Present and reasonably foreseeable future actions within the project area that would affect local air quality (particulate matter and visibility) include smoke from wildland fires and wood burning.

Recreational OHV use is the primary present and foreseeable future activity relevant to this discussion of cumulative effects to air quality. Most of the roads and trails in this area are part of the existing system; unauthorized route mileage is extremely limited. Although the study area is a popular destination for recreational OHV use, the relative contribution of emissions in this area to levels of ozone, particulate matter, or fugitive dust is considered to be low because:

- Proposals to add routes to the NFTS would not result in measurable adverse cumulative effects to air quality related issues, given the extremely limited added mileage within one mile of either Class I or Class II wildernesses.

Carbon Dioxide (CO2), Methane (CH4) and Nitrous Oxide (N20) emissions generated by public motorized vehicle travel on NFTS facilities are expected to contribute to the global concentration of greenhouse gases that affect climate change. Projected climate change impacts include air temperature increases, sea level rise, changes in the timing, location, and quantity of precipitation, and increased frequency of extreme weather events such as heat waves, droughts, and floods. The intensity and severity of these effects are expected to vary regionally and even locally. However, because greenhouse gases from vehicle emissions mix readily into the global pool of greenhouse gases, it is not currently possible to discern the effects of this project from the effects of all other greenhouse gas sources worldwide. Potential regional and local variability in climate change effects add to the uncertainty regarding the actual intensity of this project's effects on global climate change. Further, emissions associated with this project are extremely small in the global atmospheric CO2 context, making it impossible to measure the incremental cumulative impact on global climate from emission associated with this project.

In summary, the potential for cumulative effects is considered negligible for all alternatives because none of the alternatives would result in measurable direct and indirect effects on air quality or global climatic patterns.

3.12.5 Compliance with the Forest Plan and Other Direction

All standards and guidelines from the Forest Plan related to air quality are met. This approach meets the standards for: Federal, State and local air quality standards; dust abatement; and Class I and Class II wilderness areas. Additionally this discussion presents the potential for health risk from Naturally Occurring Asbestos.

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3.13 Visual Resources

This section of the Motorized Travel Management environmental analysis examines the extent to which alternatives respond to visual resources management direction established in the Six Rivers National Forest Land and Resource Management Plan (LRMP) and the Travel Management (TM) Rule. The LRMP visual resources direction was established under the implementing regulations of the National Forest Management Act (NFMA).

In the development of the Six Rivers National Forest's Land and Resource Management Plan (LRMP), the Forest's visual resources were inventoried to determine the landscape's scenic attractiveness (Variety Class inventory) and the public's visual expectations (Sensitivity Level inventory). Based upon these inventories, Visual Quality Objectives (VQOs) were established for all forest land areas. The VQOs establish minimum acceptable thresholds for landscape alterations from an otherwise natural-appearing forest landscape. For example, areas with a Retention VQO are expected to retain a natural appearance; areas with a Partial Retention VQO may have some alterations, but they remain subordinate to the characteristic landscape; areas with a Modification VQO can have alterations that do not look natural appearing.

Roads and trails create linear alterations in landscapes that can be mitigated through sound design. Unmitigated, they present uncharacteristic line qualities in forest landscapes. Landscapes with a dense canopy cover have the capability of masking these linear alterations; sparsely covered landscapes have less capability. The proliferation of unauthorized routes, particularly in sparsely covered landscapes, can adversely affect the Forest's visual resources.

3.13.1 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

Direction relevant to the proposed action as it affects visual resources includes:

National Forest Management Act (NFMA) The National Forest Management Act (NFMA), and its implementing regulations, required the inventory and evaluation of the forest's visual resource, addressing the landscape's visual attractiveness and the public's visual expectations. Management prescriptions for definitive lands areas of the forest are to include Visual Quality Objectives.

Travel Management Rule The TM Rule does not cite aesthetics specifically, but in the designation trails or areas, the responsible official shall consider effects on forest resources, with the objective of minimizing effects of motor vehicle use.

3.13.2 Six Rivers Land and Resources Management Plan (LRMP)

The LRMP contains forest-wide management direction in the form of Visual Quality Objectives and specific management area (MA) direction for visual resources. The forest-wide goal for visual resources is to "Manage Forest lands to achieve visual quality commensurate with public uses. The Forest will implement a program of visual resource management that will emphasize the maintenance of the undisturbed or near undisturbed character of the landscape within the viewsheds adjacent to heavily used recreation travel routes or use areas." (IV-63). Forest-wide visual standards and guidelines in the LRMP applicable to Motorized Travel

Management include 17 Management Areas identified in the Six Rivers LRMP, two of which provide guidelines for this process, MA 13 Retention and MA 16 Partial Retention.

3.13.3 Effects Analysis Methodology

Agriculture Handbook Number 434 (USDA Forest Service, 1973) and Agriculture Handbook Number 701 (USDA Forest Service, 1995) describes the basic landscape management concepts used by the Forest Service for the management of visual resources. The basic visual terminology used to describe landscape character include form, line, color, and texture. For classification, analysis, and inventory of the visual resource landscape viewing is identified by the distance zones of foreground (300' to ½ mile), middleground (½ – 4 miles), and background (4 miles to horizon). Agriculture Handbook Number 462 (USDA Forest Service, 1974) provides a description of the VQOs used for the visual management of lands administered by the Six Rivers National Forest:

- Preservation – Only allows for ecological changes and all other management activities, are prohibited.
- Retention – Provides for management activities that are not visually evident and landscape character appears unaltered with only minimal deviations.
- Partial Retention – Provides for management activities that remain visually subordinate to the landscape and landscape character may appear slightly altered.
- Modification – Management activities may visually dominate the characteristic landscape.

Assumptions specific to visual resources analysis:

1. Based upon the review of the LRMP, the basic Measurement Indicator for the visual resources is compliance with the Retention and Partial Retention VQOs which are delineated as specific management areas in the LRMP.
2. Viewsheds adjacent to heavily used recreation travel routes or use areas are already covered under the basic Sensitivity Level inventory used in establishing the LRMP's VQOs; therefore, it is not necessary to conduct an additional analysis of these travel routes or use areas.
3. NFTS additions contributing to the continuity of motor vehicle travel will have a beneficial effect on visual resources, since it is assumed that dead-end route situations will be reduced.
4. Preservation VQO is not addressed since there are no proposed additions to the NFTS within these areas.
5. Modification VQO is not analyzed because it allows for alterations such as roads that do not appear natural.

3.13.3.1 Data Sources:

1. LRMP 1995
2. Six Rivers National Forest National Visitor Use Monitoring Results Report FY 2003.
3. GIS layers and associated tabular data sets of the following data: routes, and, VQOs updated for 2007 California Wilderness Act Additions.

Visual Resources Indicators:

The extent to which the proposed additions to the NFTS fall within the Retention and Partial Retention VQOs (number of miles traversing landscapes that are to remain natural to near-natural appearing in character).

Visual Resources Methodology by Action:

1. **Direct/indirect effects of the prohibition of cross-country motorized vehicle travel.**

The prohibition of cross-country motorized vehicles will have a positive effect on the Forest's visual resources. Improvement of the visual resource is long-term; unauthorized route and impact areas will gradually heal over time**.**

2. **Direct/indirect effects of adding trails to the NFTS, including identifying vehicle class and seasons of use.**

Adding trails to the NFTS can have a beneficial effect on the motorized vehicle experience if the additions contribute to the continuity of the motor vehicle travel experience and dead ends are reduced. Loop experiences are desired to maximize recreational opportunity. Non-characteristic line quality created by trail segments is the greatest impact to the visual resources; the location and design of the segments can significantly reduce their visual impact.

Short-term timeframe: 1 year

Long-term timeframe: 20 years, the approximate length of time for natural rehabilitation of unauthorized routes

Spatial boundary: The viewshed is the unit of spatial analysis when considering effects associated with changes in the NFTS or season of use.

Indicator(s): The extent to which the proposed additions to the NFTS fall within the Retention and Partial Retention VQOs (number of miles traversing landscapes that are to remain natural to near-natural appearing in character).

Methodology: GIS analysis of added trails in relation to Retention and Partial Retention VQOs.

Rationale: Compliance with the Retention and Partial Retention Visual Quality Objectives VQOs.

3. **Direct and indirect effects of changes to the existing NFTS**

No change in effect for visual resources.

Cumulative Effects

Short-term timeframe: Not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term timeframe: 20 years.

Spatial boundary: The viewshed is the unit of spatial analysis for determining cumulative effects.

Indicator(s): Number of key viewsheds that are or have the potential to be affected by motor vehicle travel.

Methodology: Key viewsheds are identified in the LRMP as MA 13 Retention and MA 16 Partial Retention VQOs. Identify whether any of these key viewsheds are or have the potential to be affected by motor vehicle travel.

Rationale: Compliance with the Retention and Partial Retention VQOs.

3.13.4 Affected Environment

From a visual perspective, the Forest has a diverse landscape with many areas of high scenic quality such rivers, steep river canyons, and forested peaks. There are two different types of landscapes. The northern portion of the Forest has very steep slopes and sharp ridges; the southern portion has gentler, moderately steep slopes with more rounded landforms; grassy glades are common and they tend to diversify the landscape by providing breaks in the forested cover. The scenic qualities of the Forest have changed over the last 100 years, from an undisturbed appearing landscape to one modified by human activities such as timber harvest and road construction. To a lesser degree, wildfires and the historic needs to move goods and people through the landscape have modified its appearance. Grazing, utility lines, and mining have affected the undisturbed appearance of the Forest to a lesser extent.

The condition of forest scenery is of high importance to forest visitors. In the 2003 National Visitor Use Monitoring (NVUM) survey, visitors rated the condition of forest scenery as good to very good; on a mean scale of importance with 5.0 as highest, scenery was ranked 4.7. During their visits to the Forest, viewing natural features was one of the top five recreation activities along with driving for pleasure. Visitors also identified viewing natural features as one of the top primary activities in addition to hunting, relaxing, fishing, and picnicking.

Table 3.13-1: Project Area by VQOs

VQO	Acres	Percent
Preservation	57,271	13.6%
Retention	27,156	6.4%
Partial Retention	60,560	14.3%
Modification	277,089	65.7%
Total	**422,076**	

Table 3.13-2: VQO Baseline and Proposed Mileage Additions for Retention and Partial Retention VQOs by Alternative in Project Area

VQO	1 Current NFTS System (miles)	2 Proposed miles	3 Proposed miles	4 Proposed miles
Preservation	0	n/a	n/a	n/a
Retention	111	0.3	0.3	0
Partial Retention	435	17	20	0
Modification	763	n/a	n/a	n/a
Total	1309			

3.13.5 Environmental Consequences

See the effects methodology section above regarding how this analysis was conducted.

3.13.5.1 Alternative 1 – No action

Direct/Indirect Effects:

1. Prohibition of cross-country motorized vehicle travel.

Existing conditions would continue. Maintaining the status quo over the long term (20 years) would not improve visual conditions on the Forest because no permanent forest order prohibiting cross-country travel would be implemented. There would be no re-vegetation of any unauthorized routes, except for those routes that receive very low to no motorized use in the future. This alternative would have a negative effect to visual resources over the long-term time frame.

2. **Addition of facilities (unauthorized trails) to the NFTS, including identifying season of use and vehicle class.**

No additions to the NFTS are proposed; it is likely additional unauthorized routes would develop with no cross-country ban of off-highway use. Users would continue to create additional motorcycle single track and quad trails. Retention and Partial Retention VQOs would not be met.

3. **Changes to the NFTS (can include deletions of facilities and changing season of use and vehicle class).**

No effect.

Cumulative Effects:

1. Prohibition of cross-country motorized vehicle travel.

Retention and Partial Retention VQOs would not be met. Subpart B of the Travel Management Rule would not be implemented. Attempting to quantify effects associated with potential future cross-country travel is speculative at best because it is impossible to predict exactly where, when, or how such use would occur.

There would be no permanent order in place prohibiting cross country travel by motorized vehicles which would result in increased landscape alteration and less natural appearing viewsheds in Retention and Partial Retention VQOs.

2. **Addition of facilities (unauthorized trails) to the NFTS, including identifying season of use and vehicle class.**

Unauthorized trails would proliferate with no prohibition of cross-country travel having a negative effect on visual quality. Retention and Partial Retention VQOs would not be met.

3. **Changes to the NFTS (can include deletions of facilities and changing season of use and vehicle class).**

No effect.

3.13.5.2 Alternative 2 – Proposed Action

Direct/Indirect Effects:

1. **Prohibition of cross-country motorized vehicle travel.**

Cross country travel is prohibited in this alternative. It would have a positive effect on visual resources over the long-term timeframe through the natural rehabilitation of the closed routes. Retention and Partial Retention VQOs would be met.

2. **Addition of facilities (unauthorized trails) to the NFTS, including identifying season of use and vehicle class.**

This alternative adds approximately 64 miles of inventoried unauthorized routes to the NFTS. Approximately 17 miles of inventoried unauthorized routes would be added in Partial Retention VQO and 0.3 mile added in Retention. It would meet the visual quality objectives for Partial Retention and Retention for the short-term timeframe and in the long-term, and therefore, have no effect on visual resources.

3. **Changes to the NFTS (can include deletions of facilities and changing season of use and vehicle class).**

No effect.

Cumulative Effects:

1. Prohibition of cross-country motorized vehicle travel.

Unauthorized inventoried routes closed to use would be restored to natural conditions over the long term through natural rehabilitation. It would have a positive effect on visual resources over the long-term timeframe through the natural rehabilitation of the closed routes.

2. **Addition of facilities (unauthorized trails) to the NFTS, including identifying season of use and vehicle class.**

Based upon past, present and proposed management activities in the foreseeable future, there are no cumulative effects on visual resources.

3. **Changes to the NFTS (can include deletions of facilities and changing season of use and vehicle class).**

No effect

3.13.5.3 Alternative 3

Direct/Indirect Effects:

1. **Prohibition of cross-country motorized vehicle travel.**

Cross country travel is prohibited in this alternative. It would have a positive effect on visual resources over the long-term timeframe through the natural rehabilitation of the closed routes. Retention and Partial Retention VQOs would be met.

2. **Addition of facilities (unauthorized trails) to the NFTS, including identifying season of use and vehicle class.**

This alternative adds approximately 72 miles of inventoried unauthorized routes to the NFTS. Approximately 20 miles of inventoried unauthorized routes would be added in Partial Retention VQO and 0.3 mile added in Retention. It would meet the visual quality objectives for Partial Retention and Retention for the short-term timeframe and in the long-term, and therefore, have no effect on visual resources.

3. **Changes to the NFTS (can include deletions of facilities and changing season of use and vehicle class).**

No effect.

Cumulative Effects:

1. **Prohibition of cross-country motorized vehicle travel.**

Unauthorized inventoried routes closed to use would be restored to natural conditions over the long term through natural rehabilitation. It would have a positive effect on visual resources over the long-term timeframe through the natural rehabilitation of the closed routes.

2. **Addition of facilities (unauthorized trails) to the NFTS, including identifying season of use and vehicle class.**

Same as Alternative 2.

3. **Changes to the NFTS (can include deletions of facilities and changing season of use and vehicle class).**

No effect.

3.13.5.4 Alternative 4

Direct/Indirect Effects

1. **Prohibition of cross-country motorized vehicle travel.**

Current baseline NFTS in the LRMP is in place. Cross country travel is prohibited. It would have a positive effect on visual resources over the long-term timeframe through the natural rehabilitation of the closed routes. Retention and Partial Retention VQOs would be met.

2. **Addition of facilities (unauthorized trails) to the NFTS, including identifying season of use and vehicle class.**

No effect

3. **Changes to the NFTS (can include deletions of facilities and changing season of use and vehicle class)**
   No effect.

Cumulative Effects:

1. **Prohibition of cross-country motorized vehicle travel.**
   Unauthorized inventoried routes closed to use would be restored to natural conditions over the long term through natural rehabilitation. It would have a positive effect on visual resources over the long-term timeframe through the natural rehabilitation of the closed routes.

2. **Addition of facilities (unauthorized trails) to the NFTS, including identifying season of use and vehicle class.**
   No effect

3. **Changes to the NFTS (can include deletions of facilities and changing season of use and vehicle class).**
   No effect.

3.13.6 Summary of Effects Analysis Across All Alternatives

Table 3.13-3: Indicators - Visual Resources

Indicators – Visual Resources	lt. 1	lt. 2	lt. 3	lt. 4
Disturbance/Integrity: Compliance with the Retention and Partial Retention VQOs.	1	4	4	4
Average for Visual Resources	**1**	**4**	**4**	**4**

[1] A score of 4 indicates the alternative is the best for visual resources related to the indicator; a score of 1 indicates the alternative is the worst for visual resources related to the indicator

3.13.7 Compliance with the LRMP and Other Direction.

All action alternatives comply with the Six Rivers LRMP and other regulatory direction.

3.14 Recreation

Nearly all forest visitors, regardless of the purpose for their visit, use the motorized transportation system to reach their destination. Making changes to the NFTS (e.g. adding facilities, prohibiting or allowing motor vehicle use by vehicle type or season of use) changes the diversity of motorized and non-motorized opportunities on the forest. These visitors may be participating in motorized recreation, or utilizing motor vehicles to access trailheads, facilities, destinations, or geographic areas that are utilized for non-motorized recreational activities. This section of the Travel Management DEIS examines the extent to which the diversity of recreation opportunities is affected by the proposed action and alternatives and the extent to which alternatives are consistent with direction established in the Six Rivers National Forest Land and Resource Management Plan (LRMP) and the Travel Management (TM) Rule.

3.14.1 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

Regulatory Direction relevant and specific to the proposed action as it affects recreation resources includes:

National Forest Management Act (NFMA). The NFMA sets forth requirements for development of Forest Plans. The Six Rivers National Forest Land and Resource Management Plan includes standards and guidelines for management of recreation including use of Off-Highway Vehicles.

Travel Management Rule, Subpart B (36 CFR 212.50-57)
(Criteria that incorporated E.O. 11644 and E.O. 11989).

1. The responsible official shall consider the effects of designated roads, trails and areas on the provision of recreational opportunities, access needs, and conflicts among uses of National Forest System lands. 36 CFR 212.55 (a)
2. The responsible official shall consider effects on the following, with the objective of minimizing: Conflicts between motor vehicle use and existing or proposed recreational uses of National Forest System lands or neighboring federal lands; conflicts among different classes of motor vehicle uses of National Forest System lands or neighboring federal lands; and the compatibility of motor vehicle uses with existing conditions in populated areas, taking into account sound, emissions, and other factors. 36 CFR 212.55 (b).

3.14.2 Six Rivers National Forest Land and Resource Management Plan (LRMP).

The LRMP provides goals for the recreation resource and requires a broad range of developed and dispersed recreation opportunities in balance with existing and future demand. For management and conceptual convenience possible mixes or combinations of activities, settings, and probable experience opportunities have been arranged along a spectrum, or continuum. This continuum is called the Recreation Opportunity Spectrum (ROS), and planning

for recreation opportunities using the ROS is conducted as part of Land and Resource Management Planning. The ROS provides a framework for defining the types of outdoor recreation the public might desire, and identifies that portion of the spectrum a given National Forest might be able to provide. ROS is divided into six classes: Primitive, Semi-Primitive Non-Motorized, Semi-Primitive Motorized, Roaded Natural, Rural and Urban. Each class is defined in terms of its combination of activity, setting, and experience opportunities (ROS Users Guide USDA Forest Service, 1982).

The intent is to use ROS and its associated settings to provide recreation input into LRMPs which in turn may be incorporated into LRMP management prescriptions or used in project level planning beyond the programmatic planning used to develop the LRMP.

For the purposes of travel management actions, 'off-highway vehicles' is applied to public motor vehicle use (highway legal and non-highway legal). How ROS applies to the LRMP depends on how it is integrated into the management prescriptions and associated standards and guidelines in the forest LRMP. On Six Rivers National Forest, ROS is incorporated into the LRMP direction and standards and guidelines. The forest S&Gs are incorporated into 17 Management Areas (MAs) reflecting the capability and suitability of the land to support various activities.

3.14.3 Recreation

3.14.3.1 Goals

The Six Rivers National Forest LRMP states several goals for recreation, including:

Provide a wide range of quality outdoor recreation opportunities, emphasizing the unique character of the Six Rivers by providing access, facilities, and information necessary to meet public demand.

Incorporate universal design into all developed recreation settings to ensure accessibility and usability for a diversity of visitors.

Establish partnerships to develop recreation resources involving the three northern California counties (Del Norte, Humboldt, and Trinity), the State of California Department of Parks and Recreation, and the National Park Service and other partners.

Develop designated motorized recreation routes on existing roads and trails, and expand opportunities by creating partnerships with user groups and other agencies.

3.14.3.2 Direction

The "Recreation Opportunity Spectrum Users Guide" will be used to determine the applicable activities, social settings, and recreational experiences for each ROS class.

Motorized Recreation

According to the Six Rivers LRMP motorized recreation is the most popular recreation activity occurring within National Forest System lands and is a legitimate use. It is conducted in a variety of vehicles which includes, but is not limited to, passenger cars, motorhomes, four wheel drives, motorcycles, snowmobiles, all-terrain vehicles, and sport-utility vehicles.

The LRMP contains programmatic direction for motorized recreation and identified that implementation schedules to be developed should be consistent with Plan direction for different areas of the Forest. They would assess potential user and resource conflicts and propose

designated routes. Specific routes would be designated at the project level through the NEPA process.

Direction in the LRMP includes:

Provide a range of recreational opportunities to meet the needs of motorized recreationists. Manage motorized recreation to provide for public safety and resource protection, and to reduce user conflicts.

Develop a cooperative effort with state, local, and other agencies, Indian Tribes, and user groups to identify potential motorized recreation facilities and interpretive opportunities, where appropriate.

Trails

Develop trail management objectives for all trails included in the Forest trail system. These management objectives will be used to identify the standard for each of the Forest's system trails.

3.14.3.3 Standards and Guidelines

Table 3.14-1 Applicable Standards and Guidelines for Recreation

Reference	S&G
General Recreation	
IV-123, 18-2	Manage recreation according to the recreation opportunity spectrum (ROS) classes described in the ROS User's Guide, as specified in the management prescriptions.
IV-123, 18-8	Work in partnership with local communities, universities, and other agencies to expand recreational facilities, programs, and trails on both public and private lands.
IV-123, 18-9	Remove hazard trees in developed recreation sites, and along roads and trails.
IV-123, 18-10	Provide adequate off-road parking at trailheads to accommodate acceptable levels of use.
IV-123, 18-11	Maintain trailhead information sites that provide safety and effective recreation information.
Dispersed Recreation	
IV-123, 18-15	Manage the trail system to provide for a range of recreational opportunities.
IV-124, 18-16	Manage most trails for multiple uses. Sign to indicate the preferred or desired use type. Restrict specific types of trail use only for reasons of resource protection or user conflicts.
IV-124, 18-17	Provide trailheads at road intersections as needed. Facilities at trailheads will be provided for health and safety or resource protection.
IV-124, 18-18	Trail maintenance will be performed in the following order of priority: 1) Correct trail hazards that endanger public health and safety, 2) prevent resource damage, 3) protect the trail resource, 4) repair, replace, or remove signs or markers, and 5) for the comfort and convenience of the user.

Reference	S&G
IV-124, 18-19	Depending on ROS class designation, facilities will be installed at areas of concentrated public use to protect the resource and for public health and safety rather than for user convenience.
Motorized Recreation	
IV-124, 18-21	OHV use is restricted to designated routes.
IV-124, 18-22	Level 2 roads are open to motorized recreation vehicles (including OHVs), unless otherwise designated closed.
IV-124, 18-23	Roads and trails emphasized for motorized recreation will be signed.
IV-124, 18-24	Road, trail, or area use may be further restricted or prohibited by order of the Forest Supervisor if necessary to provide for public safety, prevent resource damage, or otherwise serve the public interest.
IV-124, 18-25	Closed routes will be evaluated for obliteration, restoration, or rehabilitation
IV-124, 18-26	Over-the-Snow Vehicle (OSV) travel is permitted upon at least 12 inches of snow with no ground contact.
IV-124, 18-27	In order to reduce the spread of Port-Orford-cedar root disease, a risk analysis will be completed for all projects (see 20-7) in watersheds containing Port-Orford-cedar (see Section 3.10 Port-Orford-Cedar)
Interpretive Services and visitor Information	
IV-124, 18-32	Use the TREAD LIGHTLY and 'Pack it in, Pack it out' programs to inform recreationists and other users about responsible land use ethics.

3.14.4 Effects Analysis Methodology

The Effects Analysis Methodology focuses on the assumptions, methodology, and indicators for addressing the direct and indirect effects of three actions and the cumulative effects of implementing the alternative as a whole. The three discrete actions common to all action alternatives are: (1) The prohibition of cross-country motorized vehicle travel; (2) The addition of facilities (unauthorized roads and trails) to the NFTS, including identifying seasons of use and vehicle class; and (3) Changes to the existing NFTS (deletions of facilities/changing the vehicle class/season of use).

Also common to all action alternatives:

Spatial boundary: The Lower Trinity and Mad River Ranger Districts boundaries is the unit of spatial analysis when considering effects associated with the prohibition of cross-country travel, the addition of facilities, and changes to the existing NFTS.

Rationale: The effects measurement indicators are based on NFMA and Travel Management Rule requirements as well as significant issues raised during internal and public scoping.

3.14.4.1 Impacts Relevant to Recreation:

1. The compatibility of proposed changes to the NFTS with LRMP recreation and OHV management prescriptions and ROS.
2. The impact of proposed changes to the NFTS on non-motorized (i.e., quiet) recreation (dust, noise, use conflicts).
3. The amount and diversity of motorized recreation opportunity by alternative.
4. The amount of motorized access to dispersed recreation by alternative.
5. The impact of proposed changes to the NFTS on wilderness, and neighboring private and federal lands (dust, noise, use conflicts).

3.14.4.2 Assumptions Specific to Recreation Analysis:

1. The prohibition of cross-country travel is not a change to ROS (e.g., semi-primitive motorized), it is simply a prohibition within that ROS 'zone' to travel off of designated routes.
2. The change from an open to cross-country travel condition to a cross-country travel prohibited condition will reduce the availability of acreage for both motorized recreation as well as motorized access to dispersed recreation activities.
3. The change from an open to cross-country travel condition to a cross-country travel prohibited condition will increase the availability of acreage for non-motorized recreation as well as non-motorized access to dispersed recreation activities.
4. Proposed additions to the NFTS will have a beneficial effect on motorized recreation opportunities by providing a variety of trail riding experiences and increasing the amount of motorized recreation opportunities (loops, connectors).
5. Proposed changes and additions to the NFTS will have a beneficial effect on the amount of motorized access to dispersed recreation opportunities available.
6. The Forest's National Visitor Use Monitoring (NVUM) report accurately expresses the most popular motorized and non-motorized recreation activities for use in this analysis.
7. The area of influence (dust, noise) of proposed additions for motorized use on populated areas or 'quiet recreation' opportunities is ½ mile from associated boundaries (e.g. wilderness, Research Natural Area (RNA), property line).
8. There has never been any use analysis of the unauthorized routes and no data exists (traffic counts, etc). As a result it would be highly speculative to make assumptions of use levels on the unauthorized routes.
9. The majority of the motorized public use occurring on NFS land is occurring within the existing NFTS based on observation and NVUM data.
10. For each unauthorized route added to the NFTS as a trail for the purpose of accessing dispersed recreation, a minimum of one site is accessed. In many instances, multiple sites may be accessed through the addition of these routes to the system, but this number acts as a surrogate to determine how many dispersed areas are accessed under each alternative.
11. No cross-country travel.
12. No open areas.
13. No motorized trails within Wilderness, RNAs, or Recreation Opportunity Spectrum (ROS) classification of Semi-primitive Non-motorized.
14. Changes to non-motorized system trails will not be considered.

15. Maintenance Level 2 Roads (ML2, roads maintained for high clearance vehicles) are already open to OHV use.
16. The analysis does not include Over-the-Snow Vehicle (OSV) use.
17. A risk analysis for watersheds containing Port-Orford-cedar is covered in Section 3.10 Port-Orford-Cedar.

3.14.4.3 Data Sources:

1. Six Rivers National Forest Land and Resource Management Plan (LRMP) (1995).
2. GIS layers and associated tabular data sets.
3. Six Rivers National Forest National Visitor Use Monitoring Results Report FY 2003.
4. In-house knowledge (e.g. Forest Protection Officers, OHV Program Manager, Recreation Officers, and Resource Specialists).
5. Public input from 11 meetings, 2005 to present.

3.14.4.4 Recreation Indicator Measures:

Indicator measures are intended to address how each alternative as the sum total of its proposed actions conforms to the LRMP, significant issues identified in scoping, and Subpart B of the TM Rule: whether the motorized recreation opportunity has the potential to conflict with other recreation opportunities, specifically non-motorized opportunities; the proximity of motor vehicle use to populated areas or neighboring private and federal lands; the quality of the motorized recreation experience; and the quality of motorized access to dispersed areas for both motorized and non-motorized uses. It also responds to the amount of motorized access available on the unit. Conflicts with other resources (including air quality) are examined in other resource sections. Public Safety is addressed in the Transportation Section.

For analyzing the effects of changes to the NFTS by vehicle class and season of use as well as the addition of unauthorized routes to the NFTS as trails, indicator measures were used. Mileage available for each class of vehicle is useful in analyzing the ability of Forest users to not only travel around the Forest and enjoy motorized recreation opportunities but also to access non-motorized recreation opportunities, such as trailheads, hunting, and dispersed recreation sites for activities such as fishing and camping, which the forest has determined are important based on both NVUM data and public scoping for this project. Mileage for motorized recreation is an indicator of the number and types of experiences available for motorcycles, ATVs, and 4WDs in each alternative. The changes to motorized mileages can be used to interpret the level of change in opportunities for motorized and non-motorized users. The details of the proposed seasonal closure relate to both the months that motorized recreation will not be allowed to use designated trails and, conversely, the time of year that conflicts between motorized and non-motorized uses will be minimized. Also, the effect on non-motorized recreation activities that are accessed by proposed routes is considered. Number of acres located ½ mile away from trails and boundaries are used to analyze the opportunity for non-motorized and ‘quiet’ recreation on the Forest. Finally, to determine the amount of dispersed recreation access provided under each alternative, a method was applied that a minimum of one site is accessed by each route (in many instances multiple sites are accessed, but one site is used as a proxy).

Measurement Indicator 1:
ROS consistency with LRMP.
Description:
The ROS remains consistent with the LRMP with no proposed change of ROS class acreages by alternative.

Measurement Indicator 2:
Non-motorized recreation opportunity.
Description:
This measurement indicator looks at the impact of proposed changes to the NFTS on non-motorized recreation (dust, noise, use conflicts). It also addresses "Quiet Recreation".
Method:
Number of acres outside ½ mile of an area where motorized use is allowed (designated trails in the NFTS miles that would result under each alternative). This method was determined through a literature review of sound studies and reports listed under References for this section.

Measurement Indicator 3:
Motorized recreation opportunity.
Description:
This measurement indicator looks at the impact of proposed changes to the NFTS to motorized recreation opportunities by alternative.
Method:
Roads:

1. Number of miles of high standard NFTS road available by vehicle class to highway licensed drivers for non-highway licensed vehicles (combined use) and season of use.
2. Number of miles of NFTS road available by vehicle class to highway and non-highway licensed drivers for non-highway licensed vehicles and season of use (change in road maintenance level).

Trails: Number of miles available by vehicle class and season of use.
Quality of Trail Experience: Number of miles by degree of difficulty.

Measurement Indicator 4:
Type of motorized access to dispersed recreation.
Description:
This measurement indicator looks at the impact of proposed changes to the NFTS to motorized access to dispersed recreation opportunities by alternative.
Method:
Trails: Number of miles available by vehicle class and season of use.
Quality of Trail Experience: Number of facilities provided as surrogate for number of dispersed sites accessed. One site per route addition for the purposes of access to dispersed recreation will be used as a proxy (in some instances multiple sites are accessed via a single route addition).

Measurement Indicator 5:
Impact of proposed changes to the NFTS on wilderness, and neighboring private and federal lands (dust, noise, use conflicts).

Description:
This measurement indicator looks at the impact of proposed changes to the NFTS on wilderness, and neighboring private and federal lands (dust, noise, use conflicts) by alternative.
Method:
Number of miles of new routes proposed within ½ miles of populated areas, neighboring federal land boundaries, wilderness boundaries, and private land boundaries.
(Acts as surrogate and indicates how much conflict off NFTS may occur by alternative). This method was determined through a literature review of sound studies and reports listed under References for this section.

3.14.5 Affected Environment

Historic Recreation Use

Travel has been occurring on the land within the administrative boundary project area for thousands of years with much of this use occurring adjacent to modern travel routes, especially along rivers and ridges.

Historically, a network of trails was established through aboriginal use, miners traveling to and supplies being hauled to mines (1850s), and cattle and sheep being herded on trailways to grazing lands of the high country. Homesteading within the area increased after 1905 when the Trinity and Mendocino National Forests were created and the Forest Homestead Act (and later the Indian Allotment Act) was enacted. Trails were the principal means of travel and transportation in this remote region of northwestern California. Trails were used by inland communities and homesteaders as commerce routes with the coast. Steps were also taken to establish and maintain a trail system, probably as part of a transportation system used for controlling wildfire, getting to fire lookouts and to local homesteads. In 1947, the Six Rivers National Forest was created out of portions of the Klamath, Siskiyou, and Trinity National Forest. Both Lower Trinity and Mad River Ranger Districts were included within its boundaries. The principal recreation activities within the area were hunting, hiking and associated dispersed camping. Developed facilities in the area were minimal. It was in the early 1960s when small developed camping areas began to be developed; facilities consisted of a few vault toilets, picnic tables, and fire rings. These developed facilities were normally found along a state highway or county road located at the lower elevations of the units.

Logging of private lands within the boundaries of the Districts was practiced in the 1950s and 1960s. On federal lands, timber harvesting peaked during the 1970s and 1980s. The road transportation system, consisting of arterial (primary) and collector (secondary) routes mainly along ridges was constructed primarily to access timber harvest units, and consequently further opened access for recreationists.

Much of the historical trail network has been destroyed by this road construction, logging, and other land disturbing activities. However, portions of some of the original trails are included in the current network of recreation trails, especially on the Mad River RD. An example of this can be found within the Pilot Creek watershed located at the northern end of the District. Most of the existing system of motorized trails in the Forest is located within this watershed and cobbled from portions of some of these original trails used by miners and homesteaders. The rest of the system within the Pilot Creek area consists of Forest System roads, many of which were built over the rest of the original trail system. This would also include portions of Forest Highway 1 which borders much of the watershed and connects State

Highway 299, (which bisects the Lower Trinity District), with State Highway 36, (which bisects the Mad River District).

3.14.5.1 Current Recreation Use

A significant number of the Six Rivers National Forest users come from the Northcoast, Redding, and North Central Valley areas, as well as southern Oregon. The major metropolitan centers of Sacramento, the Bay Area, and Portland are six to eight hours driving distance, which precludes a weekend visit to the area. Tourism travel trends indicate that most people recreate within a two to three hour drive of home when considering a weekend getaway. Consequently, much of the visitation that occurs within the Six Rivers National Forest consists of local users - residents who live within an hour or two. The National Visitor Use Monitoring (NVUM) survey conducted on the Forest in 2003 estimated that approximately half the Forest's visitation comes from the four local counties of Del Norte, Siskiyou, Humboldt, and Trinity. Communities within the boundaries of the Lower Trinity and Mad River Districts are small and scattered due to high mountain passes and the area as a whole is geographically isolated. Rural isolation and self-sufficiency are highly valued and most of the inhabitants enjoy the isolation and seclusion as a result.

In general, the two Districts receive some of the highest use on the forest because of their river and lake attractions, snow availability, diverse topography and proximity to the coastal population centers. Common recreation activities during the summer months include hiking, backpacking, hunting, fishing, mountain bike riding, horseback riding, picnicking, wildlife viewing, sightseeing, driving for pleasure, four-wheeling (4WD), motorcycle and ATV use, motor boating, canoeing, sailing, kayaking, rafting, water-skiing, swimming, and primitive and developed camping. The Districts manage five developed fee campgrounds including Boise Creek, East Fork, Mad River, Fir Cove and Bailey Canyon containing 111 developed campsites for public use. Winter recreational activities include cross-country skiing, snow play, and over-the-snow wheeled motor vehicle travel. The primary season of recreational use is May through November and nearly all forest visitors, regardless of the purpose for their visit, use the motorized transportation system.

Motorized Recreation

The Lower Trinity and Mad River Districts provide for a range of motorized recreation opportunities for visitors operating motor vehicles, from highway-licensed cars, sedans, SUVs, 4WDs, and dual-sport motorcycles, to OHV non-licensed motorcycles, ATVs, and 4WDs.

Although reliable visitation numbers specific to the analysis area are not available, both Districts receive some of the highest OHV use due to gentler topography than found within the northern Districts of the Forest not covered by this analysis. Even with the higher use, the use received on the Districts is normally light (0-25 vehicles per week) on the NFTS roads and trails. The exception to this is during hunting season (October through November) when use of routes, both NFTS and unauthorized, increases, but is still low in a regional perspective (25-100 per week). Currently, the Districts provide 898 miles of NFTS roads managed for high clearance vehicles including non-street legal OHVs. In addition, managed OHV use has been focused on the Mad River District which provides 36 of the Forest's 39 miles of system OHV trail opportunity and the Forest's designated 150 mile segment of the California Back Country Discovery Trail consisting of county and Forest System roads.

The NVUM survey, generated a sample of visitors large enough to provide statistically valid visitor use estimates for the Forest.

Limitations to the accuracy of the NVUM results include the willingness of visitors in different user groups to stop for the survey. Based on the visitor participation in the survey, the estimates are statistically valid. It was reported in the results for the Forest that an estimated 28.6 percent of visitors participated in driving for pleasure, while 7.5 percent of visitors participated in OHV use during their visit. OHV use as the primary activity was estimated for only 1.1 percent of visitors (USDA Forest Service 2003). See Table 3.14-2 below.

Table 3.14-2 Six Rivers NF Visitor Activity Participation and Primary Activity As Reported In NVUM Results (2003).

Activity	Activity Emphasis for Road & Trail Use	Total Activity Participation (%)[1/2]	Percent as Main Activity (%)[3/4]
Snowmobiling	Motorized	0.1	0.1
Driving for Pleasure	Motorized	28.6	1.1
OHV Use	Motorized	7.5	1.1
Other Motorized Activity	Motorized	1.1	1.1
		Motorized Subtotal	**3.4**
Hiking / Walking	Non-motorized	40.0	3.8
Bicycling	Non-motorized	1.6	0.1
Other Non-motorized	Non-motorized	13.7	5.1
Backpacking	Non-motorized	2.6	1.3
Horseback Riding	Non-motorized	0.2	0.0
Fishing	Non-motorized	12.3	7.2
		Non-motorized Subtotal	**17.5**
Downhill Skiing	Other	2.7	2.2
Cross-country Skiing	Other	1.7	0.8
Viewing Natural Features	Other	60.0	14.6
Relaxing	Other	61.9	10.3
Motorized Water Activities	Other	1.3	0.5
Hunting	Other	22.5	20.7
Non-motorized Water	Other	7.1	4.1
Developed Camping	Other	4.7	2.1
Primitive Camping	Other	11.4	0.8
Picnicking	Other	17.0	7.9
Viewing Wildlife	Other	56.2	1.6
Sightseeing	Other	0.0	0.0
Resort Use	Other	11.4	3.2
Visiting Historic Sites	Other	5.2	0.2
Nature Study	Other	4.6	0.3
Gathering Forest Products	Other	7.7	3.9
Nature Center Activities	Other	5.3	0.1
No Activity Reported	Other	20.6	20.9
		Other Subtotal	**94.2**
		Total	**115.1**

[1] Survey respondents could select multiple activities so this column may total more than 100%.
[2] The number in this column is the percent of survey respondents who indicated participation in this activity.
[3] Survey respondents were asked to select just one of their activities as their main reason for the forest visit. Some respondents selected more than one, so this column may total more than 100%.
[4] The number in this column is the percent of survey respondents who indicated this activity was their main activity.

Based on the reported 414,763 visits to National Forest System land on the Six Rivers NF during FY 2003 indicates 118,622 visitors spent some time driving for pleasure, 31,107 used off-highway vehicles during their visit, and the primary activity for 4,562 visitors was OHV use. When primary motorized uses are combined (OHV use, driving for pleasure and other motorized activities) visitor numbers total 13,687 versus 72,584 for primary non-motorized uses (Table 3.14-3). Motorized access is the primary form of access to non-motorized recreation activities on the forest.

For more information about the National Visitor Use Monitoring (NVUM) program, go to the NVUM program website at: http://www.fs.fed.us/recreation/program/nvum/.

Table 3.14-3 Approximate Six Rivers NF Visitors by Type of Main Activity

Type of Use	NVUM Categories	Percent as Main Activity	Approximate Visitors in 2003
Camping	Developed Camping Primitive Camping	2.9	12,028
Hunting	Hunting	20.7	85,856
Motorized Uses	OHV use Driving for Pleasure Other Motorized Activity	3.3	13,687
Non-motorized Uses	Backpacking Fishing Hiking/Walking Horseback Riding Bicycling Other Non-Motorized Activities	17.5	72,584
Other Activities	Resort Use Picnicking Viewing Natural Features Visiting Historic Sites Nature Center Activities Nature Study Relaxing Gathering Forest Products Viewing Wildlife Sightseeing	42.1	174,615
Water Sports	Motorized Water Activities; Non-motorized Water	4.6	19,079
Winter Sports	Downhill Skiing; Cross-country Skiing; Snowmobiling	3.1	12,858

For a description of the unauthorized route additions and changes to the current NFTS by alternative refer to Appendix A.

3.14.6 Environmental Consequences

See the Effects Analysis Methodology (including indicators) section above regarding how this analysis was conducted.

3.14.6.1 Alternative 1 - No Action

In summary, the status quo would continue. No Motorized Visitor Use Map (MVUM) would be printed.

1. **Direct/Indirect effects of the prohibition of cross-country wheeled motorized vehicle travel.**

ROS consistency: Alternative 1 may have a negative effect on ROS consistency. It is the current situation and does not propose any additional prohibitions to cross-country motorized travel. Cross-country travel would be unabated potentially adding to the existing 0.5 miles of unauthorized routes within and inconsistent with ROS class areas of SPNM.

Non-motorized recreation: Alternative 1 would have a negative effect on non-motorized recreation. It would result in minimizing (16,740 acres) National Forest System land available for non-motorized forms of recreation beyond the immediate influence of motorized use. Impacts to non-motorized recreation would increase due to potential unabated cross-country vehicle travel and noise.

Motorized recreation: Alternative 1 would have a minor beneficial effect on motorized recreation. It proposes no changes to the NFTS. Of the 255 miles of existing unauthorized routes, none would be added to the NFTS, although these routes would remain available to motorized recreation. Added to the existing NFTS road and trail miles (1,255), this alternative has a total of 1,510 miles of routes plus unknown additional miles of cross-country riding opportunity. While routes would remain available for motorized recreation, the quality and diversity of the District's motorized recreation opportunity would not change, as Alternative 1 does not propose any motorized trail (including 4-wheel drive trail, 50" ATV trail, or 18' singletrack trail). This may lead to a more homogenous motorized recreation opportunity, as the existing unauthorized routes will remain available to all vehicle classes, potentially leading to the widening of routes over time. For example, field observations show that where routes start as a narrow singletrack and are not managed specifically as singletrack, they progressively become wider due to use by ATVs and 4WD vehicles.

Dispersed recreation: Alternative 1 would have a beneficial effect on dispersed recreation. There would be limitless access to dispersed recreation opportunities. It would not displace motorized access to any specific dispersed recreation site.

Wilderness and adjacent ownership: Not applicable, no new routes are proposed. However, Alternative 1 would contribute to wilderness intrusion, cause conflict with adjacent land owners, and potentially be incompatible with adjacent public lands since there would be no prohibitions to cross-country motorized travel and the existing unauthorized routes would remain available for motorized use.

Indicators: Indicators 1, 2, 3, and 4 were used in making effects determinations for this action.

2. **Direct/Indirect effects of adding facilities (presently unauthorized trails) to the NFTS, including identifying seasons of use and vehicle class.**

No facilities will be added to the NFTS in this alternative.

Direct/Indirect Effects: No direct or indirect effects would result. There would be no change from the current management situation.

3. **Direct/indirect effects of changes to the existing NFTS [this can include deletions of facilities and changing the vehicle class and season of use].**
   No changes to the existing NFTS will be made in this alternative.

Direct/Indirect Effects: No direct or indirect effects would result. No change from the current management situation.

Cumulative Effects:

1. Prohibition of cross-country wheeled motorized vehicle.

Subpart B of the Travel Management Rule would not be implemented. There would be no prohibition of cross-country travel. Attempting to quantify effects associated with potential future cross-country travel is speculative at best because it is impossible to predict exactly where, when, or how such use would occur. Never-the-less it is assumed that routes would increase in ROS class SPNM areas, have a negative effect on non-motorized recreation from increased dust, noise, and use conflicts, and cause conflict with neighboring private and federal lands. Even though all routes would remain available plus unknown additional miles of cross-country riding opportunity it may lead to a more homogenous motorized recreation opportunity excluding diversity and quality. Dispersed recreational opportunities would be limitless.

2. Addition of facilities (unauthorized trails) to the NFTS, including identifying seasons of use and vehicle class.

No facilities will be added. However, unauthorized routes would proliferate with no prohibition of cross-country travel and have a negative effect on the ROS class of SPNM areas, non-motorized recreation opportunities, and use conflicts.

3. Changes to the existing NFTS [can include deletions of facilities and changing the vehicle class and season of use].

There are no changes to the NFTS.

3.14.6.2 Alternative 2 Proposed Action

In summary, 64 miles of routes are proposed for addition to the NFTS. Cross-country travel is prohibited. Blocks illegal motorized access into North Fork Wilderness. Season and types of use for routes will be established. A Motor Vehicle Use Map (MVUM) of the designated system will be printed.

1. **Direct/indirect effects of the prohibition of cross-country wheeled motorized vehicle travel.**

ROS consistency: Alternative 2 would remain consistent with the LRMP with no proposed change of ROS class acreages.

Non-motorized recreation: Alternative 2 would have a minor beneficial effect on non-motorized recreation. Cross-country travel would be prohibited resulting in less wheeled motor

vehicle activity and better management of the NFTS. Motorized trails have been identified to reduce potential user conflict with non-motorized activities (e.g., no trails proposed within SPNM) but still provide sufficient motorized access for such activities. More use would occur on the NFTS creating more noise and dust impacts near them, but other areas would become free of wheeled motor vehicle activities. This will increase and benefit opportunities for quiet recreation away from the NFTS and provide a net gain in acreage (332,224 acres) for non-motorized activities in both the short and long terms. In addition, this alternative proposes to block one unauthorized route off Country Road 520 to discourage and/or prevent vehicle access into the North Fork Wilderness.

Motorized recreation: Alternative 2 would have a minor beneficial effect on motorized recreation. It would provide wheeled motor vehicle mileage (64 miles) available for a variety of OHV opportunities. However, it would have a net loss of 218 acres available for wheeled motor vehicle activities due to the prohibition of cross-country travel.

Dispersed recreation: Alternative 2 would have a minor beneficial effect on dispersed recreation. It provides motorized access to dispersed recreation opportunities, including traditional dispersed campsites. If motorized access is preferred, the development of new campsites will be limited to locations closer to NFTS roads or trails since parking will be limited to a vehicle length off these routes.

Wilderness and adjacent ownership: Regarding the prohibition of cross-country travel only, Alternative 2 would help minimize conflict associated with wilderness areas, adjacent land owners, and adjacent public lands.

Indicators: Indicators 1, 2, 3, and 4 were used in making effects determinations for this action.

2. **Direct/Indirect Effects of adding facilities (presently unauthorized trails) to the NFTS, including identifying seasons of use and vehicle class.**

ROS consistency: Alternative 2 would remain consistent with the LRMP and ROS classes (e.g., no trails proposed within SPNM).

Non-motorized: Alternative 2 would have a minor beneficial effect on non-motorized recreation. The existing and proposed NFTS motorized trails will provide recreationists access to a diversity of dispersed recreation including non-motorized activities. However, these trails especially in popular OHV riding areas will see some increased use, but is expected not to exceed a light level of 0-25 users per week except during hunting season (October through November) in the long term. The increase during hunting season would be at the low scale of low use (25-100 users per week). At these locations more noise and dust would occur, negatively affecting quiet recreation activities for some recreationists. Proposed seasons of use on some motorized trails will help benefit opportunities and acreage for non-motorized recreation.

Motorized recreation: Alternative 2 would have a minor beneficial effect on motorized recreation. It would provide wheeled motor vehicle mileage (64 miles) available for a variety of OHV opportunities. Since the Districts would be closed to cross-country travel, all use is on designated routes. NFTS routes would meet existing demand. Consideration has been given to accommodate a range of difficulty levels for motorcycles, ATVs, and four-wheel-drive vehicles distributed across the two Districts. Access to trailheads is easy over NFTS roads. Of the 255 miles of unauthorized route, 57 miles will be added to the NFTS as trails. Seven miles of new

motorized trails will be co-located on existing NFTS roads that are closed year-round to provide loops and/or connect trails. Season of use would restrict use on a total of 36 miles of proposed trail additions varying by resource or NFTS requirements. Although a reduction in miles occurs, this system would be manageable and sustainable with 1,312 miles of potential opportunity in the NFTS.

Dispersed recreation: Alternative 2 would have a minor beneficial effect on dispersed recreation. It provides motorized access to all of the estimated 116 routes to traditional dispersed campsites.

Wilderness and adjacent ownership: Alternative 2 would have a minor beneficial effect on wilderness and adjacent ownership. It would avoid and/or minimize conflict associated with wilderness areas, adjacent land owners, and adjacent public lands.

Indicators: Indicators 1, 2, 3, 4, and 5 were used in making effects determinations for this action.

3. **Direct/indirect effects of changes to the existing NFTS [this can include deletions of facilities and changing the vehicle class and season of use].**

Non-motorized: Alternative 2 would have a beneficial effect on non-motorized recreation. It proposes to remove motorized use from two NFTS trails (Devils Backbone and Bradburn) totaling six miles thus reducing noise and dust. Also, a season of use (use allowed June 1 through October 31) would be placed on 12 miles of NFTS motorized trail accessed by NFTS roads subject to wet weather closure increasing the opportunities and acreage for non-motorized recreation. In addition, four miles of NFTS motorcycle trail is proposed to allow the use of ATVs. Only a minimal increase in use is expected from this change and should not have a negative effect non-motorized activity.

Motorized recreation: Alternative 2 would have a minor beneficial effect on motorized recreation. Road management will change allowing combined use on some sections of NFTS roads and reducing the maintenance level on a portion of one road allowing an additional 25 miles of use by OHVs to connect trails or complete loop opportunities. In addition, four miles of NFTS motorcycle trail are proposed to allow the use of ATVs in order to expand loop type opportunities. As mentioned in the non-motorized section above, there will be a decrease of six miles of motorized opportunity by removing motorized use from two NFTS trails (Devils Backbone and Bradburn). Seasonal closures (use allowed June 1 through October 31) are proposed on 12 miles of NFTS motorized trails accessed by seasonally closed roads leading to their trailheads. These wet weather closures due not correspond to the same seasonally closed time period of the roads (use allowed May 1 through November 15) leading to the trailheads. This would negatively effect spring and fall motorized use of the trails.

Dispersed recreation: There would be no change to existing dispersed recreation opportunities except those changes to NFTS trails previously mentioned.

Wilderness and adjacent ownership: Alternative 2 would have a beneficial effect on adjacent ownership. Conflicts with adjacent land owners would be reduced by removing motorized use from one NFTS trail (Bradburn Trail) and applying a wet weather seasonal closure on several NFTS motorized trails. Road management changes allowing combined use on some sections of NFTS roads would increase use. However, only a minimal increase in use is expected and should not have a negative effect on adjacent ownerships.

Indicators: Indicators 2, 3, 4, and 5 were used in making effects determinations for this action.

Cumulative Effects:

1. Prohibition of cross-country wheeled motorized vehicle.

Subpart B of the Travel Management Rule would be implemented. Cross-country travel would be prohibited. ROS would remain consistent with the LRMP with no change of ROS class acreages. There are increased opportunities for quiet recreation away from the NFTS. A variety of motorized opportunities would be available but a net loss in acreage available for motorized use would occur. Dispersed recreational opportunities would be provided. Minimal conflict with wilderness areas, adjacent land owners, and adjacent public lands would be expected.

2. Addition of facilities (unauthorized trails) to the NFTS, including identifying seasons of use and vehicle class.

ROS would remain consistent with the LRMP with no change of ROS class acreages. Facilities will be added negatively affecting quiet recreation activities for some recreationists. Seasons of use identified for some motorized trails will benefit opportunities for non-motorized recreation. A variety of motorized opportunities would be available accommodating a variety of vehicle classes and difficulty levels distributed across the two Districts. Although a reduction in miles of unauthorized routes occurs and seasons of use are identified on some trails, this system would be manageable and sustainable. Dispersed recreational opportunities would be provided. Motorized use conflicts associated with wilderness areas and adjacent ownerships would be avoided and/or minimized.

3. Changes to the existing NFTS [can include deletions of facilities and changing the vehicle class and season of use].

Non-motorized opportunities would benefit from the removal of motorized use from two NFTS trails and placing a season of use on some NFTS motorized trails. Road management changes on some sections of NFTS roads would allow additional miles of use by OHVs to connect trails or complete loop opportunities. Also, allowing ATV use on a NFTS motorcycle trail expands loop type opportunities. Removing motorized use from one NFTS trail and applying a seasonal closure on several NFTS motorized trails would help reduce conflicts with adjacent ownerships.

3.14.6.3 Alternative 3

In summary, 71 miles of routes are proposed for addition to the NFTS. Cross-country travel is prohibited. Blocks illegal motorized access into North Fork Wilderness. Season and types of use for routes will be established. A Motor Vehicle Use Map (MVUM) of the designated system would be printed.

1. **Direct/indirect effects of the prohibition of cross-country wheeled motorized vehicle travel.**

ROS consistency: Same as Alternative 2.

Non-motorized recreation: The effects would primarily be the same as Alternative 2 except will decrease opportunities for quiet recreation providing a net gain in acreage (326,245) for non-motorized activities.

Motorized recreation: The effects would primarily be the same as Alternative 2 but provide additional wheeled motor vehicle mileage available to OHV use. However, it would have a net loss of 213 acres available for wheeled motor vehicle activities due to the prohibition of cross-country travel.

Dispersed recreation: The effects would primarily be the same as Alternative 2 but provide a slight increase in motorized access to dispersed recreation opportunities.

Wilderness and adjacent ownership: Same as Alternative 2.

Indicators: Indicators 1, 2, 3, and 4 were used in making effects determinations for this action.

2. **Direct/Indirect effects of adding facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, including identifying seasons of use and vehicle class.**

ROS consistency: Same as Alternative 2.

Non-motorized recreation: The effects would primarily be the same as Alternative 2 except will decrease opportunities for quiet recreation away from the NFTS due to seven miles of additional motorized trail added to the NFTS.

Motorized recreation: The effects would primarily be the same as Alternative 2 but would provide seven miles of additional motorized trail added to the NFTS. Included in this is the only mileage available for motorcycle use only. Also, a seasonal closure would be placed on one of these additional miles of trail (for a total of 37 miles) proposed to be added to the NFTS.

Dispersed recreation: The effect would primarily be the same as Alternative 2 but provide a seven mile increase in motorized access to dispersed recreation opportunities.

Wilderness and adjacent ownership: The effect would primarily be the same as Alternative 2 but would slightly increase the potential for conflict due to the addition of miles adjacent to or in close proximity to private land owners.

Indicators: Indicators 1, 2, 3, 4, and 5 were used in making effects determinations for this action.

3. **Direct/indirect effects of changes to the existing NFTS [this can include deletions of facilities and changing the vehicle class and season of use].**

Non-motorized Recreation: The effects would primarily be the same as Alternative 2 except, the season of allowed use would be increased by approximately one and a half months (use allowed May 1 through November 15) on 12 miles of NFTS motorized trail to correspond to the wet weather closure of NFTS roads accessing these trails. This will decrease the opportunities and acreage for non-motorized recreation during this lengthened time of allowed motorized use.

Motorized recreation: The effects would primarily be the same as Alternative 2 except as stated above, the season of allowed use would be increased by approximately one and a half months (use allowed May 1 through November 15) on 12 miles of NFTS motorized trail. Thus, increasing motorized opportunity during this lengthened time.

Dispersed recreation: Same as Alternative 2.
Wilderness and adjacent ownership: Same as Alternative 2.

Indicators: Indicators 2, 3, 4, and 5 were used in making effects determinations for this action.

Cumulative Effects:

1. Prohibition of cross-country wheeled motorized vehicle.

The effects would primarily be the same as Alternative 2 except for a slight decrease in opportunities for quiet recreation away from the NFTS due to adding an additional seven miles of motorized routes. Because of the additional seven miles a slightly greater amount and variety of OHV opportunities would be available but a net loss in acreage available for motorized use would occur. Also, a slight increase in dispersed recreational opportunities would be provided that could slightly increase conflict with adjacent land owners.

2. Addition of facilities (unauthorized trails) to the NFTS, including identifying seasons of use and vehicle class.

The effects would primarily be the same as above with the exception of a very slight increase in the opportunity for quiet recreation and a very slight decrease in OHV opportunity due to the seasonal closure placed on one additional mile of trail to be added to the NFTS.

3. Changes to the existing NFTS [can include deletions of facilities and changing the vehicle class and season of use].

The effect would primarily be the same as Alternative 2 except the season of allowed use on several NFTS motorized trails would be lengthened decreasing opportunities for non-motorized activities but increasing motorized opportunity.

3.14.6.4 Alternative 4

In summary, the current baseline NFTS in the LRMP is in place; no additional routes will be added to the system. Cross-country travel is prohibited. It blocks illegal motorized access into North Fork Wilderness. Season and types of use for routes will be established. A Motor Vehicle Use Map (MVUM) of the designated system will be printed.

1. **Direct/indirect effects of the prohibition of cross-country wheeled motorized vehicle travel.**

ROS consistency: Same as Alternative 2.

Non-motorized recreation: Alternative 4 would have a minor beneficial effect on non-motorized recreation. Cross-country travel would be prohibited resulting in less wheeled motor vehicle activity. More use would occur on the NFTS creating more noise and dust impacts near them, but other areas would become free of wheeled motor vehicle activities. The recreation use would change from mostly motorized to non-motorized on lands currently experiencing motorized travel. This will increase and benefit opportunities for quiet recreation away from the NFTS and provide a net gain in acreage (405,337 acres) for non-motorized activities in both the short and long terms. In addition, this alternative proposes to block one unauthorized route off Country Road 520 to discourage and/or prevent vehicle access into the North Fork Wilderness.

Motorized recreation: Alternative 4 would have a negative effect on motorized recreation. Cross-country travel would be prohibited, eliminating use on 422,077 acres. 1,255 miles of existing NFTS roads and trails will remain available. The quality of the recreation opportunity will be most affected. Much of the existing NFTS does not provide a quality opportunity especially for those using non-licensed motorized vehicles. Use would be mostly limited to existing Maintenance Level 2 roads, which do not necessarily provide continuity or loops. These routes are, therefore, not necessarily desirable. The most challenging motorcycle and ATV trails will be concentrated in a few desirable areas resulting in relatively higher use, negatively changing the opportunity. This alternative is the least desirable for motorized recreation. Little thought of the recreation opportunity has been incorporated.

Dispersed recreation: Alternative 4 would have a negative effect on dispersed recreation. It would provide motorized access to a limited number of dispersed recreation opportunities (e.g. dispersed campsites). All of the unauthorized routes to dispersed campsites will not be available to motorized travel. Parking will be limited to a vehicle length off existing NFTS routes. New campsites will be pioneered along these roads by those displaced. Campsites and special places would still be accessible to those who wish to hike the route. Dispersed campers would seek new sites in lieu of access to traditional sites which would be unavailable for motorized use. Proliferation of new campsites adjacent to parking locations along NFTS roads would occur at many locations.

Wilderness and adjacent ownership: Same as Alternative 2.

Indicators: Indicators 1, 2, 3, and 4 were used in making effects determinations for this action.

2. **Direct/Indirect Effects of adding facilities (presently unauthorized trails) to the NFTS, including identifying seasons of use and vehicle class.**

ROS consistency: Same as Alternative 2.

Non-motorized recreation: Alternative 4 would have a beneficial effect on non-motorized recreation. It does not provide any additional motorized routes to the NFTS and prohibits cross-country travel. However, it would preclude motorized access to some non-motorized activities (e.g., many dispersed camping sites). The indirect effect of displacing use to only NFTS roads and trails is the primary impact. Quiet recreation will be increasingly impacted near the NFTS roads and trails. However, outside of these locations, dust and noise from motorized vehicles would be minimized.

Motorized recreation: Alternative 4 would have a negative effect on motorized recreation. The 1,255 miles of existing NFTS roads and trails will remain available for motorized use. However, it adds no additional routes inclusive of the 255 miles of identified unauthorized routes and seven miles of co-located trail causing a direct effect to the motorized recreation opportunity.

Dispersed recreation: Alternative 4 would have a negative effect on dispersed recreation. All of the unauthorized routes to dispersed campsites will be unavailable to motorized travel and no additional dispersed recreation facilities are proposed.

Wilderness and adjacent ownership: Alternative 4 would have a beneficial effect on wilderness and adjacent ownerships. It would have the least conflict with adjacent land owners and the most compatibility with wilderness areas and adjacent public lands since cross-country travel would be prohibited and no unauthorized routes would be available for use.

Indicators: Indicators 1, 2, 3, 4, and 5 were used in making effects determinations for this action.

3. **Direct/indirect effects of changes to the existing NFTS [this can include deletions of facilities and changing the vehicle class and season of use].**

Non-motorized recreation: Alternative 4 would have a minor negative effect on non-motorized recreation. It would not remove motorized use from two NFTS trails (Devils Backbone and Bradburn).

Motorized recreation: Alternative 4 identifies the season of use on 12 miles of existing NFTS motorized trails accessed by NFTS roads subject to wet weather closure. The season of allowed use will be the same as the roads (May 1 to November 15). This is only identified in order for the trails to be compatible with the NFTS access roads. No change from the existing ground conditions would occur and so no direct or indirect effect from this action is anticipated.

Dispersed recreation: No additional dispersed recreation facilities are proposed in this alternative. Facilities along NFTS routes will remain available.

Wilderness and adjacent ownership: Under Alternative 4 there would be no change from the existing condition so no direct or indirect effect from this action is anticipated.

Indicators: Indicators 2, 3, 4, and 5 were used in making effects determinations for this action.

Cumulative Effects:

1. Prohibition of cross-country wheeled motorized vehicle.

Cross-country travel would be prohibited and no unauthorized routes would be added to the NFTS. Non-motorized recreation opportunity would benefit but motorized recreation would not. Motorized travel would be limited to the existing NFTS. Dispersed recreation (e.g., dispersed campsites) would be negatively impacted. Many traditional campsites would no longer be available to motorized access. A beneficial effect would occur to the compatibility of the prohibition of cross-country travel with wilderness areas and adjacent private and other public lands.

2. Addition of facilities (unauthorized trails) to the NFTS, including identifying seasons of use and vehicle class.

No additional motorized routes would be added to the NFTS. Cross-country travel is prohibited. This would result in benefiting opportunities for quiet recreation but have a negative effect to motorized recreation opportunities.

3. Changes to the existing NFTS [can include deletions of facilities and changing the vehicle class and season of use].

There are no changes to the existing NFTS.

The following tables refer to data referenced in the five Measurement Indicators as well as the four alternatives.

Table 3.14-4. MI 2. Acreage outside ½ mile of trails proposed for public use under each alternative as a measurement indicator of acreage available for quiet recreation and non-motorized activities without the potential for use conflicts with motorized vehicles.

Quiet Recreation	1	2	3	4
	Acreage	Acreage	Acreage	Acreage
Total Acreage in Alternative	16,740	348,964	342,985	422,077

Table 3.14-5 MI 3. Road mileage open to the public – total mileage of proposed combined use and change in road maintenance level by alternative (class of vehicle and season of use). These are existing NFTS roads but would be available for use by all vehicle classes listed.

Class of Vehicle	Season of Use	1	2	3	4
		Mileage	Mileage	Mileage	Mileage
1. Mileage Proposed Combined Use – open to highway-legal vehicles and non-highway legal wheeled OHV < = 50”	Yearround	0	22	22	0
2. Mileage Proposed By Change In Maintenance Level – open to highway-legal high- clearance vehicles, non-highway-legal 4WD and Vehicles < = 50”	May 1 – November 15	0	3	3	0
Total Mileage – proposed combined use and change in maintenance level		0	25	25	0
Total Existing Motorized NFTS Road Mileage*		1,219	1,219	1,219	1,219
* Total Motorized NFTS Road Mileage includes Objective Maintenance Level 2-4 roads.					

Table 3.14-6 MI 3 and 4. Trail mileage open to the public – total mileage of proposed change in season of use to existing NFTS trails by alternative.

Class of Vehicle	Season of Use	1	2	3	4
		Mileage	Mileage	Mileage	Mileage
Highway-legal High-Clearance Vehicle	June 1 – October 31	0	3	0	0
	May 1 – November 15		0	3	3
Dual Sport Highway-legal Motorcycle	June 1 – October 31	0	11	0	0
	May 1 – November 15		0	11	11
Non-Highway Legal 4WD	June 1 – October 31	0	3	0	0
	May 1 – November 15		0	3	3
Non-Highway Legal ATV	June 1 – October 31	0	6	0	0
	May 1 – November 15		0	6	6
Non-Highway Legal Motorcycle	June 1 – October 31	0	11	0	0
	May 1 – November 15		0	11	11
Total Mileage – proposed change in season of use		0	11	11	11
Total Existing Motorized NFTS Trail Mileage		36	36	36	36

Table 3.14-7 MI 3 and 4. Trail mileage open to the public by alternative (class of vehicle and season of use). Includes unauthorized routes and co-located trails on closed roads.

Class of Vehicle	Season of Use*	1	2	3	4
		Mileage	Mileage	Mileage	Mileage
Highway-legal High-Clearance Vehicle	Seasonal	0	28.41	29.78	0
	Yearlong		28.45	35.02	
Dual Sport Highway-legal Motorcycle	Seasonal	0	35.61	36.98	0
	Yearlong		28.45	34.33	
Non-Highway Legal 4WD	Seasonal	0	28.41	29.78	0
	Yearlong		28.45	35.02	
Non-Highway Legal ATV	Seasonal	0	23.67	23.67	0
	Yearlong		7.02	7.02	
Non-Highway Legal Motorcycle	Seasonal	0	23.67	23.67	0
	Yearlong		7.02	12.35	
Total Mileage in Alternative		0	64.06	71.32	0
* See Appendix A for specific allowed season of use dates by alternative.					

Table 3.14-8 MI 3 and 4. Trail mileage open to the public by alternative by degree of difficulty. Includes unauthorized routes and co-located trails on closed roads.

Class of Vehicle	Degree of Difficulty	1	2	3	4
		Mileage	Mileage	Mileage	Mileage
Highway-legal High-Clearance Vehicle	Easy	0	15.38	20.18	0
	More Difficult		25.08	27.00	
	Most Difficult		16.40	17.63	
Dual Sport Highway-legal Motorcycle	Easy	0	22.58	26.69	0
	More Difficult		25.08	27.00	
	Most Difficult		16.40	17.63	
Non-Highway Legal 4WD	Easy	0	15.38	20.18	0
	More Difficult		25.08	27.00	
	Most Difficult		16.40	17.63	
Non-Highway Legal ATV	Easy	0	10.59	10.59	0
	More Difficult		15.11	15.11	
	Most Difficult		4.99	4.99	
Non-Highway Legal Motorcycle	Easy	0	10.59	25.01	0
	More Difficult		15.11	23.89	
	Most Difficult		4.99	4.78	
Total Mileages in Alternative	Easy	0	22.58	26.69	0
	More Difficult		25.08	27.00	
	Most Difficult		16.40	17.63	

Table 3.14-9 MI 4. Number of dispersed recreation sites accessed by trails proposed for addition to the NFTS under each alternative.

	1	2	3	4
	Number of Dispersed Sites Accessed	**Number of Dispersed Sites Accessed**	**Number of Dispersed Sites Accessed**	**Number of Dispersed Sites Accessed**
Unauthorized Trail Additions	0	116	116	0
Total Sites Accessed in Alternative	116+	116	116	0

Table 3.14-10 MI 5. Number of miles of routes proposed for addition to the NFTS under each alternative within ½ mile of wilderness boundaries and neighboring private and federal lands. Includes unauthorized routes and co-located trails on closed roads.

	1	**2**	**3**	**4**
	Mileage	**Mileage**	**Mileage**	**Mileage**
Route Additions	0	64.06	72.04	0
Total Within ½ Mile	0	33.06	38.57	0

3.14.7 Summary of Effects Analysis across all Alternatives

1. **Direct and indirect effects of the prohibition of cross-country motorized vehicle travel in Alternatives 2, 3 and 4.**

Direct Effects: As a result of prohibiting cross-country travel, motorized recreational riding opportunities would be reduced. In addition, motorized access to dispersed campsites would be reduced. This would directly impact recreationists that rely on motorized access to their *special places*, reducing capacity for those types of use. Opportunities for some non-motorized recreation activities would be affected by the loss of access also. Some non-motorized opportunities would benefit by the action, which will improve opportunities for quiet recreation.

Indirect Effects: ROS classes remain the same; however, areas that receive cross-country use would change from a predominately motorized environment to a predominately non-motorized environment. By default, routes not inventoried or included in this analysis will not be available for motorized use. More motorized activity would occur along the NFTS. Vehicles would be required to park alongside the NFTS road, often in new locations. Dispersed recreation (e.g., camping) would occur at many of these locations.

2. **Direct and indirect effects of adding facilities to the NFTS including identifying seasons of use and vehicle class in Alternatives 2 and 3.**

Direct Effects: Adding facilities would continue existing riding opportunities for OHV classes, but at a reduced scale, varying by alternative. Riding opportunities decrease during seasonal closures affecting early and late-season use. Motorized trails would provide access to a variety of dispersed recreation activities.

Indirect Effects: By adding these routes to the NFTS, it will be clear to all users where the motorized uses are allowed. This would facilitate enforcement. Maps and information about these routes would be valuable to motorized users and make enforcement easier. Recreationists desiring a quiet setting would know where to expect motorized activity in order to avoid it.

3. **Direct and indirect effects of changes to the existing NFTS including identifying seasons of use and vehicle class in Alternatives 2, 3 and 4 (change in season of use only).**

Direct Effects: Motorized recreation would benefit if the changes contribute to the continuity of the motor-touring opportunity, including access to dispersed recreation and loop trails. Motorized recreation would also benefit with a change in a road maintenance level and the addition of routes designated for combined use. A reduced season of use would limit early and late season access but protect the travelway and require less maintenance. Non-motorized opportunities would benefit by removing motorized use from selected NFTS trails improving opportunities for quiet recreation.

Indirect Effects: Changes to the volume and mixes of vehicles would occur.

Table 3.14-12 shows a summary of the effects on recreation resources across all alternatives.

Table 3.14-11 Recreation Resource Effects Summary

Indicator – Recreation Resources	Rankings of Alternatives for Each Indicator*			
	1	**2**	**3**	**4**
Non-motorized recreation opportunity.	1	3	2	4
Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).	1	3	2	4
Average ranking for Non-motorized Values	**1**	**3**	**2**	**4**
Motorized recreation opportunity.	4	2	3	1
Type of motorized access to dispersed recreation.	4	2	3	1
Average ranking for motorized values	**4**	**2**	**3**	**1**
* A score of 4 indicates the alternative is the least impact for this resource; a score of 1 indicates the most impact.				

3.14.8 Compliance with the Forest Plan and Other Regulatory Direction.

All action alternatives comply with the Six Rivers LRMP and other regulatory direction. This includes the ROS class consistency with the LRMP. There are no proposed changes by alternative to the current ROS class acreages.

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3.15 Inventoried Roadless

This section describes the affected environment and the environmental consequences for Inventoried Roadless Areas (IRAs). IRAs are identified in the Forest Service Roadless Area Conservation Final Environmental Impact Statement, Volume 2 – Maps of Inventoried Roadless Areas. Classification of IRAs began with the RARE II (Roadless Area Review and Evaluation) study in 1978, which identified 23 areas in the Six Rivers National Forest totaling approximately 313,000 acres as roadless study areas subject to evaluation for potential wilderness designation. Of these, approximately 121,000 acres were designated wilderness by the California Wilderness Act of 1984. The 1984 Act released approximately 190,000 acres of roadless areas for non-wilderness uses (1995_SRF_ LRMP_FEIS-151). In 2006 the Northern California Coastal Wild Heritage Wilderness Act designated another 59,748 acres as wilderness mostly occurring within IRAs.

For the purpose of this analysis, there are nine IRAs within the Lower Trinity and Mad River Ranger Districts including Orleans Mountain, Cow Creek, Underwood, Board Camp, Pilot Creek, Mount Lassic, Soldier, Big Butte Shinbone, and Salt Creek IRAs. Combined, these areas total approximately 50,000 acres or approximately 12% of the two Districts.

3.15.1 Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction

The 1984 California Wilderness Act allowed for non-wilderness, multiple-use management of roadless areas. Some of the Roadless areas "released" in 1984 have been roaded and all have been managed for multiple-use other than wilderness. None are recommended to be managed to protect wilderness potential in the Six Rivers National Forest Land and Resource Management Plan. The identified roadless areas within the Lower Trinity and Mad River Ranger Districts have been allocated to various non-wilderness management areas. A management area represents lands that will be managed in a uniform manner, through a set of management area prescriptions unique to that area. The management areas allocated to the Pilot, Mt. Lassic, and Soldier IRAs include Research Natural Area, Special Habitat, Riparian, Special Interest Area, Retention and Partial Retention Visual Quality Objectives (VQOs), Managed Habitat, and General Forest (see Table 3.15-3). The actions proposed under this EIS only pertain to the management areas where such actions are not precluded.

3.15.2 Effects Analysis Methodology

This analysis focuses on how each alternative would affect three of the nine Inventoried Roadless Areas (IRAs) (Pilot, Mt. Lassic, and Soldier) and their characteristics specifically within the Mad River Ranger District. Changes to the NFTS and/or unauthorized route additions are not proposed within the other six IRAs.

Roadless characteristics identified in the 2001 Roadless Area Conservation Rule include: (1) high quality or undisturbed soil, water, and air; (2) sources of public drinking water; (3) diversity of plant and animal communities; (4) habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land; (5) primitive (P), semi-primitive non-motorized (SPNM) and semi-primitive motorized

(SPM) classes of dispersed recreation; (6) reference landscapes; (7) natural appearing landscapes with high scenic quality; (8) traditional cultural properties and sacred sites and, (9) other locally identified unique characteristics (66 FR 3245, Jan. 12, 2001). Principle wilderness characteristics, as described in Forest Service Handbook (FSH) 1909.12, include: (1) natural, (2) undeveloped, (3) outstanding opportunities for solitude or primitive and unconfined recreation, and (4) special features or values. The presence or absence of these qualities influences the wilderness potential of an area.

Table 3.15-1: Roadless and Wilderness Characteristics and Desriptions

Roadless Characteristic	Description
Soil, Water and Air resources	These three key resources are the foundation upon which other resource values and outputs depend. Healthy watersheds provide clean water for domestic, agricultural, and industrial uses; help maintain abundant and healthy fish and wildlife populations; and are the basis for many forms of outdoor recreation.
Sources of public drinking water	NFS lands contain watersheds that are important sources of public drinking water. Careful management of these watersheds is crucial in maintaining the flow of clean water to a growing population.
Diversity of plant and animal communities	Undeveloped areas are more likely than roaded areas to support greater ecosystem health, including the diversity of native and desired nonnative plant and animal communities, due to the absence of disturbances caused by roads and accompanying activities. Inventoried roadless areas also conserve native biodiversity, by providing areas where nonnative invasive species are rare, uncommon, or absent. Discuss the diversity of plant and animal communities.
Habitat for TES and species dependent on large undisturbed areas of land	Inventoried roadless areas function as biological strongholds and refuges for many species. Of the nation's species currently listed as threatened, endangered, or proposed for listing under the Endangered Species Act, approximately 25% of animal species and 15% of plant species are likely to have habitat within inventoried roadless areas on NFS lands.
Primitive, semi-primitive non-motorized, and semi-primitive motorized classes of recreation	These areas often provide outstanding recreation opportunities such as hiking, camping, picnicking, wildlife viewing, hunting, fishing, cross-country skiing, and canoeing. While they may have many Wilderness-like attributes unlike Wilderness, the use of mountain bikes and motorized means of travel is allowed.
Reference landscapes for research study or interpretation	The body of knowledge about the effects of management activities over long periods of time and on large landscapes is very limited. Reference landscapes can provide comparison areas for evaluation and monitoring. These areas provide a natural setting that may be useful as a comparison to study the effects of more intensely managed areas.
Landscape character and integrity	High quality scenery, especially scenery with natural-appearing landscapes, is a primary reason that people choose to recreate. In addition, quality scenery contributes directly to real estate values in neighboring communities and residential areas.
Traditional cultural properties and sacred sites	Traditional cultural properties are places, sites, structures, art, or objects that have played an important role in the cultural history of a group. Sacred sites are places that have special religious significance to a group. Traditional cultural properties and sacred sites may be eligible for protection under the National Historic Preservation Act.

Roadless Characteristic	Description
Other locally identified unique characteristics	Roadless area may offer other locally identified unique characteristics and values. Examples include uncommon geological formations, valued for their scientific and scenic qualities, or unique wetland complexes.
Wilderness Characteristic	**Description**
Natural	This quality monitors both intended and unintended effects of modern people on ecological systems.
Undeveloped	This quality monitors the presence of permanent improvements such as structures, construction, habitations, and other evidence of modern human presence or occupation.
Outstanding opportunities for solitude or a primitive and unconfined type of recreation	This quality monitors conditions that affect the opportunity for people to experience solitude or primitive, unconfined recreation in a wilderness setting, rather than monitoring visitor experiences per se.
Special Features and Values	Area's capability to provide other values such as those with ecologic, geologic, scientific, educational, scenic, historical, or cultural significance.

Effects on these characteristics are described in the analysis as follows:

- Negligible: No measurable effects to the characteristic.
- Minor: Effects are detectable, but are not expected to increase or influence the level of development within the IRA.
- Moderate: Effects on the characteristic are detectable, and expected to increase the level of development for short periods of time until effects have recovered.
- Major: Effects on the characteristic are easily detectable and measurably increase the long-term level of development.

3.15.2.1 Assumptions

The following assumptions are central to the analysis of the effects on IRAs:

- The unauthorized routes considered in the alternatives are part of the current condition of the IRAs. Motorized use is currently taking place within the IRAs affected by this analysis.
- Public motorized use of the 24.59 miles of existing unauthorized routes and 80.11 miles of NFTS roads in IRAs within the Lower Trinity and Mad River Ranger Districts would continue under the no action alternative. No permanent prohibition on cross-country travel would be in place under the no action alternative.
- Motorized use of unauthorized routes in IRAs would result in human presence and noise in close proximity to these routes. The effect will be localized and temporary and the opportunity to experience primitive and semi-primitive recreation would be adversely affected.
- Routes in IRAs being proposed as motorized trails, in many cases, have been and continue to be used by Forest visitors who seek or engage in primitive, semi-primitive non-motorized, and semi-primitive motorized recreation opportunities.

- No further analysis or decision is necessary to continue public motorized use of the existing NFTS roads within IRAs. These decisions were made previously.
- For the purposes of this analysis, under the action alternatives, unauthorized routes are assumed to naturally decompact and revegetate unless they are added to the NFTS. Converting routes to non-motorized uses is not reasonably foreseeable at this time as site-specific proposals must first be developed and analyzed.
- Routes added to the NFTS as motorized trails would be dedicated to use for transportation and would not support native vegetation within the road prism or wheel treads. The proposed prohibition on cross-country motorized travel would allow recovery of natural vegetation unless unauthorized routes are added to the NFTS. This would benefit the natural condition of the landscape, the health of soil and water resources, and plant and animal communities.
- Reductions in the use of unauthorized routes will reduce the total number of stream crossings in IRAs, resulting in localized improvements in water quality and increasing the extent of any riparian vegetation within the crossing.
- Opportunities for primitive and semi-primitive non-motorized recreational experiences would increase with the prohibition on cross-country motorized travel, as would opportunities to experience solitude, or the isolation from the sights, sounds, and presence of others.
- Opportunities for semi-primitive motorized experiences would decrease compared to the existing condition with the prohibition of cross-county travel . Fewer unauthorized routes would be available for exploration in remote, low density areas.

3.15.2.2 Data Sources:

1. Six Rivers National Forest Land and Resource Management Plan (LRMP) (1995)
2. GIS layers and associated tabular data sets
3. In-house knowledge (e.g. Forest Protection Officers, OHV Program Manager, and Resource Specialists)
4. Public input

3.15.2.3 Measurement Indicators

Because there are direct and indirect relationships between the level of motorized use in IRAs and the roadless characteristics listed in table 0-1, the following measurement indicators will be used in the analysis:

1. Miles of routes available for public motorized use within IRAs.
2. Density (miles per square mile) of routes available for motorized use within IRAs.
3. Number of stream crossings in IRAs.

3.15.2.4 Roadless Methodology by Action

1. **Direct/indirect effects of prohibition of cross-country motorized vehicle travel.**

Short-term timeframe: 1 year

Long-term timeframe: 20 years

Spatial boundary: Inventoried Roadless Areas affected.

Indicators: Density (miles per square mile) of routes available for motorized use within IRAs.

Rationale: Cross-country travel could affect roadless area values.

2. **Direct/indirect effects of adding facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, including identifying seasons of use and vehicle class.**

Short-term timeframe: 1 year

Long-term timeframe: 20 years

Spatial boundary: Inventoried Roadless Areas affected.

Indicators: Miles of routes available for public motorized use within IRAs. Density (miles per square mile) of routes available for motorized use within IRAs impacted

Rationale: Motorized travel could affect roadless area values.

3. **Changes to the existing NFTS [this includes changes to the vehicle class and season of use].**

Short-term timeframe: 1 year

Long-term timeframe: 20 years

Spatial boundary: Inventoried Roadless Areas affected.

Indicators: Miles of routes available for public motorized use within IRAs.

Rationale: Motorized travel could affect roadless area values.

3.15.3 Affected Environment

IRAs offer a unique landscape with few developed roads where recreationists may experience technical trail driving and access to remote dispersed recreation opportunities. The terrain and relative accessibility of the IRAs provide good opportunities for visitors to experience semi-primitive conditions with a high degree of challenge and limited developed recreation facilities. The areas provide many opportunities to experience adventure, challenge, and self-reliance due to their mostly high elevation, ruggedness, and remoteness. Recreation in IRAs and surrounding areas includes hunting, fishing, hiking, backpacking, camping, nature viewing and motorized use. There are nine Roadless areas within the Lower Trinity and Mad River Ranger Districts as illustrated in Table 3.15-2 below. This table illustrates the 93.22 miles of existing NFTS roads within IRAs. 1.85 miles of county roads are within two IRAs. This table also shows the breakdown of the total 24.59 miles of unauthorized routes and 5.95 miles of NFTS motorized trails within these IRAs.

Table 3.15-2: Inventoried Roadless Areas NFTS Road and Trail Miles within the Lower Trinity and Mad River Ranger Districts

Roadless Area	County and NFTS Roads*					Unauthorized and NFTS Trails*		
	ML1	ML2	ML3 & 4	CTY	Total	UNA	MOT	Total
Orleans MT	4.51	1.24	2.25	0.00	8.00	2.81	0.00	2.81
Cow Creek	0.27	0.0	0.00	0.00	0.27	0.00	0.00	0.00
Underwood	1.99	0.74	0.00	0.00	2.73	0.39	0.00	0.39
Board Camp	0.00	0.74	0.00	0.00	0.74	4.45	0.00	4.45
Pilot Creek	4.43	22.12	7.47	0.00	34.02	4.46	2.79	7.25
Mt. Lassic	0.00	0.02	0.31	0.00	0.33	5.78	0.00	5.78
Soldier	0.43	28.26	1.05	0.25	29.99	5.84	3.16	9.00
Big Butte Shinbone	0.00	0.64	1.36	0.00	2.00	0.06	0.00	0.06
Salt Creek	1.48	13.91	0.00	1.60	16.99	0.80	0.00	0.80
Total	**13.11**	**67.67**	**12.44**	**1.85**	**95.07**	**24.59**	**5.95**	**30.54**

* Roads:

ML1 = closed to public use – no maintenance performed.
ML2 = high clearance vehicles – both licensed and non-licensed.
ML3 = licensed vehicles only.
CTY = county roads.

* Trails:

UNA = unauthorized
MOT = NFTS motorized

Within the Lower Trinity Ranger District there are four IRAs within this analysis: Orleans Mt (N5079), Cow Creek (05222), Underwood (05237), and Board Camp (05308). A short narrative description of each IRA, including a description of each IRA's unique capability and features, can be found in the SRF LRMP FEIS Appendix C-1-11. Changes to the NFTS and/or unauthorized route additions are not proposed within the four IRAs in the Lower Trinity Ranger District.

Within the Mad River Ranger District there are five IRAs within this analysis: Pilot Creek (05310), Mt. Lassic (05309), Soldier (05251), Salt Creek (05252), and Big Butte-Shinbone (05145). Changes to the NFTS and/or unauthorized route additions are proposed within three of the five IRAs. These three IRAs are Pilot Creek, Mt. Lassic, and Soldier and are briefly described below.

Pilot Creek IRA: The Pilot Creek area (9,204 acres) is readily accessible from Forest Service Route 1 that borders the area on the north, northwest, and east. The area receives light dispersed recreation use, primarily hiking, hunting, and motorized use. The apparent naturalness of the northern portion of the area has been altered very little. Two NFTS motorized trails run through this portion as part of the Pilot Creek motorized trail system. The southern portion however has been extensively altered by road construction during 1987 Blake Fire salvage operations. Generally, throughout most of the unit, the apparent naturalness remains due to re-growth of the cutover units and vegetative screening of the old roads. The size and shape of the area limit the opportunities of solitude or primitive recreation.

MT. Lassic IRA: Much of the original Mt. Lassic IRA (6,564 acres) has become part of the Mt. Lassic Wilderness passed under the October 17, 2006 Northern California Coastal Wild Heritage Act; 1,100 remain in the IRA. Portions of the Lassics Geologic and Botanical Area are

in this IRA and it has moderate dispersed recreation use and old unauthorized jeep routes that receive motorized use. The apparent naturalness of the area has been affected by past vegetation management, visible roads, and grazed areas. The opportunities for solitude and primitive recreation are limited. Recreation use is influenced by the unique geologic and botanical features.

Soldier IRA: The Soldier area (15,014 acres) has been modified by timber harvest and roads. Its northern edge borders private lands in Hettenshaw Valley while the southern boundary is close to the North Fork Wilderness. Hettenshaw Peak, at 4,660 feet, is in the northern portion of the area. The area also consists of drainages of the North Fork and East Fork of the Eel River, and Soldier and Bluff Creeks. Recreation use of the area is low; there are trails that receive hiking and motorized use. The apparent naturalness and natural integrity have been noticeably altered. Fences, range trails, and water developments are noticeable within the area. The opportunities of solitude and primitive recreation are limited.

Table 3.15-3: Inventoried Roadless Areas Within the Project Area Affected by this Analysis

Inventoried Roadless Area (IRAs)	Total Acres	Management Areas (MA)	Existing NFTS Roads and Motorized Trails (miles)	Unauthorized Route (miles)	Unauthorized Route Density (miles/ square miles)	Stream Crossings (unauthorized routes)
Pilot Creek	9,204	MA 8 – Special Habitat, MA 9 – Riparian, MA 14 - Managed Habitat, MA 16 – Partial Retention VQO, and MA 17 - General Forest	36.81	4.46	0.31	0
Mt. Lassic	1,100*	MA 8 – Special Habitat, MA 9 – Riparian, MA 10 - Special Interest Area, MA 16 – Partial Retention VQO, and MA 17 - General Forest	0.33	5.78	3.38	3
Soldier	15,014	MA 2 – Wild River, MA 5 – Research Natural Area, MA 8 – Special Habitat, MA 9 – Riparian, MA 13 – Retention VQO, MA 16 – Partial Retention VQO, and MA 17 - General Forest	33.15	5.84	0.24	13

* **MT. Lassic IRA**: Much of the original Mt. Lassic IRA (6,564 acres) has become part of the 7,279 acre Mt. Lassic Wilderness passed under the October 17, 2006 Northern California Coastal Wild Heritage Act; 1,100 acres remain of the IRA.

3.15.4 Environmental Consequences

This section discloses the environmental effects of each of the alternatives on IRAs affected by the action alternatives. This analysis is focused on the effects of three actions proposed by the alternatives: (1) prohibition of cross-country travel, (2) additions of currently unauthorized routes to the National Forest Transportation System (NFTS), and (3) changes to the use of existing National Forest Transportation System (NFTS). See the resource sections in Chapter 3 for more information about effects of the alternatives on natural and cultural resources.

This analysis focuses primarily on how each alternative would affect three of the nine Inventoried Roadless Areas (IRAs) (Pilot, Mt. Lassic, and Soldier) and their characteristics due to proposed changes to the NFTS and/or unauthorized route additions. There are no changes to the NFTS and/or unauthorized route additions proposed within the other six IRAs (Orleans Mt, Cow Creek, Underwood, Board Camp, Salt Creek, and Big Butte-Shinbone). Briefly however, there would be minor adverse or beneficial effects to the roadless characteristics associated with these six IRAs. Under Alternative 1, the no action alternative, motorized cross-country travel would continue including use on the combined 8.5 miles of unauthorized routes. This would have or potentially have a minor adverse effect on the characteristics of soil, water, and air; diversity of plant and animal communities; habitat for TES and species dependent on large, undisturbed areas of land: primitive, and semi-primitive non-motorized recreation; reference landscapes; traditional cultural properties and sacred sites; and the principle wilderness characteristics of natural, and special features or values. The minor beneficial effect would be an increase in the opportunity for semi-primitive motorized recreation. Under Alternative 4, motorized use off the designated NFTS would be prohibited, including use of all 8.5 miles of unauthorized routes. Since no cross-country travel would be allowed Alternative 4 would mainly have an opposite effect to Alternative 1. Alternative 4 would have a minor beneficial effect on the characteristics of soil, water, and air; diversity of plant and animal communities; habitat for TES and species dependent on large, undisturbed areas of land; primitive, and semi-primitive non-motorized recreation; and the principle wilderness characteristics of natural, undeveloped, and outstanding opportunities for solitude or a primitive and unconfined type of recreation. The minor adverse effect would be a decrease in the opportunity for semi-primitive motorized recreation.

The tables below provide more detailed information about the potential effects of the alternatives on roadless characteristics of the Pilot, Mt. Lassic, and Soldier IRAs. Effects for all action alternatives are compared to the existing condition as represented by Alternative 1.

Table 3.15-4: Direct and Indirect Effects of Project Activities on Roadless Area Characteristics of IRAs (see the resource sections in Chapter 3 for more information about effects of the alternatives on natural and cultural resources)

Roadless Characteristics	Intensity of Effect (Minor Moderate, Major) and type (Beneficial, Stable or Degrading)	Description of Effect by IRA
Soil, Water & Air Resources	**Alternative 1** NO ACTION Minor adverse effect	**Pilot Creek IRA:** Motorized cross-country travel would continue including use of 4.46 miles of unauthorized routes (approximately 3 acres), resulting in continued impacts (e.g., compaction, minor erosion)

Roadless Characteristics	Intensity of Effect (Minor Moderate, Major) and type (Beneficial, Stable or Degrading)	Description of Effect by IRA
		within the route prism. There are no unauthorized route stream crossings, therefore, no impacts to water resources in the area. No measurable effects to air resources are expected. Due to the predominantly light use levels and heavy snowfall that restricts wheeled vehicle access on the unauthorized routes during the winter months, this alternative would not result in measurable variations from current air resource conditions (e.g., particulate matter and ozone generating emissions). There would be no reduction in fugitive dust as motorized use would continue. **Mt. Lassic IRA:** Motorized cross-country travel would continue including use of 5.78 miles of unauthorized routes (approximately 7 acres), resulting in continued impacts (e.g., compaction, minor erosion) within the route prism. Unauthorized routes would cross three stream crossings, impacting (crushing or removing) any riparian vegetation growing in the crossings and causing minor localized impacts to water resources in the area. No measurable effects to air resources are expected. Due to the predominantly light use levels and heavy snowfall that restricts wheeled vehicle access on the unauthorized routes during the winter months, this alternative would not result in measurable variations from current air resource conditions (e.g., particulate matter and ozone generating emissions). There would be no reduction in fugitive dust as motorized use would continue. **Soldier IRA:** Motorized cross-country travel would continue including use of 5.84 miles of unauthorized routes (approximately 7 acres), resulting in continued impacts (e.g., compaction, minor erosion) within the route prism. Unauthorized routes would cross 13 stream crossings, impacting (crushing or removing) any riparian vegetation growing in the crossings and causing minor localized impacts to water resources in the area. No measurable effects to air resources are expected. Due to the predominantly light use levels and heavy snowfall that restricts wheeled vehicle access on the unauthorized routes during the winter months, this alternative would not result in measurable variations from current air resource conditions (e.g., particulate matter and ozone generating emissions). There would be no reduction in fugitive dust as motorized use would continue.

Roadless Characteristics	Intensity of Effect (Minor Moderate, Major) and type (Beneficial, Stable or Degrading)	Description of Effect by IRA
	Alternative 2 Minor beneficial effect	**Pilot Creek IRA:** Adds 2.15 miles of unauthorized route to the NFTS as a motorized trail. Motorized use off the designated NFTS would be prohibited, including use of 2.31 miles of existing unauthorized routes. No cross-country travel would be allowed. This prohibition would result in minor positive impacts to the soil resources in the area as erosion is reduced and the area is gradually revegetated. There are no stream crossings on the unauthorized route additions. There are two stream crossings on the NFTS motorized trail (Dan East (5E14)) proposed under this alternative to be converted from motorcycle to < = 50" wheeled vehicles. One is a hardened stream crossing by design. No measurable effects to air resources are expected. Due to the predominantly light use levels and heavy snowfall which restricts wheeled vehicle access on the unauthorized routes during the winter months, this alternative would not result in measurable variations from current air resource conditions (e.g., particulate matter and ozone generating emissions). There would be localized reductions in fugitive dust from a reduction in motorized use. **Mt. Lassic IRA:** Adds 1.88 miles of unauthorized routes to the NFTS as a motorized trail. Motorized use off the designated NFTS would be prohibited, including use of 3.90 miles of existing unauthorized routes. No cross-country travel would be allowed. This prohibition would result in minor positive impacts to the soil resources in the area as erosion is reduced and the area is gradually revegetated. Reduces the unauthorized route stream crossings to zero resulting in minor localized improvements to water resources. No measurable effects to air resources are expected. . Due to the predominantly light use levels and heavy snowfall which restricts wheeled vehicle access on unauthorized routes during the winter months, this alternative would not result in measurable variations from current air resource conditions (e.g., particulate matter and ozone generating emissions). There would be localized reductions in fugitive dust as motorized use from a reduction in motorized use. **Soldier IRA:** This alternative adds no unauthorized routes within Soldier to the NFTS as motorized trails. Motorized use off the designated NFTS would be prohibited, including use of 5.84 miles of existing unauthorized routes. No cross-country travel would be allowed. This prohibition would result in minor positive impacts to the soil resources in the area as erosion is reduced and the area is gradually revegetated. This alternative also proposes to remove

Roadless Characteristics	Intensity of Effect (Minor Moderate, Major) and type (Beneficial, Stable or Degrading)	Description of Effect by IRA
		motorized use from a 4.56 mile NFTS trail (Bradburn Trail (7E04)) due to resource concerns adding to a positive impact to the soil resources (3.16 of the 4.56 miles of trail are within the Soldier IRA). Reduces the unauthorized route stream crossings to zero resulting in minor localized improvements to water resources. Although there would be a positive impact to air resources, no measurable effects are expected. There would be localized reductions in fugitive dust as motorized use would be prohibited on the currently existing unauthorized routes and Bradburn Trail.
	Alternative 3 Minor beneficial effect	**Pilot Creek IRA:** Same as Alternative 2. **Mt. Lassic IRA:** Same as Alternative 2. **Soldier IRA:** Adds 1.07 miles of unauthorized route to the NFTS as a motorized trail. Motorized use off the designated NFTS would be prohibited, including use of 4.77 miles of existing unauthorized routes. No cross-country travel would be allowed. This prohibition would result in minor positive impacts to the soil resources in the area as erosion is reduced and the area is gradually revegetated. Again, as in Alternative 2, this alternative also proposes to remove motorized use from a 4.56 mile NFTS trail (Bradburn Trail (7E04)) adding to a positive impact to the soil resources (3.16 of the 4.56 miles of trail are within the Soldier IRA). The unauthorized route would cross 5 stream crossings, impacting (crushing or removal) any riparian vegetation growing in the crossings and causing minor localized impacts to water resources in the area. No measurable effects to air resources are expected. Due to the predominantly light use levels and heavy snowfall that restricts wheeled vehicle access on the unauthorized routes during the winter months, this alternative would not result in measurable variations from current air resource conditions (e.g., particulate matter and ozone generating emissions). There would be localized reductions in fugitive dust as motorized use would be reduced but to a lesser degree than Alternatives 2 and 4. Although there would be a positive impact to air resources, no measurable effects are expected. There would be localized reductions in fugitive dust as motorized use would be confined to fewer routes and prohibited on the Bradburn Trail.

Roadless Characteristics	Intensity of Effect (Minor Moderate, Major) and type (Beneficial, Stable or Degrading)	Description of Effect by IRA
	Alternative 4 Minor beneficial effect	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Motorized use off the designated NFTS would be prohibited, including use of all 16.08 miles of unauthorized routes (approximately 17 acres). No cross-country travel would be allowed. This prohibition would result in minor positive impacts to the soil resources in the areas as erosion is reduced and the areas are gradually revegetated. Because no unauthorized routes would be added to the NFTS in Alternative 4, motorized use across all 16 (Mt. Lassic and Soldier) existing stream crossings would be eliminated. Any riparian vegetation would gradually over the long term recover within the crossings. Use of unauthorized routes would stop entirely. Any resulting reduction in emissions would not result in measurable effects to air quality in IRAs because of the predominantly light use levels and heavy snowfall which restricts wheeled vehicle during the winter months.
Sources of public drinking water	No effect - **All Alternatives**	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** No watershed-level effects with the potential to impact sources of public drinking water are expected because there are so few routes in each watershed adjacent to or crossing stream channels.
Diversity of plant and animal communities	**Alternative 1** NO ACTION Minor adverse effect	**Pilot Creek IRA:** Cross-country motorized use would not be prohibited. However, the quality, quantity, and distribution of suitable habitat for rare animal species are not expected to be greatly altered by the continued use of 4.46 miles of unauthorized routes (approximately 3 acres). Any potential disturbance to animal communities would likely be limited to temporary auditory and/or visual perturbation of individuals in proximity to unauthorized routes when used by motorized vehicles. Continued motorized use of all unauthorized routes within IRAs will continue to displace the natural vegetation within the route prism, meaning that an estimated 3 acres would remain without native vegetation and minor adverse impacts (e.g., crushing of individual plants, dust, etc.) to rare and native plant communities in the area would continue. **Mt. Lassic IRA:** Same as for Pilot Creek except there would be continued use of 5.78 miles of unauthorized routes and the estimated 7 acres would remain without native vegetation. **Soldier IRA:** Same as for Pilot Creek except there would be continued use of 5.84 miles of unauthorized routes and the estimated 7 acres would remain without native vegetation.

Roadless Characteristics	Intensity of Effect (Minor Moderate, Major) and type (Beneficial, Stable or Degrading)	Description of Effect by IRA
	Alternative 2 Localized minor beneficial effect	**Pilot Creek IRA:** Any potential disturbances to animal communities would be reduced as cross-country motorized use would be prohibited (including use of 2.31 miles (approximately 0.4 acres) of unauthorized routes). Due to the reduction in vehicle presence and associated noise, the potential for adverse effects to species is decreased, resulting in minor beneficial impacts to plant and animal communities in the area. Native vegetation would gradually colonize the 0.4 acres currently encumbered by unauthorized routes. Minor long term adverse effects to plant and animal communities would continue on and adjacent to the 2.15 miles of routes added to the NFTS. **Mt. Lassic IRA:** Any potential disturbances to animal communities would be reduced as cross-country motorized use would be prohibited (including use of 3.90 miles (approximately 5 acres) of unauthorized routes). Due to the reduction in vehicle presence and associated noise, the potential for adverse effects to species is decreased, resulting in minor beneficial impacts to plant and animal communities in the area. Native vegetation would gradually colonize the 5 acres currently encumbered by unauthorized routes. Minor long term adverse effects to plant and animal communities would continue on and adjacent to the 1.88 miles of routes added to the NFTS. **Soldier IRA:** Any potential disturbances to animal communities would be reduced as cross-country motorized use would be prohibited (including use of all 5.84 miles (approximately 7 acres) of unauthorized routes). This also includes the removal of motorized use from the 4.56 mile NFTS Bradburn Trail (3.16 of the 4.56 mile Bradburn Trail (7E04) is within this IRA). Due to the reduction in vehicle presence and associated noise, the potential for adverse effects to species is decreased, resulting in minor beneficial impacts to plant and animal communities in the area. Native vegetation would gradually over the long term colonize the 7 acres currently encumbered by unauthorized routes.
	Alternative 3 Localized minor beneficial effect	**Pilot Creek IRA:** Same as Alternative 2. **Mt. Lassic IRA:** Same as Alternative 2. **Soldier IRA:** Any potential disturbances to animal communities would be reduced as cross-country motorized use would be prohibited (including use of 4.77 miles (approximately 6 acres) of unauthorized routes). Again, this includes the removal of motorized use from the 4.56 mile NFTS Bradburn Trail (3.16 of the 4.56 mile Bradburn Trail (7E04) is within this IRA). Due to the reduction in vehicle presence and associated noise, the potential for adverse effects to species is decreased, resulting in minor beneficial impacts to plant and animal communities in the area.

Roadless Characteristics	Intensity of Effect (Minor Moderate, Major) and type (Beneficial, Stable or Degrading)	Description of Effect by IRA
		Native vegetation would gradually over the long term colonize the 6 acres currently encumbered by unauthorized routes. Minor adverse effects to plants and animal communities would continue on and adjacent to the 1.07 miles of route added to the NFTS.
	Alternative 4 Minor beneficial effect	**Pilot Creek IRA:** No unauthorized routes would be added to the NFTS. Native vegetation will gradually over the long term colonize the 3 acres currently encumbered by unauthorized routes, resulting in minor beneficial impacts to the native plant communities in the area. Due to the elimination of vehicle presence and associated noise, any adverse effects to wildlife species associated with motorized use of unauthorized routes would be eliminated. **Mt. Lassic IRA:** Same as Pilot Creek except native vegetation will gradually over the long term colonize the 7 acres currently encumbered by unauthorized routes. **Soldier IRA:** Same as Pilot Creek except native vegetation will gradually colonize the 7 acres currently encumbered by unauthorized routes.
Habitat for TES and species dependent on large undisturbed areas of land	**Alternative 1** NO ACTION Minor adverse effect	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Cross-country motorized use would not be prohibited and would continue to affect plant and wildlife species and their habitat through disturbance, crushing of individuals, dust, spread of invasive plants, etc. However, these effects are expected to be minor because habitat effectiveness is currently high and the existing routes have very little influence on habitat quality. (See Chapter 3 Terrestrial Wildlife and Rare Plant sections for more detailed analysis.)
	Alternatives 2, 3, and 4 Minor beneficial effect	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** All alternatives result in a low level of habitat influence and high habitat effectiveness for terrestrial wildlife species. All action alternatives could have a beneficial impact on TES terrestrial wildlife and plants by reducing the existing level of direct, indirect and cumulative impacts associated with motor vehicle use of routes. However, this effect is expected to be minor because habitat effectiveness is currently high and all routes have a very low level of influence on habitat quality.
Primitive and semi-primitive non-motorized, and semi-primitive motorized classes of recreation	**Alternative 1** NO ACTION Minor beneficial effect on SPM Minor adverse effect on P/SPNM	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Provides for the greatest opportunity for semi-primitive motorized (SPM) recreation because it allows for the highest concentration of unauthorized routes (route density of 3.93 mi/square mile) within the IRAs. Conversely, this alternative reduces the opportunity to experience solitude (a measure of primitive and semi-primitive non-motorized experiences), or the isolation from the sights, sounds, and presence of others. This is due to the likelihood of encounters with other recreationists.
	Alternative 2 Minor beneficial effect on P/SPNM Minor adverse effect on SPM	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Provides more opportunity for semi-primitive motorized (SPM) recreation than Alternative 4, but less than Alternatives 1 and 3 due to the reduction of available routes in IRAs, inclusive of the removal of motorized use from the 4.56 mile NFTS Bradburn Trail

Roadless Characteristics	Intensity of Effect (Minor Moderate, Major) and type (Beneficial, Stable or Degrading)	Description of Effect by IRA
		(3.16 of the 4.56 mile Bradburn Trail (7E04) is within the Soldier IRA). Conversely, the reduction in available routes increases the opportunity to experience solitude (a measure of primitive (P) and semi-primitive non-motorized (SPNM) experiences), or the isolation from the sights, sounds, and presence of others. This is even though the concentration of unauthorized routes (route density of 0.25 mi/square mile) is higher than Alternative 3, but less than Alternative 1.
	Alternative 3 Minor beneficial effect on P/SPNM Minor adverse effect on SPM	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Decrease the opportunities for semi-primitive motorized recreation experiences, inclusive of the removal of motorized use from the 4.56 mile NFTS Bradburn Trail (3.16 of the 4.56 mile Bradburn Trail (7E04) is within the Soldier IRA), when compared to Alternative 1. Would provide more opportunities for SPM experiences than the other action alternatives. Opportunities for primitive and semi-primitive non-motorized recreation experiences would improve as compared to Alternative 1 and 2 because of the reduced concentration of unauthorized routes (route density of 0.13 mi/square mile).
	Alternative 4 Minor beneficial effect on P/SPNM Minor adverse effect on SPM	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Would result in the greatest reduction in opportunities for semi-primitive motorized recreation experiences because motorized use of unauthorized routes in the IRAs would be prohibited. Conversely, these alternatives would result in the greatest change in the opportunity to experience solitude (a measure of primitive and semi-primitive non-motorized experiences), and isolation from the sights, sounds, and presence of others.
Reference landscapes for research study or interpretation	**Alternative 1** NO ACTION Minor adverse effect	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Cross-country motorized use would not be prohibited (including use of all 16.08 miles (17 acres) of unauthorized routes) possibly causing a short or long term effect to a potential reference landscape providing, for example, a comparison for estimating impacts to a similar but impaired area. This includes, but is not limited to, the Soldier Research Natural Area within the Soldier IRA.
	No effect - **Alternatives 2, 3, and 4**	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** None of the action alternatives are anticipated to cause an effect to a potential reference landscape including the Research Natural Area located in the Soldier IRA. Routes to be added under both Alternatives 2 and 3 are either along the periphery of the IRAs, such as the case within the Pilot and Soldier IRAs, or within a small remaining fragmented portion of the Mt. Lassic IRA due to wilderness designation.
Landscape character and integrity	No effect – **All Alternatives**	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** None of the alternatives are anticipated to detract from the landscape character and integrity of the IRAs, as rugged terrain masks the visibility of existing routes and use levels are light (0 -25 vehicles/week) compared to roads outside of IRAs. Routes added to the NFTS are low standard, primitive, native surface routes that remain visually subordinate to the landscape by following natural

Roadless Characteristics	Intensity of Effect (Minor Moderate, Major) and type (Beneficial, Stable or Degrading)	Description of Effect by IRA
		terrain and contour. (See Visual Resources section for more detailed analysis of the visual impacts of unauthorized routes.)
Traditional cultural properties and sacred sites	**Alternative 1** NO ACTION Minor adverse effect	**Pilot Creek, Mt. Lassic, and Soldier IRA:** Cross-country motorized use would not be prohibited and use of potentially new unauthorized routes could possibly cause impact to cultural properties and sacred sites.
	No effect – **All Action Alternatives 2, 3, and 4**	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Consultation with local Native American Tribes is ongoing to ensure the protection of, and access to, traditional secular, religious, and ceremonial sites.
Other locally unique characteristics	No effect – **All Alternatives**	See the Reference Landscapes discussion above.
Natural	**Alternative 1** NO ACTION Minor adverse effect	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Cross-country motorized use would not be prohibited and use of the existing and potentially new unauthorized routes would continue. Although light use (0 -25 vehicles/week) is expected, natural vegetation would not be allowed to regrow within the treads of existing or new unauthorized routes. There will be a potential for spread of noxious weeds from continued wheeled motor vehicle use of routes. Localized sediment input would continue at stream crossings, as would continued removal of any riparian vegetation.
	Alternative 2 Minor beneficial effect	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Natural vegetation would be allowed to regrow in the treads of unused routes where cross-country travel is prohibited but not regrow in routes added to the NFTS. There will be a limited potential for spread of noxious weeds from continued wheeled motor vehicle use of added routes.
	Alternative 3 Minor beneficial effect	**Pilot Creek, and Mt. Lassic IRAs** Same as Alternative 2. **Soldier IRA:** Same as Alternative 2, except localized sediment input would continue at stream crossings, as would continued removal of any riparian vegetation.
	Alternative 4 Minor beneficial effect	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Prohibiting motorized use on all unauthorized routes will result in gradual revegetation of route prisms and would reduce the visual presence of routes on the landscape. There will be little potential for spread of noxious weeds and no sediment input into stream crossings from motorized vehicles.
Undeveloped	No effect - **Alternative 1** NO ACTION	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Cross-country motorized use would not be prohibited and use of the existing and potentially new unauthorized routes would continue. Although light use (0 -25 vehicles/week) is expected, natural vegetation would not be allowed to regrow within the treads of existing or new unauthorized routes. However, the unauthorized routes would not have permanently developed features such as culverts and bridges.

Roadless Characteristics	Intensity of Effect (Minor Moderate, Major) and type (Beneficial, Stable or Degrading)	Description of Effect by IRA
	Alternatives 2, and 3 Minor beneficial effect	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Routes added to the NFTS as motorized trails would be dedicated to motorized use and would not support native vegetation within the road prism or wheel treads. Adding unauthorized routes to the NFTS would not increase the level of development within IRAs since the routes under consideration are part of the existing condition and do not represent a permanent development of the landscape. The majority of unauthorized routes are primitive wheel tracks which follow natural terrain. They have native surfacing and lack constructed structures such as culverts and bridges.
	Alternative 4 Minor beneficial effect	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Vegetation on all unauthorized routes would gradually recover to a natural state, causing minor improvements to the undeveloped character of 17 acres of the IRAs. With motorized use eliminated the surface would be expected to revegetate and return to natural soil function within 20-40 years.
Outstanding opportunities for solitude or a primitive and unconfined type of recreation	No effect - **Alternative 1** NO ACTION	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** There will be no changes to the opportunity to experience solitude because use is expected to remain at existing levels. Use of existing unauthorized routes would continue.
	Alternatives 2, and 3 Minor beneficial effect	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** The prohibition of cross country travel and commensurate reduction in the miles of unauthorized routes in the IRAs will decrease the likelihood of encountering other recreationists and increase the sense of isolation from sights, sounds and the presence of others compared to the existing condition.
	Alternative 4 Minor beneficial effect	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** This alternative would not add any unauthorized routes to the NFTS, providing the greatest increase in opportunity for primitive and non-motorized recreation within IRAs. Of the alternatives, this would create the lowest likelihood of encountering other recreationists, contributing to the sense of isolation from sights, sounds and the presence of others and evidence of man.
Special Features and Values	**Alternative 1** NO ACTION Minor adverse effect	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** Cross-country motorized use would not be prohibited (including use of all 16.08 miles (17 acres) of unauthorized routes) potentially causing a long term effect to special features and values, if present.
	No effect - **Alternatives 2, 3, and 4**	**Pilot Creek, Mt. Lassic, and Soldier IRAs:** None of the action alternatives would cause an effect to special features and values, if present.

Table 3.15-5: Additions to NFTS and Existing NFTS Routes in Inventoried Roadless Areas by Alternative

Unauthorized routes in IRAs available for motorized use as:	Miles in IRA Alternative 1			Miles in IRA Alternative 2			Miles in IRA Alternative 3			Miles in IRA Alternative 4		
	Pilot Creek	Mt. Lassic	Soldier	Pilot Creek	Mt. Lassic	Soldier	Pilot Creek	Mt. Lassic	Soldier	Pilot Creek	Mt. Lassic	Soldier
Open to licensed high clearance vehicles	4.46	5.78	5.84	0.32	1.88	0	0.32	1.88	1.07	0	0	0
Open to wheeled vehicles <=50”	4.46	5.78	5.84	2.15	1.88	0	2.15	1.88	1.07	0	0	0
Subtotal unauthorized miles added to NFTS	0	0	0	2.15	1.88	0	2.15	1.88	1.07	0	0	0

Existing NFTS roads and trails in IRAs (includes changes in vehicle class and season of use)	Miles in IRA Alternative 1			Miles in IRA Alternative 2			Miles in IRA Alternative 3			Miles in IRA Alternative 4		
	Pilot Creek	Mt. Lassic	Soldier	Pilot Creek	Mt. Lassic	Soldier	Pilot Creek	Mt. Lassic	Soldier	Pilot Creek	Mt. Lassic	Soldier
Open to hwy legal vehicles	29.56	0.32	29.31	29.56	0.32	29.31	29.56	0.32	29.31	29.56	0.32	29.31
Open to licensed high clearance vehicles	29.56	0.32	29.31	29.56	0.32	29.31	29.56	0.32	29.31	29.56	0.32	29.31
Open to ATV	22.93	0.02	28.26	27.36	0.02	28.26	27.36	0.02	28.26	22.93	0.02	28.26
Open to Motorcycle	24.91	0.02	31.42	27.36	0.02	28.26	27.36	0.02	28.26	24.91	0.02	31.42
Change from NFTS motorcycle trail to <=50”	0	0	0	1.98	0	0	1.98	0	0	0	0	0
Closed to public use	4.43	0	0.43	4.43	0	0.43	4.43	0	0.43	4.43	0	0.43
Subtotal miles of NFTS roads and motorized trails	30.87	0.32	32.90	33.65	0.32	29.74	33.65	0.32	30.87	30.06	0.32	32.90
Total unauthorized additions and NFTS miles in IRAs	30.87	0.32	32.90	35.80	2.20	29.74	35.80	2.20	31.94	30.06	0.32	32.90

Cumulative Effects for All Alternatives

Table 3.15-5 displays the miles of existing NFTS roads, trails and NFTS additions within IRAs for each alternative. None of the alternatives propose new road construction or other development in IRAs. Alternative 2 and 3 would add some existing unauthorized routes to the NFTS as motorized trails.

Past actions have resulted in an existing network of 81 miles of NFTS roads, trails, and unauthorized routes. Records indicate that motorized use (of NFTS roads, trails, and unauthorized routes) was occurring at the time IRA boundaries were established during the RARE II evaluations in 1978 and presently that use continues. The greatest potential threats to maintaining roadless characteristics are road construction, reconstruction, and timber harvesting. These activities pose disproportionately greater risks of altering and fragmenting natural landscapes. Therefore, consideration of cumulative effects resulting from present and foreseeable future activities was limited to proposals to construct or reconstruct roads or harvest timber within IRAs. No present or reasonably foreseeable actions are known or proposed for the affected IRAs at this time.

For the IRAs affected, the action alternatives are expected to result in minor adverse direct and indirect effects to semi-primitive motorized recreation opportunities. Semi-primitive motorized opportunities are characterized by the presence of primitive roads and trails. Primitive routes are used by vehicles not primarily intended for highway use (ROS Users' Guide, p. 16). All unauthorized routes in the IRAs are not constructed to any agency standards and are considered to be primitive trails.

The action alternatives would have the cumulative effect of reducing semi-primitive motorized opportunities in the IRAs by prohibiting cross country travel including continued use of many unauthorized routes. This effect is expected to be most pronounced in Alternative 4, which would not add any unauthorized routes to the NFTS, followed by the Alternatives 2, and 3. For all other characteristics, direct and indirect effects are either not expected or are expected to be beneficial. Therefore, adverse cumulative effects to these characteristics are not expected.

3.15.5 Summary of Effects

Direct and indirect effects of the alternatives on roadless characteristics are summarized in the table below. As shown, the alternatives result in varying degrees of minor effects to roadless characteristics. All action alternatives would result in minor beneficial effects to the overall character of the IRAs compared to existing conditions.

Table 3.15-6: Summary of Direct and Indirect Effects on Roadless Characteristics

Roadless Characteristics	Alternative 1 Effect	Alternative 2 Effect	Alternative 3 Effect	Alternative 4 Effect
Soil, Water & Air Resources	Minor Adverse	Minor Beneficial	Minor Beneficial	Minor Beneficial
Sources of public drinking water	No	No	No	No
Diversity of plant and animal communities	Minor Adverse	Minor Beneficial	Minor Beneficial	Minor Beneficial
Habitat for TES and species dependent on large undisturbed areas of land	Minor Adverse	Minor Beneficial	Minor Beneficial	Minor Beneficial

Roadless Characteristics	Alternative 1 Effect	Alternative 2 Effect	Alternative 3 Effect	Alternative 4 Effect
Primitive and semi-primitive recreation opportunities	Minor Beneficial (SPM) Minor Adverse (P/SPNM)	Minor Beneficial (P/SPNM) Minor Adverse (SPM)	Minor Beneficial (P/SPNM) Minor Adverse (SPM)	Minor Beneficial (P/SPNM) Minor Adverse (SPM)
Reference landscapes for research study or interpretation	Minor Adverse	No	No	No
Landscape character and integrity	No	No	No	No
Traditional cultural properties and sacred sites	Minor Adverse	No	No	No
Other locally unique Characteristics	No	No	No	No
Wilderness Characteristics				
Natural	Minor Adverse	Minor Beneficial	Minor Beneficial	Minor Beneficial
Undeveloped	No	Minor Beneficial	Minor Beneficial	Minor Beneficial
Outstanding opportunities for solitude or a primitive and unconfined type of recreation	No	Minor Beneficial	Minor Beneficial	Minor Beneficial
Special Features and Values	Minor Adverse	No	No	No

Table 3.15-7: Summary of Effects: Roadless

Indicators – Roadless Areas	Rankings of Alternatives for Each Indicator[1]			
	Alt 1	Alt 2	Alt 3	Alt 4
Roadless Area and Wilderness Characteristics	1	3	2	4

[1] A score of 4 indicates the alternative has the most beneficial impact on this resource; a score of 1 indicates the alternative has the most adverse impact.

3.15.6 Compliance with Forest Plan Direction

Roadless areas will be managed according to the management area in which they occur.

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3.16 Society and Culture

3.16.1 Affected Environment

The Lower Trinity and Mad River Travel Management Project area is the Lower Trinity and Mad River Districts of the Six Rivers NF. Both Districts include portions of Trinity and Humboldt Counties. Natural resources contribute to the quality of life of local residents by providing employment and careers opportunities through recreation-related tourism and timber production, income through resource-related jobs and sales of special forest projects, food, and materials for personal and ceremonial uses through subsistence activities, and personal recreation opportunities through access to hiking trails, hunting areas, boating areas, and fishery resources.

Fishing and hunting are significant elements of these communities' lifestyle and adds to their yearly food supply.

Fishing, hunting, whitewater rafting, swimming, camping, wildlife photography, bird watching, and OHV driving are the recreational draws to the area.

The communities' design of its desired future condition includes recreation as a major component of its economy.

The lifestyle is rural with many families with generational roots in the community attached to a land resource value. A substantial number of young adults have been attracted to this area by the natural beauty and its environmental features. Family and social values are more important than services and conveniences that are more readily available in highly populated areas.

Recreation and tourism are seen as the primary areas with the potential to provide for economic stimulus. Infrastructure is needed to support this effort. Recreational facilities, which include trails and safe road systems, are needed.

These two communities share similar values and lifestyles as it relates to this project proposal but have their own histories and composition.

The Lower Trinity Communities

In the Lower Trinity Ranger District most of the populations is located in the unincorporated communities of Willow Creek, Salyer, and Hawkins Bar, all located on Highway 299, and in the Hoopa Valley Indian Reservation, located north of Willow Creek on Highway 96. Historic economic activities occurring in this area over the past 150 years include mining (e.g., copper, gold), homesteading and ranching, logging, and recreation-related tourism. The area provides diverse opportunities for outdoor enthusiasts and travelers, including fishing, hunting, hiking, rafting, and wildlife-viewing. Currently, the main industries are services, recreation-related tourism, agriculture, aggregate extraction, forest products, local branches of federal, state, and county government agencies, and the Hoopa Tribal government.

The largest non-reservation community in the area, and in the entire Six Rivers National Forest, is Willow Creek, with a Census 2000 population totaling 1,743. Willow Creek has several small businesses, a major bank branch, service businesses, forest products industry and government agencies. As the largest community in the area, Willow Creek serves to some extent as a regional trade and service center.

Salyer and Hawkins Bar are small communities located in Trinity County east of the South Fork Trinity River. The area's population is approximately 794. Key economic sectors include educational, health and social services, and retail trade. The agriculture, forestry, fishing, hunting, and mining sectors are also important to the local economy.

The Hoopa Valley Indian Reservation population is approximately 2,633 in 2000. Most of the population is located in the portion of the 144-square mile reservation north of the project area. The Forest shares 25.1 miles of border with the Reservation. Several small business, a major bank branch, a small cattle industry, and tribal government offices and enterprises are located here. The Tribe manages its lands, administering timber, fisheries, wildlife, cultural plants, and sites, and other natural resource based programs.

The project area is rural and predominately composed of public lands under the jurisdiction of the SRNF, the Hoopa Valley Indian Reservation under the jurisdiction of the Hoopa Valley Trial Council and community lands within Willow Creek, Salyer, and Hawkins Bar. In addition, there are less populated communities such as Adens Flat, Suzy Q Ranch, and Gray Ranch located within the project area. The local communities, including Hoopa, have a long history of use of resources within the project area and have a high level of concern in the management of the environment, river resources, and economic conditions that surround their communities.

The Mad River Communities

The Mad River communities developed around a resource-based lifestyle. Fur trappers and deer hide hunters were forced to move on by homesteaders with their cattle and sheep, and by horse ranchers. As the timber industry grew, the local people developed skills in this occupation and began to diversify their small homestead incomes by becoming laborers in the timber industry. The citizens of this area live here because of a long tradition and attachment to the lad that predates the timber industry.

There is an estimated 1,100 residents living in the Mad River community. Occupations are professional, education, farming, home business, timber, construction, government, retail/wholesale, recreation, and other. Lifestyle is rural with an ethnic composition consisting predominately of white Americans. A small percentage of the population are American Indians are associated with recognized tribes. A substantial number of 30-34 year old people were attracted to the Southern Trinity County by the natural beauty and place family and social values above services and conveniences. Advances in telecommunications and computer technology allow residents great flexibility in the location of home-based offices/businesses.

Existing economic activities can be classified into four broad categories: community-orientated services and business, recreation-oriented services and businesses, resource-based industries, and government employment and activities.

The Mad River Ranger District area of the project includes Ruth Lake which provides the majority of recreational activities within the project area. Other than Ruth Lake, the main attraction to this area has been hunting due to the abundance of deer. There is also boar and bear hunting which as some following, and wild turkey and mountain/valley quail. There are other opportunities within the area that are relatively unknown by the general public. The Lassics Botanical Area provides viewing of plants indigenous to only this area, numerous trails ranging in difficulty, and scenic views. There is also a neo-tropical bird spring migration path through the national forest. Cross county skiing in the winter is quite popular, but winter recreation is relatively undeveloped.

Other than Ruth Lake, one of Southern Trinity's main attractions is hunting. Trinity County is well known for its abundant deer population. Boar and bear hunting are popular and for shot-gunners, there are wild turkey, mountain, and valley quail. The community's forest has some attractions that are not well known to the general public. The Lassics Botanical Area provides access to view botanical plant specimens indigenous to only this part of the world. There is also a known neo-tropical bird spring migration path through the Six Rivers National Forest. Some winter recreation is available but undeveloped. Cross country skiing is possible on South Fork Mountain almost every winter.

The community information comes in part from the Mainstem Trinity Watershed Analysis (USDA. 2003) and the Mad River Community Action Plan (1996) for the Lower Trinity and Mad River communities respectively.

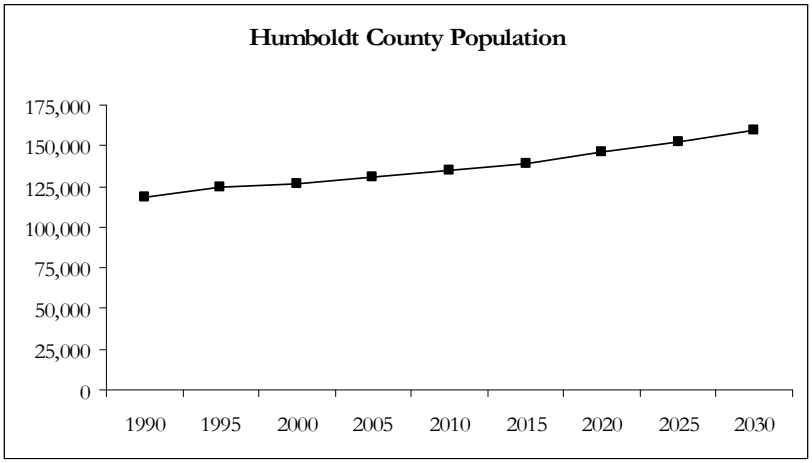
POPULATION AND DEMOGRAPHICS

Population, age and racial distributions of counties are important socioeconomic consideration in land management planning. The following sections highlight demographic trends in the Six Rivers NF study area. Population forecasts provide a projection of future population levels, which may help to indicate the potential for increased pressures for uses and recreation opportunities on the Six Rivers NF. Age distributions provide insights into the socioeconomic dynamic in the local area in terms of assessing the proportion of individuals in the working age group versus retirees and minors who typically use local services in different ways. Similarly, the racial composition of the local area may affect the cultural uses of public lands.

Current Population and Growth Trends

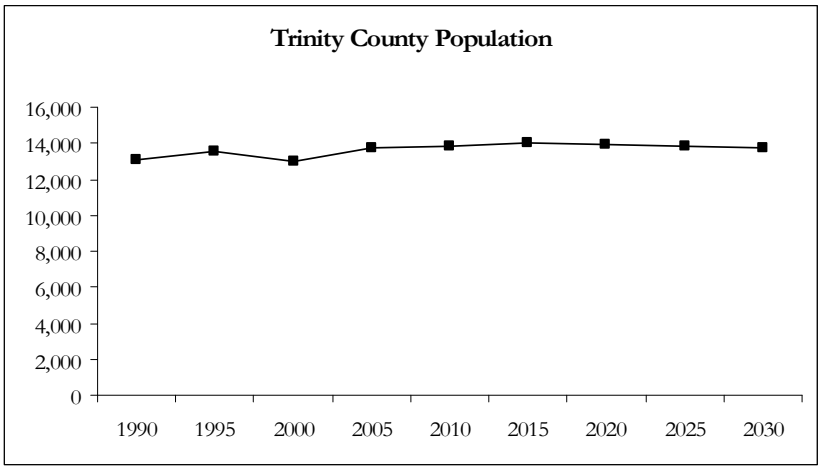
Humboldt County is currently home to over 132,800 people, with a projected population of over 139,100 by 2015. This projection is supported by the fact that population has been steady for the last fifteen years, with an average annual increase of 0.5 percent. Between 1998 and 2008, the county's population grew 5 percent. This steady increase is due to a greater number of births than deaths in this area. See figure below for more details on Humboldt's growing population from 1990 to 2030 (projected).

Figure 4: Humboldt County Population 1990-2000



Trinity County is currently home to 13,966 people, with a projected population of 113,981 by 2015. This projection is supported by the fact that population increase has varied for the last ten years, with an average annual increase of 0.4 percent. In 2004, the county saw its largest population increase of 2 percent, and it increase each year until 2007. Between 2006 and 2008, the county experienced no growth. See the figure for more details on Trinity County's growing populating from 1990 to 2030 (projected).

Figure 5: Trinity County Population 1990-2000



Race/Ethnicity

Approximately 81 percent of residents in Humboldt County classified themselves as white in 2008, compared to 43 percent statewide. Hispanics represented the next largest group with 7.5 percent of the population, which is 28.5 percent lower than California. American Indian (6 percent) and Asians (2 percent) were the next largest groups, with 7,845 and 2,285 people, respectively. Blacks (0.9 percent) were the smallest census-classified group, with 1,140 people. The Asian population is projected to increase by 2015 in Humboldt County, followed by the black population with a projected 30% increase. These projections included a 21 percent increase in the Hispanic population, a 4 percent increase in the white population, and a 4 percent increase in the American Indian population. The following table shows Humboldt County's population by ethnicity since 1990.

Table 3.16-1: Humboldt County's population by ethnicity since 1990

	1990	2008
White	88%	81%
Hispanic	4%	7%
Asian	2%	2%
Black	1%	1%
American Indian	5%	6%
Other	0%	4%

Approximately 97 percent of residents in Trinity County classified themselves as white in 2008, compared with 43 percent in California. American Indians represented 4.4 percent of the county's population, while California contained less than 1 percent. Hispanics represented the next largest group, with 4 percent of the population, compared to 36 percent in California. Asians and blacks were the smallest census-classified group, with seventy-five and sixty-two people, respectively. The following table shows Trinity County's population by ethnicity since 1990.

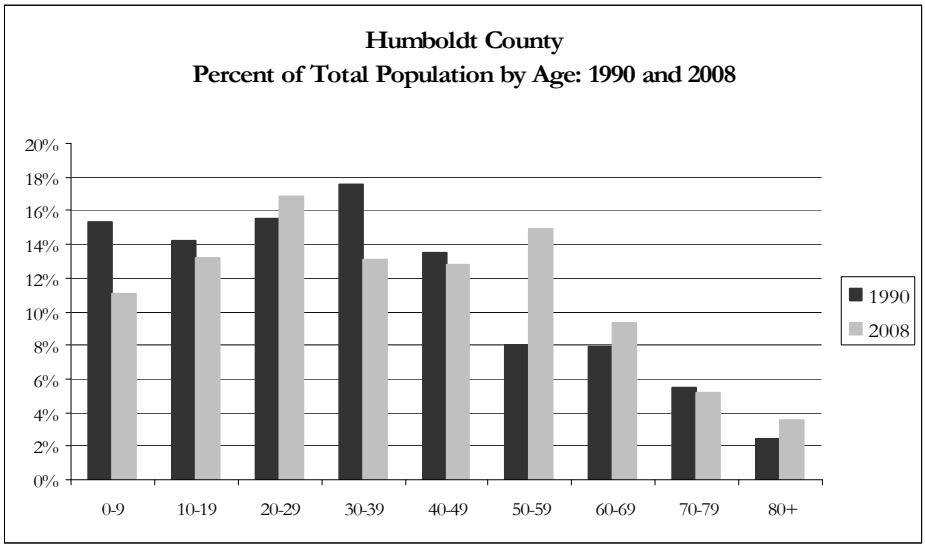
Table 3.16-2: Trinity County's population by ethnicity since 1990

	1990	2008
White	91%	87%
Hispanic	3%	4%
Asian	1%	1%
Black	0%	0%
American Indian	5%	4%
Other	0%	4%

Age Distribution of the Population

The largest age group in Humboldt County in 2008 was the 20-29 year-old group, with 22,500 people. This number represents approximately 17 percent of Humboldt County's population, which is 3 percent higher than the statewide average. Since 1990, the number of people between the ages of 50-59 increased 7 percent, while those 30-39 decrease 4.5 percent, causing a 4 percent decrease among children 0-9. These trends may indicate that the number of jobs for those between 30-39 has declined, while people looking towards retirement are migrating into the area. Residents over 60 make up a higher percentage of the population in Humboldt County than the sate average. By 2015, the number of people between the ages of 10-19 is expected to decrease 13 percent, and the number of people ages 20-29 and 50-59 is expected to decrease 9 percent. Those is in the 30-39 age bracket are projected to increase 23 percent, and those aged 60-69 are expected to increase 29 percent by 2015. See the following figure for more details on age distribution in Humboldt County since 1990.

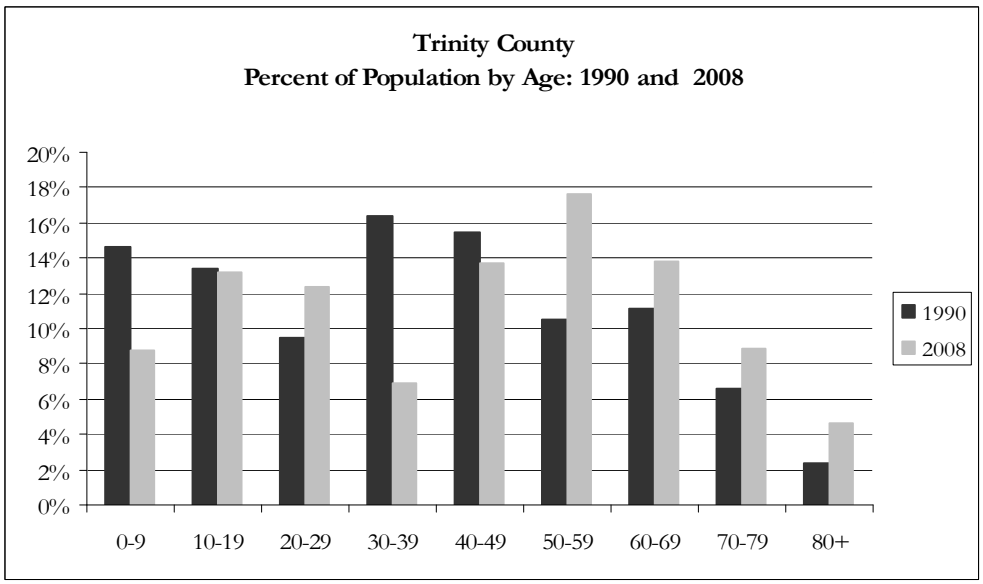
Figure 6: Age distribution in Humboldt County since 1990



The largest group in Trinity County in 2008 was 50-59 year-olds, with 2,620 people. This number represents 18 percent of Trinity County's population, which is 6 percent higher than the state average. Since 1990, the number of people in Trinity County between the ages of 50-59 increased over 17 percent, while those between 30-39 decreased 9 percent causing a 6 percent decrease among children between 0-9. Residents over 60 make up a high percentage of the population in Trinity County than the state average.

By 2015, all age groups, with the exception of the 30-39 and the 60-69 groups, are expected to decrease. The 30-39 age group is projected to increase 36 percent, and the 60-69 group has a projected increase of 21 percent. The decreases are expected in the 10-19 age group (40% percent) and the 40-49 age group (30 percent). See the following figure for more details on age distribution in Trinity County since 1990.

Figure 7: Age distribution in Trinity County since 1990



The population and demographics information comes from the 2008-09 Trinity County Economic and Demographic Profile and 2008-09 Humboldt County Economic and Demographic Profile respectively.

Lifestyles, Attitudes, Beliefs and Values

Six Rivers National Forest held several workshops designed to help the public better understand the project, gather information, and learn how to provide input that could be used to help create alternatives to the Proposed Action. The majority of commenters supported the goals of the Agency to prohibit cross country motorized travel and to designate routes. A mutual perspective was the desire to see the Forest managed for motorized vehicle use and ensure protection of the resources. During these workshops and from the scoping letters received on the Proposed Action various perspectives came from how to manage for motorized use and to what degree. Comments ranged from adding all unauthorized routes to the system to providing maximum protection of resources.

Following are comments that reflect some of these perspectives:

- Driving is part of the recreational experience which provides opportunities to enjoy the scenery and explore remote areas.
- Most people like to use the Forest with their families and friends. This is an example of what was expressed, "I do feel the vast majority of off highway enthusiasts are very respectful people who are just sharing their love of riding in the great outdoors with their families…it is nice to have a common ground where my teenagers and I can share a wonderful and positive bonding experience in this great state of ours". Another example included, "…without a place like this, the youths won't have a place for good quality family activities."
- They are concerned that eliminating trails will limit their areas of enjoyment.
- The value of most OHV enthusiasts is to have a continuity of trails. OHV enthusiasts want existing trail systems to continue and be enhanced. This is an example of what was expressed, "I would like to see these opportunities continue and be enhanced, not only for me, but for future generations of recreationists."
- They are concerned that seasonal closures will adversely impact the prime use recreation times. One public comment stated, "March, April, May and November are the prime times for locals to use the forest for wood cutting and recreational use prior to and after the tourist season."
- There was a trend among the motorcycles users desiring trails designated for single track routes in order to increase their enjoyment of the experience. An example is, "My concern is that the single track trails that exist continue to be maintained and open for use."
- The trend among local residences is the desire to have trails they can ride near their home. One comment included, "It has become harder and harder to find decent areas that are near our homes where we can go out and enjoy ourselves in a productive and nurturing manner with our families."
- Concern was raised from hunters that the quality of the experience would decline with the closure of trails.
- An overall trend was the concern that access to a variety of trails would be restricted.

These concerns captured during the scoping process are summarized in Chapter 1.

3.16.2 Social Effects

Social effects can be difficult to measure because each individual may be affected differently by the same action depended upon their experience and perspective. The changes resulting from the alternatives, have the potential to impact the qualify of life for some individuals that may be positive or negative. Alternatives with the most change proposed are most likely to affect people. Nearby residents that live adjacent to the Six Rivers NF or that visit the Forest frequently, are most likely to be affected. This depends on their location, their values, and the activities that they participate in.

Direct and Indirect Effects

If the prohibition of cross-country travel is implemented (Alternative 2, 3, 4), it may negatively impact OHV users on the Mad River and Lower Trinity Ranger Districts by limiting use on unauthorized routes currently open to motorized use. This action may also affect the very young and the very old by preventing them from participating in activities that may then require strenuous walking for access. This same action may enhance the recreation opportunity for users wishing to experience a non-motorized form of recreation. What positively affects one faction of users may negatively affect the other. This may cause resentment between user groups but because of the low number of users on the Forest, it is unlikely that this will occur. This addition of trails to the system (Alternatives 2, 3) may appeal to users who recreate by driving for pleasure. Conversely, this may negatively affect "quiet users." Again the social implication is that there may be conflict between the groups.

Cumulative Effects

Based on historic effects and our best estimates, the Forest assumes that use will not change dramatically in the future because of this project. It is also assumed, that under all action alternatives, levels of use would be relatively static; although the use patterns may change. For example, even though cross-country travel is prohibited in all of the action alternatives, the same levels of use would simply become more concentrated on the trail additions and existing system.

Six Rivers NF is not adjacent to a larger urban center and although it is possible that use may increase by non-local users because of more restrictive regulations on their local Forests, it is unlikely that it would increase to any significant degree.

Based on the current numbers and these assumptions, the possibility of conflict between user groups is probably the most constant cumulative effect socially and may be present regardless of which alternative is chosen. However, based on current and predicted use on the Forest being low, it is unlikely that such conflict would occur.

3.16.3 Environmental Justice

Environmental justice speaks to concerns that costs of Federal decisions could fall disproportionately on people of a particular ethnic or cultural heritage group, or on people with low incomes. Environmental Justice is an executive order (EO 12898) that requires, in brief, that each Federal Agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or

environmental effects of its programs, policies, and activities on minority populations and low income populations.

The Council on Environmental Quality (CEQ) (1997) provides the following definitions in order to provide guidance for compliance with environmental justice requirements in NEPA:

> "…Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater that the minority population percentage in the general population or other appropriate unit of geographic analysis…"
>
> "…Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect."

Potentially affected tribes have been consulted and effects have been considered on theirs rights and concerns within the analysis of alternatives. American Indian populations will not be disproportionately impacted under any alternative with avoidance of heritages resources, consideration of traditional values, and reasonable access allowed through agreements, permits and recognition of their sovereignty and legal rights. None of the alternatives would have a disproportionate economic impact on any minority or low-income community as the motorized use decisions are spread through the project area and do not cause any adverse effect on any particular minority population. Non-motorized access may be a burden to some individuals, particular those with mobility related disabilities, young children, or heavy objects that would be difficult to transport.

The Forest held several workshops designed to help the public better understand the project, gather information, and learn how to provide input that could be used to help create alternatives to the Proposed Action. These meetings were well attended by stakeholders with a variety of interests. All people were encouraged to provide comments.

At this time, no evidence suggests that actions being considered have disproportionately high and adverse impact on minority and low-income populations.

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3.17 Economics

This section presents information useful to understand and analyze the economic effects in the surrounding area.

3.17.1 Analysis Framework: Statute, Regulation, Forest Plan and Other Direction

Multiple statutes, regulations and executive orders identify the general requirement for the application of economic and social evaluation in support of Forest Service planning and decision making. These include, but are not limited to, the Multiple-Use Sustained Yield Act of 1960 (74 Stat. 215: 16 USC 528-531), National Environmental Policy Act of 1969 (83 Stat. 852; 42 USC 4321, 4331-4335, 4341-4347), and the Planning Act of 1974.

3.17.2 Effects Analysis Methodology

3.17.2.1 Assumptions specific to Economics

The economic area used for this employment and income analysis includes Del Norte, Humboldt, and Trinity Counties in northwestern California.

3.17.2.2 Data Sources

1. IMPLAN - Pro input-output modeling system and 2006 IMPLAN data.
2. National Visitor Use Monitoring (NVUM) data for September 2002 through October 2003.
3. Travel Management Economic Contribution Application for Six Rivers National Forest (TMECA Six Rivers NF.xls, April 2009).
4. United States Department of Labor, Bureau of Labor Statistics (www.bls.gov).

3.17.2.3 Economic Indicators

Indicators used in the analysis of economic effects include jobs and labor income in the economic impact analysis. Non-market values, such as the value of recreation experiences and ecological services, by their nature are difficult to quantify. Direction provided in 40 CFR 1502.23 and Forest S ervice Handbook 1909.15, (7/6/04) and 22.35 (01/14/05) provides for the use of qualitative analysis to evaluate the effects of these non-market values. The non-market aspects of each proposed activity will be described in other resource sections and specialist reports.

3.17.3 Economic Methodology

Economic effects can be categorized as direct, indirect and induced. Direct effects are changes directly associated with spending by a recreation visitor. Indirect and induced effects are the multiplier effects resulting from subsequent rounds of spending in the local economy.

Input-output analysis was used to estimate the direct, indirect and induced employment and labor income effects stemming from motorized and non-motorized use. Input-output analysis is a means of examining relationships within an economy both between businesses as well as between businesses and final consumers. It captures all monetary market transactions for consumption in a given time period. The resulting mathematical representation allows one to examine the effect of a change in one or several economic activities on an entire economy. This examination is called impact analysis. Input-output analysis requires the identification of an economic impact area. The economic area that surrounds the Six Rivers National Forest used for this jobs and income analysis include Del Norte, Humboldt, and Trinity Counties in northwestern California.

The IMPLAN Pro input-output modeling system and 2006 IMPLAN data (the most recent data available) were used to develop the input-output model for this analysis (IMPLAN Professional 2004). IMPLAN translates changes in final demand for goods and services into resulting changes in economic effects, such as labor income and employment of the affected area's economy. For the economic impact area, employment and labor income estimates were generated that were attributable to all current recreation use (wildlife and non-wildlife activities), motorized, non-motorized and other activities for the Six Rivers National Forest.

The expenditure and use information collected by the NVUM survey are crucial elements in the economic analysis. The NVUM survey collects use and expenditure information for various activity types. The expenditure information is collected by twelve activity groups within four trip segments (non-local overnight trips, non-local day trips, local day trips and local overnight trips) (Stynes and White 2005; Stynes and White 2006). The reported spending for each of the spending categories is allocated to the appropriate industry within the IMPLAN model (the allocation process, also referred to as "bridging," was conducted by the USDA Forest Service, Planning Analysis Group in Fort Collins, CO). The bridged IMPLAN files were used to estimate economic effects (e.g., employment and labor income) related to changes in spending (i.e., changes in spending; technically referred to as changes in final demand are caused by changes in use).

The Travel Management Economic Contribution Application (TMECA) is an Excel application that organizes NVUM data and provides a calculation interface with IMPLAN to produce reports useful for travel management analysis. TMECA can be used to look only at motorized recreation, or can be used to estimate the local economic contribution of motorized, non-motorized, and all other recreation.

Estimated economic effects (full and part-time jobs and labor income) are presented. Estimated economic effects are displayed in the following ways:

1. Direct, and indirect and induced employment and labor income response coefficients by activity type (jobs and labor income per 1,000 visits); and
2. Estimated employment and labor income by motorized, non-motorized, and all other activity types.

3.17.4 Affected Environment

3.17.4.1 Employment and Income

Six Rivers National Forest land management activities affect the economic well-being of communities close to and within the Forest boundaries. The Forest's zone of influence includes Humboldt, Del Norte, and Trinity counties in northwestern California. These counties are predominantly rural and to some extent depend upon the Forest's natural resources - timber, fish, wildlife, range, recreation, air and water quality, visual quality, and biodiversity. Forest outputs provide raw materials for local industries and influence expenditures by the population.

Employment: There were approximately 78,604 full and part-time jobs in 2006 within the three county zone of influence. Of these jobs, 27% are associated with proprietors (owners) and 73% with wage and salary employees. Farm employment was approximately 2% of the total while non-farm employment accounts for 98% of total local employment.

Service providing jobs account for approximately 62% of total employment. Employment within the service providing sector covers a wide range of occupations such as wholesale and retail trade, transportation and warehousing, utilities, information and financial services, professional and business services, education, health, lodging, fuel, and food. Retail trade accounts for approximately 21% of employment within the services sector, followed by health and social assistance at 18%, and lodging and food services at 13%. Goods producing jobs, such as agriculture, forestry, fishing, mining, construction, and manufacturing account for approximately 16% of total employment while government jobs (federal, state, and local) account for 22% of total employment.

Unemployment rates within the three county area are typically higher than the average annual unemployment rates for California. Between 2000 and 2008, the average annual unemployment rate for California ranged from 4.9%-7.2%. Humboldt county unemployment rates for the same time period were somewhat comparable, ranging from 5.5%-7.2%. Unemployment rates for Del Norte and Trinity counties, however, were consistently higher than the state, ranging from 6.9%-8.8% in Del Norte county, and 9.3%-12.4% in Trinity county.

Income: Personal income in 2006 within the three county area of influence totaled approximately $4.70 billion. Personal income is income that is received by all persons from all sources including wages, salaries, proprietor's income, rents, interest, and dividends. Labor income, which includes wage and salary disbursements to employees and proprietors income, totaled approximately $3.01 billion. Approximately 50% ($1.52 billion) of labor income was associated with the services sector, 31% ($0.93 billion) with the government sector, and 19% ($0.56 billion) with the goods producing sector.

In 2006, the average per capita income within the three county area was approximately $27,392, as compared to the California state average of $38,956. Per capita income for the counties ranged from 26 to 43 percent less than the average for the state. Humboldt County had the highest per capita income at $29,009 followed by Trinity County at $23,248, and Del Norte County at $22,263.

3.17.4.2 Recreation Use

The National Visitor Use Monitoring (NVUM) program provides reliable information about recreation visitors to National Forest system managed lands at the national, regional, and forest level. Information about the quantity and quality of recreation visits is required for

National Forest plans, Executive Order 12862 (Setting Customer Service Standards), and implementation of the National Recreation Agenda. To improve public service, the agency's Strategic and Annual Performance Plans require measuring trends in visitor satisfaction and use levels. NVUM information assists Congress, Forest Service leaders, and program managers in making sound decisions that best serve the public and protect valuable natural resources by providing science based, reliable information about the type, quantity, quality and location of recreation use on public lands. The information collected is also important to external customers including state agencies and private industry. NVUM methodology and analysis is explained in detail in the research paper entitled Forest Service National Visitor Use Monitoring Process: Research Method Documentation; English, Kocis, Zarnoch, and Arnold; Southern Research Station; May 2002 (*www.fs.fed.us/recreation/programs/nvum*).

Table 3.17-1: Activity Participation on Six Rivers National Forest

Activity	Activity Emphasis for Road & Trail Use	Total Activity Participation (%)[1/2]	Percent as Main Activity (%)[3/4]
Snowmobiling	Motorized	0.1	0.1
Driving for Pleasure	Motorized	28.6	1.1
OHV Use	Motorized	7.5	1.1
Other Motorized Activity	Motorized	1.1	1.1
		Motorized Subtotal	**3.4**
Hiking / Walking	Non-motorized	40.0	3.8
Bicycling	Non-motorized	1.6	0.1
Other Non-motorized	Non-motorized	13.7	5.1
Cross-country Skiing	Non-motorized	1.7	0.8
Backpacking	Non-motorized	2.6	1.3
Horseback Riding	Non-motorized	0.2	0.0
		Non-motorized Subtotal	**11.1**
Downhill Skiing	Other	2.7	2.2
Fishing	Other	12.3	7.2
Viewing Natural Features	Other	60.0	14.6
Relaxing	Other	61.9	10.3
Motorized Water Activities	Other	1.3	0.5
Hunting	Other	22.5	20.7
Non-motorized Water	Other	7.1	4.1
Developed Camping	Other	4.7	2.1
Primitive Camping	Other	11.4	0.8
Picnicking	Other	17.0	7.9
Viewing Wildlife	Other	56.2	1.6
Sightseeing	Other	0.0	0.0
No Activity Reported	Other	20.6	20.9
Resort Use	Other	11.4	3.2
Visiting Historic Sites	Other	5.2	0.2
Nature Study	Other	4.6	0.3
Gathering Forest Products	Other	7.7	3.9
Nature Center Activities	Other	5.3	0.1
		Other Subtotal	**100.6**
		Total	**115.1**

[1] Survey respondents could select multiple activities so this column may total more than 100%.
[2] The number in this column is the percent of survey respondents who indicated participation in this activity.
[3] Survey respondents were asked to select just one of their activities as their main reason for the

forest visit. Some respondents selected more than one, so this column may total more than 100%.
[4] The number in this column is the percent of survey respondents who indicated this activity was their main activity.

The Six Rivers National Forest participated in the National Visitor Use Monitoring (NVUM) project from October 2002 through September 2003. Approximately 414,763 National Forest visits occur on the Six Rivers National Forest during fiscal year 2003. Table 3.17-1 presents participation rates by activity for the Six Rivers National Forest during the NVUM survey period. The Total Activity Participation (%) column of the table presents the participation rates by activity. Participation rates will exceed 100% since visitors can participate in multiple activities. The Percent as Main Activity column presents the participation rates in terms of primary activity.

The primary activity participation rates (Percent as Main Activity) displayed in Table 3.17-1 were used to estimate use by activity emphasis. The emphasis areas were grouped into those emphasizing non-motorized, motorized and other activities. Motorized activities were those that used motor vehicles on Forest Service roads and trails. Non-motorized activities still used the Forest's roads and trails, but on foot or by non-motorized transportation such as cross country skis or bicycles. All other activities are all the other Forest based activities measured by the NVUM survey that didn't utilize roads or trails to pursue their primary activity. Examples of "other" are downhill skiing, motorized water activities, etc. Motor vehicles may have been used to reach a destination or participate in the activity, but it was not the primary emphasis of the visit.

Table 3.17-2 displays the number of party-trips for these activities. A party-trip is equal to the number of visits divided by the average party size for that activity and segment (Local Day, Local Overnight, etc.). Table 3.17-3 displays the average expenditure per visit by activity and trip type. Users were determined to be either local or non-local based on the miles from the user's residence to the forest boundary. If the user reported living within 50 miles of the Forest boundary, they are considered local; if over 50 miles, they are considered non-local. It is critically important to distinguish between local and non-local spending as only non-locals bring new money and new economic stimulus into the local community. Local spending is already accounted for in the study area base data. It is impossible to predict how locals would have spent money if they didn't have local recreation opportunities on the National Forest, but it's a safe guess that much of that money would not have been lost to the local economy. People tend to substitute other local recreation activities or change the time or place for continuing the same activity rather than traveling long distances and incurring high costs to do the same activity.

The most popular non-motorized use is "other" non-motorized use, followed by hiking/walking, backpacking, cross-country skiing, and bicycling. The most popular motorized use is driving for pleasure, followed closely OHV use. Non-local visitors spend more per visit than local visitors primarily because of overnight lodging expenditures. Motorized day use expenditures are generally higher than for non-motorized activities, but non-local overnight visitors engaged in non-motorized activities generally expend more than non-local motorized users (except for snowmobiling). Snowmobilers spend the most per visit, especially non-local visitors.

Table 3.17-2: Number of Party-Trips by Activity

Activity	Use (Party-Trips)				
	Non-local Day Use	Non-local Overnight	Local Day use	Local Overnight	Non-Primary
Non-motorized					
Hiking/Walking	521	1,010	4,785	373	304
Bicycling	8	16	76	6	5
Other Non-motorized	704	1,366	6,468	504	411
Cross-country Skiing	109	336	713	53	12
Backpacking	0	843	0	915	41
Horseback Riding	0	0	0	0	0
Motorized					
Snowmobiling	12	19	90	17	15
Driving for Pleasure	109	131	1,498	52	174
OHV Use	214	376	981	286	63
Other Motorized Activity	201	353	920	268	59
Other					
Fishing	1,424	2,702	6,166	1,139	493
Hunting	1,781	7,873	21,998	8,660	1,122
Viewing Wildlife	233	539	978	170	345
Motorized Water Activities	87	153	399	116	26
Non-motorized Water	561	1,088	5,152	401	327
Downhill Skiing	265	625	1,591	509	137
Developed Camping	248	585	1,490	477	128
Primitive Camping	0	497	0	539	24
Resort Use	383	904	2,300	736	198
Picnicking	950	2,239	5,700	1,824	491
Viewing Natural Features	2,108	4,879	8,853	1,537	3,123
Visiting Historic Sites	25	60	152	49	13
Nature Center Activities	12	27	49	8	17
Nature Study	42	97	176	31	62
Relaxing	1,238	2,918	7,429	2,377	640
Gathering Forest Products	473	1,114	2,835	907	244
Sightseeing	0	0	0	0	0
No Activity Reported	2,515	5,928	15,089	4,828	1,301
Sub Total	13,825	32,589	82,953	26,545	7,151

Table 3.17-3: Expenditures ($ per visit) by Activity

Activity	Expenditures ($ per visit)				
	Non-local Day Use	Non-local Overnight	Local Day use	Local Overnight	Non-Primary
Non-motorized					
Hiking/Walking	17.62	106.96	11.11	39.55	7.41
Bicycling	17.62	106.96	11.11	39.55	7.41
Other Non-motorized	17.62	106.96	11.11	39.55	7.41
Cross-country Skiing	18.93	119.64	14.78	87.39	13.60
Backpacking	0.00	40.38	0.00	36.15	0.00
Horseback Riding	17.62	106.96	11.11	39.55	7.41
Motorized					
Snowmobiling	49.09	128.80	29.57	68.93	28.33
Driving for Pleasure	17.62	66.54	13.33	42.73	10.00
OHV Use	28.57	64.80	19.00	48.50	14.62
Other Motorized Activity	28.57	64.80	19.00	48.50	14.62
Other					
Fishing	21.00	95.65	20.00	48.00	20.00
Hunting	38.10	116.32	30.00	79.47	25.50
Viewing Wildlife	20.80	82.59	10.80	53.75	10.00
Motorized Water Activities	28.57	64.80	19.00	48.50	14.62
Non-motorized Water	17.62	106.96	11.11	39.55	7.41
Downhill Skiing	18.52	70.36	15.00	49.20	12.41
Developed Camping	18.52	70.36	15.00	49.20	12.41
Primitive Camping	0.00	40.38	0.00	36.15	0.00
Resort Use	18.52	70.36	15.00	49.20	12.41
Picnicking	18.52	70.36	15.00	49.20	12.41
Viewing Natural Features	20.80	82.59	10.80	53.75	10.00
Visiting Historic Sites	18.52	70.36	15.00	49.20	12.41
Nature Center Activities	20.80	82.59	10.80	53.75	10.00
Nature Study	20.80	82.59	10.80	53.75	10.00
Relaxing	18.52	70.36	15.00	49.20	12.41
Gathering Forest Products	18.52	70.36	15.00	49.20	12.41
Sightseeing	0.00	0.00	0.00	0.00	0.00
No Activity Reported	18.52	70.36	15.00	49.20	12.41

3.17.5 Environmental Consequences

The assessment of economic impacts attempts to identify potential effects that Forest Service management decisions may have on local, county, and regional economic systems and on people using the natural resources that the Six Rivers National Forest provides. In particular, would changes in the use of the National Forest for recreation and the amount of change in the designation of Forest roads and trails be large enough or significant enough to cause measurable economic changes? Is the economy of the local area diverse enough and robust enough that the proposed changes will be insignificant or will they be felt in very specific segments of the local economy?

The economic impacts to the local economy affected by the treatments proposed are measured by estimating the employment (full and part-time jobs) and labor income generated by the alternatives. The direct employment and labor income benefit employees and their families and therefore directly affect the local economy. Additional indirect and induced multiplier

effects (ripple effects) are generated by the direct activities. Together the direct and multiplier effects comprise the total economic impacts to the local economy.

Estimated economic effects (full and part-time jobs and labor income) are presented. Estimated economic effects are displayed in the following ways:

1. Direct, and indirect and induced employment and labor income response coefficients by activity type (jobs and labor income per 1,000 visits); and
2. Estimated employment and labor income by motorized, non-motorized, and all other activity types.

3.17.5.1 Alternative 1 (No Action)

Alternative 1, the No Action Alternative, provides a baseline for comparing the other alternatives. Under the No Action Alternative, no changes would be made to the NFTS and there would be no prohibition of cross-country travel. Current management plans would continue to guide project area management. The Travel Management Rule would not be implemented, and no Motor Vehicle Use Map (MVUM) would be published. Unauthorized routes would continue to have no status or authorization as NFTS facilities.

Direct/Indirect Effects

Response Coefficients by Activity Type

Table 3.17-4 displays the estimated employment and labor income response coefficients (employment and labor income per 1,000 visits) by local and non-local activity types. The response coefficients indicate the number of full and part-time jobs and dollars of labor income per thousand visits by activity type. The response coefficients are useful in: 1) understanding the economic effects tied to a given use level; 2) understanding projected employment effects for various use scenarios (sensitivity analysis); and 3) understanding the differences in employment effects by activity type. The response coefficients displayed in Table 3.17-4 along with the visits presented in Table 3.17-2 were used to estimate the economic effects for local and non-local use by activity type.

Table 3.17-4 indicates the following: First, economic effects tied to local visitation generate lower employment and labor income effects. This is a result of local visitors spending less per visit in comparison to non-local visitors (see Table 3.17-3). Second, economic effects vary widely by motorized and non-motorized activity types. The lowest employment effect is tied to local backpacking, followed by hiking/walking, bicycling, other non-motorized, and horseback riding activities (Note: the economic effects are identical for these categories since they share the same spending profile). Third, the largest economic effect is associated with non-local cross-country skiing, but is followed fairly closely by non-local snowmobiling. In general, economic effects vary by the amount of spending and by the type of activity, but it can not be generalized that motorized or non-motorized activities contribute more or less to the local economy on a per visit basis. It is also important to be careful with the use of response coefficients. They reflect an economic structure that is a snapshot in time, that is, they are not applicable to visitation numbers that are dramatically different from current recreation levels. If recreation activities and/or visits were to change radically, there would be a structural shift in the economy as spending patterns changed and these response coefficients would no longer reflect underlying economic processes.

Table 3.17-4: Employment and Labor Income Response Coefficients by Activity Type

		Employment (Jobs per 1,000 Party-Trips)		Labor Income (2006 dollars) ($ per 1,000 Party-Trips)	
		Direct Effects	Indirect & Induced Effects	Direct Effects	Indirect & Induced Effects
Non-motorized Use					
Hiking/ Walking, Bicycling, Horseback Riding, Other Non-motorized	Local Day	0.18	0.06	$4,198	$2,022
	Local OVN	0.86	0.31	$19,385	$10,056
	NonLocal Day	0.40	0.14	$9,299	$4,161
	NonLocal OVN	2.89	0.97	$61,316	$31,450
	NP	0.18	0.06	$4,198	$2,022
Backpacking	Local Day	0.00	0.00	$0	$0
	Local OVN	0.76	0.31	$18,707	$10,040
	NonLocal Day	0.00	0.00	$0	$0
	NonLocal OVN	0.96	0.37	$24,542	$11,459
	NP	0.76	0.31	$18,707	$10,040
Motorized Use					
OHV Use	Local Day	0.30	0.12	$7,600	$3,636
	Local OVN	0.88	0.33	$20,195	$10,542
	NonLocal Day	0.48	0.18	$11,947	$5,715
	NonLocal OVN	1.47	0.55	$33,659	$17,571
	NP	0.30	0.12	$7,600	$3,636
Driving	Local Day	0.21	0.07	$4,859	$2,256
	Local OVN	1.30	0.41	$25,406	$13,282
	NonLocal Day	0.32	0.11	$7,641	$3,547
	NonLocal OVN	2.16	0.68	$42,350	$22,140
	NP	0.21	0.07	$4,859	$2,256
Snowmobile	Local Day	0.53	0.20	$13,703	$6,322
	Local OVN	2.35	0.75	$45,894	$24,394
	NonLocal Day	0.91	0.34	$22,465	$10,563
	NonLocal OVN	3.91	1.25	$76,494	$40,659
	NP	0.53	0.20	$13,703	$6,322
Cross Country Ski	Local Day	0.33	0.12	$7,261	$3,775
	Local OVN	2.47	0.81	$49,924	$26,501
	NonLocal Day	0.52	0.19	$11,406	$5,930
	NonLocal OVN	4.12	1.36	$83,214	$44,171
	NP	0.33	0.12	$7,261	$3,775
All Other Use					
All Other Activities	Local Day	0.29	0.12	$8,185	$3,621
	Local OVN	1.09	0.47	$33,106	$13,776
	NonLocal Day	0.53	0.20	$13,682	$5,896
	NonLocal OVN	2.24	0.87	$63,514	$25,260
	NP	0.29	0.12	$8,185	$3,621

All Other Activities includes Developed Camping, Primitive Camping, Resort Use, Picnicking, Viewing Natural Features, Visiting Historic Sites, Nature Center Activities, Nature Study, Relaxing, Fishing, Hunting, Motorized Water Activities, Non-motorized Water, Downhill Skiing, Gathering Forest Products, Viewing Wildlife, Sightseeing, and No Activity Reported.

Motorized, Non-motorized, and Other Use

Table 3.17-5 displays the estimated employment and labor income effects for current use levels reported by NVUM for local and non-local non-motorized, motorized, and other activities.

Table 3.17-6 expresses these employment and labor income effects as a percent of total employment and income for each activity. In general, the estimated economic effects are a function of the number of visits and the dollars spent locally by the visitors. For example, non-local users typically spend more money per visit than local users. Also, activities that draw more users will be responsible for more economic activity in comparison to activities that draw fewer users, holding constant spending per visit. Given that the analysis is dependent on visitation and expenditure estimates, any changes to these estimates affect the estimated jobs and labor income.

Table 3.17-5 indicates, on an annual basis, that approximately 202.2 full and part-time jobs in the three county area (direct, indirect and induced), and $5.61 million in total labor income (direct, indirect, and induced) would be attributable to recreational uses on the Six Rivers National Forest.

Non-motorized activities were responsible for approximately 18.2 total jobs and $0.46 million in total labor income. The two largest non-motorized uses are “other” non-motorized activities and hiking/walking; together these account for about 75% of the jobs and 74% of the labor income generated within the non-motorized category. These activities account for about 13.6 jobs and provided $0.34 million in labor income to the area.

Motorized activities were responsible for approximately 4.4 total jobs and $0.11 million in total labor income. The two largest motorized uses are driving for pleasure and OHV use. These two activities account for about 57% of the jobs and 59% of the labor income generated within the motorized category. Together these two activities contribute 2.5 jobs and provide about $0.07 million in labor income to the area.

“All Other Activities” (see Table 3.17-1 for a list) are significant economic contributors for the activities studied. They generate approximately 179.6 jobs, or 89% of the total jobs associated with all recreational activities on the Forest. Labor income is about $5.03 million, or 90% of the total labor income generated by these activities.

Table 3.17-6 shows that about 9.0% of the total jobs generated by recreational use on the Forest are from non-motorized use, 2.2% from motorized use and 88.8% from “Other Activities.” The contributions to total labor income are 8.3% from non-motorized use, 2.1% from motorized use and 89.7% from “Other Activities.”

Table 3.17-5: Employment and Labor Income Effects by Activity Type

	Employment (full & part-time jobs)		Labor Income (2008 dollars)	
	Direct	Indirect & Induced	Direct	Indirect & Induced
Non-Motorized Use				
Backpacking - *Local*	0.7	0.3	$17,722	$9,511
Non-local	0.8	0.3	$21,427	$10,004
Hiking/Walking - *Local*	1.2	0.4	$28,273	$13,897
Non-local	3.1	1.1	$69,150	$35,141
Horseback Riding - *Local*	0.0	0.0	$0	$0
Non-local	0.0	0.0	$0	$0
Bicycling - *Local*	0.0	0.0	$449	$221
Non-local	0.0	0.0	$1,098	$558
Cross-country Skiing - *Local*	0.4	0.1	$8,092	$4,237
Non-local	1.4	0.5	$30,254	$16,045
Other Non-motorized - *Local*	1.6	0.6	$38,221	$18,787
Non-local	4.2	1.4	$93,480	$47,505
Total Non-motorized	**13.5**	**4.7**	**$308,166**	**$155,905**
Subtotal	**18.2**		**$464,071**	
Motorized Use				
OHV Use - *Local*	0.5	0.2	$13,697	$6,813
Non-local	0.7	0.2	$15,748	$8,105
Driving for Pleasure - *Local*	0.4	0.1	$8,897	$4,209
Non-local	0.3	0.1	$6,621	$3,411
Snowmobiling - *Local*	0.1	0.0	$2,069	$1,011
Non-local	0.1	0.0	$1,757	$917
Other Motorized - *Local*	0.5	0.2	$12,848	$6,391
Non-local	0.6	0.2	$14,772	$7,603
Total Motorized	**3.2**	**1.2**	**$76,409**	**$38,462**
Subtotal	**4.4**		**$114,871**	
All Other Use				
All Other Activities - *Local*	51.2	20.7	$1,428,597	$659,860
Non-local	78.7	29.0	$2,022,791	$920,563
Total Other	**129.8**	**49.8**	**$3,451,388**	**$1,580,423**
Subtotal	**179.6**		**$5,031,811**	
Grand Total	**146.5**	**55.7**	**$3,835,963**	**$1,774,790**
Grand subtotal	**202.2**		**$5,610,752**	

Table 3.17-6: Percent of Total Employment and Labor Income Effects by Activity Type

	Employment (% of full & part-time jobs)		Labor Income(2008 dollars) % of Total Income	
	Direct	Indirect & Induced	Direct	Indirect & Induced
Non-Motorized Use				
Backpacking - *Local*	0.3%	0.1%	0.3%	0.2%
Non-local	0.4%	0.2%	0.4%	0.2%
Hiking/Walking - *Local*	0.6%	0.2%	0.5%	0.2%
Non-local	1.5%	0.5%	1.2%	0.6%
Horseback Riding - *Local*	0.0%	0.0%	0.0%	0.0%
Non-local	0.0%	0.0%	0.0%	0.0%
Bicycling - *Local*	0.0%	0.0%	0.0%	0.0%
Non-local	0.0%	0.0%	0.0%	0.0%
Cross-country Skiing - *Local*	0.2%	0.1%	0.1%	0.1%
Non-local	0.7%	0.2%	0.5%	0.3%
Other Non-motorized - *Local*	0.8%	0.3%	0.7%	0.3%
Non-local	2.1%	0.7%	1.7%	0.8%
Total Non-motorized	**6.7%**	**2.3%**	**5.5%**	**2.8%**
Motorized Use				
OHV Use - *Local*	0.3%	0.1%	0.2%	0.1%
Non-local	0.3%	0.1%	0.3%	0.1%
Driving for Pleasure - *Local*	0.2%	0.1%	0.2%	0.1%
Non-local	0.2%	0.1%	0.1%	0.1%
Snowmobiling - *Local*	0.0%	0.0%	0.0%	0.0%
Non-local	0.0%	0.0%	0.0%	0.0%
Other Motorized Activity - *Local*	0.3%	0.1%	0.2%	0.1%
Non-local	0.3%	0.1%	0.3%	0.1%
Total Motorized	**1.6%**	**0.6%**	**1.4%**	**0.7%**
All Other Use				
All Other Activities - *Local*	25.3%	10.3%	25.5%	11.8%
Non-local	38.9%	14.4%	36.1%	16.4%
Total Other	**64.2%**	**24.6%**	**61.5%**	**28.2%**
Grand Total	**72.5%**	**27.5%**	**68.4%**	**31.6%**
	100.0%		**100.0%**	

Table 3.17-7 shows the relationship of jobs and income generated from all recreation activities studied on the Forest compared to total jobs and income in the three county area. There are approximately 78,604 full and part time jobs across all industry sectors within the analysis area that generate an estimated $3.01 billon in labor income. The direct, indirect, and induced jobs resulting from recreational use of the Six Rivers National Forest only account for about 0.26% of the total jobs in the area, and the income generated is about 0.19% of the total labor income in the area studied.

Table 3.17-7: Percent of Total Area Employment and Total Area Labor Income Effects

		Employment Effects (full and part time jobs)		Labor Income (2008 dollars)	
		Jobs	% of Total Area	Income	% of Total Area
Total Non-Motorized Use	Local	5.2	0.0066	$139,409	0.0046
	NonLocal	13.0	0.0165	$324,661	0.0108
Total Motorized Use	Local	2.1	0.0027	$55,936	0.0018
	NonLocal	2.3	0.0029	$58,935	0.0020
Total All Other Use	Local	71.9	0.0915	$2,088,457	0.0693
	NonLocal	107.7	0.1370	$2,943,354	0.0977
Total Recreational Use	Local	79.2	0.1008	$2,283,802	0.0757
	NonLocal	122.9	0.1564	$3,326,950	0.1105
Total for Area		**202.2**	**0.2572**	**$5,610,752**	**0.1862**

Cumulative Effects

An examination of the past, present or reasonably foreseeable future actions shows that opportunities for jobs and income to the counties will continue indefinitely. Forest projects such as thinning, shredding, fuels reduction, vegetation management and grazing will continue into the future. Jobs related to those projects will also be available. The additional Payment in Lieu of Taxes (PILT) and Secure Rural Schools Act funding continues to support jobs and spending locally. No actions in this project would jeopardize these funding programs.

3.17.5.2 Alternative 2 (Proposed Action)

Alternative 2, the Proposed Action, prohibits cross-country travel; adds 57 miles of inventoried unauthorized routes to the NFTS as motorized trails; co-locates motorized trails on 7 miles of NFTS closed roads; allows mixed use on 25 miles of specified NFTS roads; changes vehicle class on 4 miles of NFTS motorized trail; removes motorized use from 6 miles of NFTS trails; and specifies season of use on 12 miles of existing NFTS motorized trails accessed by NFTS roads subject to wet weather closure.

Direct/Indirect Effects

The direct, indirect, and induced employment and labor income response coefficients by activity type (jobs and labor income per 1,000 visits), and estimated employment and labor income by motorized, non-motorized, and all other activity types would be the same as for Alternative 1.

Predictions about changes in recreational use that may occur on the Forest are difficult to make and would be highly speculative. The Forest Service believes that under Alternative 2, levels of use would be relatively static although the use patterns may change. For example, even though cross country travel would be prohibited, many of the most commonly used OHV routes would be added to the NFTS and use would simply become more concentrated in those areas.

Cumulative Effects

Same as Alternative 1.

3.17.5.3 Alternative 3 (Expand Motorized Recreation)

Alternative 3 includes all actions identified for Alternative 2 (Proposed Action), adds an additional 7 miles of inventoried unauthorized routes to the NFTS as motorized trails, and

expands season of use for motorized trails for consistency with season of use on NFTS roads subject to wet weather closure.

Direct/Indirect Effects

The direct, indirect, and induced employment and labor income response coefficients by activity type (jobs and labor income per 1,000 visits), and estimated employment and labor income by motorized non-motorized, and all other activity types would be the same as for Alternative 1.

Predictions about changes in recreational use that may occur on the Forest are difficult to make and would be highly speculative. The Forest Service believes that under Alternative 3, levels of use would be relatively static although the use patterns may change. For example, even though cross country travel would be prohibited, many of the most commonly used OHV routes would be added to the NFTS and use would simply become more concentrated in those areas

Cumulative Effects

Same as Alternative 1.

3.17.5.4 Alternative 4 (Prohibit Cross-Country Travel; Identify Current Seasonal Use and Vehicle Type; Block Wilderness Access)

Alternative 4 provides another baseline for comparing other alternatives and responds to the issues of non-motorized recreation experience and negative affects to forest resources. The Travel Management Rule would be implemented, and a Motor Vehicle Use Map (MVUM) reflecting the current NFTS would be published. Public use of unauthorized routes would be prohibited.

Direct/Indirect Effects

Under Alternative 4, the Forest estimates a 5% increase in hiking/walking (non-motorized use), a 15% reduction in OHV use (motorized use), and a 10% and 25% reduction in hunting and dispersed camping respectively (all other activities). Levels of use associated with all other recreational activities are expected to remain static.

The direct, indirect, and induced employment and labor income response coefficients by activity type (jobs and labor income per 1,000 visits) would be the same as for Alternative 1.

On an annual basis, approximately 197.0 full and part-time jobs in the three county area (direct, indirect and induced), and $5.47 million total labor income (direct, indirect, and induced) would be attributable to recreational uses on the Six Rivers National Forest. This amounts to a loss of 5.2 jobs and $142,714 in labor income when compared to current management direction as described by Alternative 1, No Action.

Non-motorized activities would generate approximately 18.5 jobs and $0.47 million in total labor income. The two largest non-motorized uses are “other” non-motorized activities and hiking/walking; together these account for about 75% of the jobs and 75% of the income generated within the non-motorized category. These two activities would account for about 13.8 jobs and provide $0.35 million in labor income to the area. Overall, there would be an increase of 0.3 jobs and $7,326 in labor income associated with the non-motorized use category due to the anticipated increase in hiking/walking when compared to current management direction as described by Alternative 1, No Action.

Motorized activities would generate approximately 4.1 jobs and $0.11 million in total labor income. The two largest motorized uses would be driving for pleasure and "other" motorized activity; OHV use, the second largest motorized use under current management direction, would drop to the third under this alternative. Driving for pleasure and "other" motorized use account for about 58% of the jobs and 60% of the labor income generated within the motorized category. Together these two activities would contribute about 2.4 jobs and $0.06 million in labor income to the area. Overall, there would be a decrease of 0.3 jobs and $6,653 in labor income associated with the motorized use category due to the anticipated decrease in OHV use when compared to current management direction as described by Alternative 1, No Action.

"All Other Activities" (see Table 3.17-1 for a list) would generate approximately 174.4 jobs, or 88% of the jobs associated with all recreational activities on the Forest. Labor income would be about $4.89 million, or 89% of the labor income generated by recreational use on the Forest. Overall, there would be a decrease of 5.2 jobs and $143,388 in labor income associated with the anticipated reduction in hunting and dispersed camping when compared to current management direction as described by Alternative 1, No Action.

Approximately 9.4% of the jobs generated by recreational use on the Forest would be from non-motorized use, 2.1% from motorized use, and 88.5% from "Other Activities." The contributions to labor income would be 8.6% from non-motorized use, 2.0% from motorized use, and 89.4% from "Other Activities."

There are approximately 78,604 full and part time jobs across all industry sectors within the analysis area that generate an estimated $3.01 billon in labor income. The direct, indirect, and induced jobs resulting from recreational use of the Six Rivers National Forest under this alternative would only account for about 0.25% of the total jobs in the area, and about 0.18% of the total labor income.

Cumulative Effects

Same as Alternative 1.

3.17.5.5 Roads and Trails Budget Projections

The road system was largely constructed and maintained in the past as a component of timber sales. The significant reduction in timber harvest has left much of the system without needed maintenance. The current emphasis on fuel reduction will result in limited maintenance in some areas. The roads on the Forest are gradually deteriorating due to surfacing being worn out and/or storm damage. Some of the roads are being encroached upon by brush; and unless the brush is cleared, the roads will eventually become impassable. In some cases vegetation encroachment may result in less sight distance for drivers, which may result in a safety concern over time.

Table 3.17-8 displays Forest funding for roads and trails for fiscal years 2004 through 2008. Appropriated funding is used for planning, capital improvements, and maintenance of the NFTS system. Funding has been uneven over the past five years and no prediction or trend is apparent. Sharp increases in the roads budget for fiscal years 2007 and 2008 are due primarily to additional monies from the Northwest Forest Plan settlement agreement. Increases in trails funding during fiscal years 2006 and 2008 were for specific capital improvement projects and travel management analysis. It is unlikely that these higher appropriated funding levels will be maintained in the future.

Table 3.17-8: Six Rivers National Forest Roads and Trail Budget FY 2004-2008

	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
Roads (Appropriated)	$758,894	$691,091	$1,019,961	$1,869,300	$1,606,358
Trails (Appropriated)	$58,986	$87,392	$191,450	$77,460	$149,800
Trails (CA State)	$44,563	$2,296	$0	$32,399	$63,505

In the past, appropriated trail funding has been used primarily to maintain non-motorized trails. OHV trail maintenance has primarily been funded by the California OHV grant program. The Forest has been successful in receiving State OHV Grant monies and expects to remain competitive in the future.

Appropriated funding alone is not adequate to sustain the system in the long run. If this funding does not increase in the future, the Forest will need to rely on outside funding sources, partnerships, and volunteers to accomplish this work.

3.17.6 Summary of Effects Analysis Across All Alternatives

The employment and labor income effects stemming from motorized, non-motorized, and all other recreation activities occurring on the Six Rivers National Forest were estimated to address the economic impact issues tied directly to proposed actions associated with motorized use. Also, the marginal economic effects (employment and labor income effects per 1,000 visits) of motorized and non-motorized use are provided. The marginal effects (also called “response coefficients”) are useful for performing sensitivity analyses of various management alternatives. Table 3.17-9 displays the estimated employment and labor income for each of the alternatives.

Table 3.17-9: Comparison of Alternatives - Economics

Indicator	Recreation Activity	Alternative			
		1	2	3	4
Employment (number of jobs)	Motorized	4.4	4.4	4.4	4.1
	Non-motorized	18.2	18.2	18.2	18.5
	All Other	179.6	179.6	179.6	174.4
Labor Income (2008 $)	Motorized	$114,871	$114,871	$114,871	$108,218
	Non-motorized	$464,071	$464,071	$464,071	$471,397
	All Other	$5,031,811	$5,031,811	$5,031,811	$4,888,423

Alternatives 1, 2, and 3 are the same with respect to estimated employment and labor income. Predictions about changes in recreational use that may occur on the Forest are difficult to make and would be highly speculative. The Forest Service believes that under Alternatives 2 and 3, levels of use would be relatively static although the use patterns may change. For example, even though cross country travel would be prohibited, many of the most commonly used OHV routes would be added to the NFTS and use would simply become more concentrated in those areas.

Under Alternative 4, the Forest estimates a 5% increase in hiking/walking (non-motorized use), a 15% reduction in OHV use (motorized use), and a 10% and 25% reduction in hunting and dispersed camping respectively (all other activities). Levels of use associated with all other recreational activities are expected to remain static. Overall, there would be a net reduction in employment and labor income of 5.2 jobs and $142,714 when compared to Alternatives 1, 2, and 3.

Under Alternatives 1, 2, and 3, all of the recreation related jobs together only account for about 0.26% of the total jobs, and the income generated is about 0.19% of the total labor income in the area studied. Under Alternative 4, recreation related jobs only account for about 0.25% of the total jobs, and about 0.18% of the total labor income. None of the alternatives would have a significant impact on employment and labor income within Del Norte, Humboldt, and Trinity counties.

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3.18 Transportation Facilities

This section of the environmental analysis examines the extent to which alternatives respond to transportation facilities direction established in the Six Rivers National Forest Land and Resource Management Plan. The Forest Plan transportation facilities direction was established under the implementing regulations of the National Forest Management Act (NFMA) and the National Forest Roads and Trails Act (FRTA). The National Forest Transportation System (NFTS) consists of roads, trails, and airfields. The NFTS provides for protection, development, management, and utilization of resources on the National Forests.

Transportation facilities considered in this analysis include roads and trails that are suitable for motor vehicle use. This analysis considers changes proposed to the NFTS to meet the purpose and need of the proposed action. Decisions regarding changes in the transportation facilities must consider: 1) providing for adequate public safety, and 2) providing adequate maintenance of the roads and trails that will be designated for public use. The analysis in this section focuses primarily on these two aspects of the NFTS.

3.18.1 Analysis Framework: Statute, Regulation, Forest Plan and Other Direction

Direction relevant to the proposed action as it affects transportation facilities includes the following:

Title 36, Code of Federal Regulations, Part 212 (36 CFR 212) the implementing regulation for the FRTA and includes portions of the Travel Management Rule published in the Federal Register on November 9, 2005. Part 212 Subpart B provides criteria for designation of roads and trails. Providing safe transportation facilities and considering the affordability of maintaining the transportation facilities are two of the criteria.

Forest Service Manuals and Handbooks Sections 2350 and 7700 These management guidance documents contain agency policy for management of the National Forest Transportation System. The policy requires the development of trail management objectives (TMO's) and road management objectives (RMO's). The TMO's and RMO's document the purpose of each trail or road. The purpose for the trail or road sets the parameters for design, operation, and maintenance standards needed to meet user needs, resource protection and public safety. Forest Service Handbook 7709.59 Chapter 60 describes the maintenance management system the Forest Service uses and the maintenance standards needed to meet road management objectives (RMO's) for the road system and include considerations for public safety. Forest Service Handbook 2309.18 describes the development, maintenance and operations systems the Forest Service needed to meet trail management objectives (TMO's) for the trail system and include considerations for public safety.

Road maintenance levels define the level of service provided by, and maintenance required for, a specific road. Maintenance levels must be consistent with road management objectives and maintenance criteria. Policy regarding maintenance levels is found in FSH 7709.59, Road System Operations and Maintenance Handbook, Chapter 60, Section 62.3. The following are excerpts from that direction:

"Roads may be currently maintained at one level and planned to be maintained at a different level at some future date. The operational maintenance level is the maintenance level currently assigned to a road considering today's needs, road condition, budget constraints, and environmental concerns; in other words, it defines the level to which the road is currently being maintained. The objective maintenance level is the maintenance level to be assigned at a future date considering future road management objectives, traffic needs, budget constraints, and environmental concerns. The objective maintenance level may be the same as, or higher or lower than, the operational maintenance level. The transition from operational maintenance level to objective maintenance level may depend on reconstruction or disinvestment."

"Roads assigned to maintenance levels 2-5 are either constant service roads or intermittent service roads during the time they are open to traffic. "

"The distinction between maintenance levels 1 and 2 is sharply defined. Level 1 roads are roads placed in storage with all vehicular traffic eliminated. Level 2 roads are passable by prudent drivers in high clearance vehicles. "

"The distinction between maintenance levels 2 and 3 is also sharply defined. Level 2 roads are not maintained to be passable to standard four wheel passenger cars. No provision is made for user comfort, user convenience, and speed of travel. Neither is any provision made to warn users about changing conditions and safety concerns on the road ahead. On the other hand, level 3 roads are passable to prudent drivers in passenger cars. Users can reasonably drive with expectations of predictable road conditions and can expect warning signs and traffic control devices meeting Manual on Uniform Traffic Control Devices standards when hazards are present."

"The distinctions between maintenance levels 3, 4, and 5, which are roads managed as public roads (FSM 7730.5), are not sharply defined. Some parameters overlap. Maintenance levels are selected based on the best overall fit of the parameters for the road in question. In those situations where the parameters do not indicate a definite selection, the desired level of user comfort and convenience is the overriding criteria to determine the maintenance level."

Regional Forester's Letters

Direction related to motorized mixed use is contained in Regional Forester's letters, file code 7700/2350, dated 08/26/06 and 06/20/07. These letters provide procedures National Forests in Pacific Southwest Region will use to evaluate safety aspects of public travel on roads when proposed changes to the NFTS will allow both highway legal and non-highway legal traffic on a road (motorized mixed use).

The California Vehicle Code (CVC)

State Traffic Regulations:

Regulations at 36 CFR 212.5a make State traffic regulations applicable to NFTS roads. In California, those regulations are found in the California Vehicle Code (CVC).

This code regulates the use of motor vehicles in California, including motor vehicles used on the national forests. The CVC sets safety standards for motor vehicles and vehicle operators. It defines the safety equipment needed for highway legal and non-highway legal vehicles. It also defines the roads and trails where non-highway legal motor vehicles may be operated.

Six Rivers National Forest Land and Resource Management Plan

The Six Rivers Land and Resource Management Plan (LRMP) goals for Motorized Recreation states in part "Provide a range of recreational opportunities to meet the needs of motorized recreationists. Manage motorized recreation to provide for public safety and resource protection, and to reduce user conflict." (LRMP page IV – 123). Additionally the Forest Plan under the Standards and Guides for Motorized Recreation states the following: 18-21 OHV use is restricted to designated routes. 18-22 Level 2 roads are open to motorized recreation vehicles (including OHVs), unless otherwise designated closed (LRMP page IV – 124).

3.18.2 Effects Analysis Methodology for Transportation Facilities

The Effects Analysis Methodology focuses on the assumptions, methodology, and indicators for addressing the direct and indirect effects of three actions and the cumulative effects of implementing the alternative as a whole. The three discrete actions common to all action alternatives are: (1) The prohibition of cross-country motorized vehicle travel; (2) The addition of facilities (unauthorized roads and trails) to the NFTS, including identifying seasons of use and vehicle class; and (3) Changes to the existing NFTS (deletions of facilities/changing the vehicle class/season of use).

Also common to all alternatives:

Spatial boundary: The Lower Trinity and Mad River Districts boundaries are the unit of special analysis when considering effects associated with the existing NFTS

3.18.2.1 Assumptions

General

1. Any motor vehicle use authorized by state law is occurring on the NFTS unless there are Forest specific prohibitions.
2. Motor vehicle uses authorized by contracts, permits or other written authorizations are outside the scope of this proposal (i.e. fuel wood gathering, motorized special use permit event, residences, mining activities, etc.).
3. Vehicle classes eligible for motorized trail use include high clearance vehicles (4WD etc), vehicles <=50" (ATV and motorcycles), and motorcycle only. Traffic on NFTS roads generates needs for maintenance. Commercial users are required to perform or pay for maintenance made necessary by their use. Maintenance needs resulting from administrative use and public use are the Forest Service's financial responsibility.
4. There is some cost of maintenance that must be borne by the Forest Service for needs generated by natural events such as rainfall and growth of vegetation for all routes on the NFTS irrespective of motor vehicle traffic. The cost of meeting these needs is shared with commercial users and cooperators when such traffic is present.
5. State laws regulating motor vehicle equipment and operators set the standard of care for the safety of vehicle operators and other users of the NFTS.
6. Maintenance Level 2 Roads (ML2, roads maintained for high clearance vehicles) are already open to mixed use.
7. The current season of use for NFTS roads would remain unchanged.

8. It is assumed that most users are prudent drivers, observe "the rules of the road" and practice safe driving techniques.
9. Co-located motorized trails on stored NFTS roads (ML1) are considered safe.

Specific to Public Safety

36CFR212.55 requires public safety be considered when designating roads, trails and areas for motor vehicle use. The proposed additions and changes to the NFTS have been evaluated for the affects on public safety. Due to very low traffic volumes and the relatively remote location of NFTS roads, there is insufficient reporting of crashes on the roads to make determinations regarding whether roads are safe.

Motorized Mixed Use

Forest Service Manual 7700.30 defines motorized mixed use as the designation of an NFTS road for use by both highway-legal and non-highway-legal motor vehicles.

The California Vehicle Code (CVC) requires motor vehicles operated on highways be highway legal and be operated by licensed drivers. Region 5 considers passenger car roads (ML 3, 4, & 5) to be subject to state highway law. The CVC allows the operation of non-highway-legal vehicles operated by unlicensed drivers on roughly graded roads. Region 5 considers roads maintained for high clearance vehicles (Maintenance Level 2) as roughly graded and considers operation of OHVs on these roads as consistent with state law.

Motorized mixed use (MMU) on routes added to the NFTS as high clearance roads. Motorized mixed use would be authorized for all routes added to the NFTS as "roads open to all vehicle classes". All of the unauthorized routes proposed to be added to the NFTS as high clearance roads:

- Will be maintained for high clearance vehicles; passenger car traffic will be discouraged.
- Do not have documented crash history involving motorized mixed use on the road or similar roads in the vicinity.

No routes are proposed to be added as roads to the NFTS in any alternative. Depending on the alternative selected, some unauthorized routes will be added to the NFTS as full-size vehicle trails (open to all trail vehicles), motorcycle (single track) trails, and ATV (quad – double track) trails. The mixed use designation does not apply to routes added to the NFTS as motorized trails. Use by non-highway-legal trail vehicles would be allowed on motorized trails.

Motorized mixed use on existing NFTS high clearance roads. Low standard, high clearance NFTS roads (generally Maintenance Level 2) are maintained for use by high clearance 4WD vehicles rather than passenger travel. Use levels are generally low, consisting of one or a combination of administrative, permitted, dispersed recreation or other specialized uses. Log haul may occur at this level. Maintenance level 2 roads have the following attributes:

- Roads have low traffic volume and low speed.
- Typically local roads.
- Typically connect collectors or other local roads.
- Dips are the preferred drainage treatment.

• Not subject to the requirements of the Highway Safety Act.

• Surface smoothness is not a consideration.

• Not suitable for passenger cars.

All existing high clearance NFTS 4WD roads have been determined to have minimal safety concerns. These roads will be open to all vehicle classes (highway-legal and non-highway-legal) in all alternatives (Alternatives 1-4). This is because the roads:

• Are and will be maintained for high clearance vehicles; passenger car traffic is and will continue to be discouraged.

• Do not have documented crash history involving motorized mixed use on the road or similar roads in the vicinity.

Motorized mixed use on existing NFTS passenger car roads (ML3). Maintenance Level 3 (7709.58, 10, and 12.3) is assigned to open roads and maintained for travel by prudent drivers in standard passenger cars. User comfort and convenience are low priorities. Roads in this maintenance level are typically low speed, single lane with turnouts, with spot surfacing. Some roads may be fully surfaced with either native or processed material. Maintenance level 3 roads have the following attributes:

• Subject to the requirements of the Highway Safety Act and MUTCD.

• Low- to moderate-traffic volume.

• Typically connect to arterial and collector roads.

• A combination of dips and culverts provide drainage.

• May include some dispersed recreation roads.

• Potholing or wash boarding may occur.

Motorized mixed use on existing NFTS passenger car roads (ML4). Maintenance Level 4 (7709.58, 10, and 12.3) is assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane and aggregate surface. However, some roads may be single lane. Some roads may be paved and/or dust abated. The most appropriate traffic management strategy is “encourage.” However, the “prohibit” strategy may apply to specific classes of vehicles or users at certain times. Maintenance level 4 roads have the following attributes:

• Subject to the requirements of the Highway Safety Act and MUTCD.

• Roads have moderate traffic volume and speed.

• May connect to county roads.

• Culverts provide drainage.

• Usually a collector.

• May include some developed recreation roads.

A Motorized mixed use analysis is being performed to determine the number of miles and the extent to which such use would be permitted (Draft Engineering Analyses, on file at the

Supervisor's Office in Eureka, Ca.). Twelve passenger car system roads for a total of approximately 25 miles are considered for mixed use. Of those miles approximately 18 miles are ML3 and 5 miles of ML4. The road surfaces vary between native surface, aggregate, gravel, pavement and chip seal. Passenger car roads authorized for motorized mixed use will be posted to warn drivers of mixed vehicle use. Pending the final results of the engineering analysis, motorized mixed use would be authorized on these roads or a portion of these roads in alternatives 2 and 3.

Specific to Affordability

The Travel Management Rule (36CFR212.55) requires consideration of the need for maintenance and administration of the designated NFTS. Costs for the NFTS system include costs for needed maintenance work that has not been completed for various reasons (deferred maintenance) and costs of maintenance that should be performed routinely to maintain the facility to its current standard (annual maintenance). In addition there may be additional costs associated with proposed changes to the NFTS (implementation costs). These costs may be for improving unauthorized routes that will be added to the NFTS, costs for proposed safety and resource improvements, costs for changing maintenance levels, and costs for closing routes to use by motor vehicles, and cost of signing. Other future costs such as law enforcement were not analyzed

Annual maintenance funding on NFTS roads comes primarily from appropriated road maintenance funding (CMRD). The main focus of this funding has been on safety and resource protection on passenger car roads. Recently, road maintenance on high clearance roads has been funded with focused project proposal funding such as Resource Advisory Committee (RAC), Capital Investment Projects, and Legacy Roads/Trail appropriations funding. This funding must be competed for and is more sporadic and site specific in nature. Transportation system maintenance is accomplished mainly using contracts and to a lesser extent by cooperators, forest service personnel, and volunteers.

In recent years, annual road maintenance budgets have not been sufficient to fully maintain the entire road system. This has lead to an increase in deferred maintenance. An estimate of the deferred maintenance for roads on the Six Rivers National Forest is $113,439,464. Note this number is based on a national random sample of deferred maintenance needs done in 2008. It is not statistically valid at the national forest level. However, it can be used as an indicator of maintenance needs for the existing road system.

Motorized trail maintenance differs from road maintenance in that the use of mechanized equipment is limited due to the narrower width and steeper terrain of most trails. Therefore, motorized trails require considerable hand work and more time to maintain than the equivalent mile of road.

The table 3.18-1 below displays the estimated cost per mile to perform annual routine maintenance on all existing NFTS roads and motorized trails. The average costs were derived using the national road maintenance cost spreadsheet.

Annual maintenance funding on NFTS trails comes primarily from appropriated trail maintenance funding (CMTL) and other sources. Region 5 has the potential to acquire supplemental funding for motorized recreation through the California Department of Parks and Recreation's Off-Highway Motorized Vehicle Recreation Division Cooperative Agreement

Program. Since 2000 the Forest has received supplemental state funding to help maintain NFTS motorized trails.

Table 3.18-1 below displays the estimated cost per mile to perform annual routine maintenance on all existing NFTS roads and motorized trails. The average costs were derived using the national road maintenance cost spreadsheet. The cost per mile for motorized trail was derived using current District costs.

Table 3.18-1 Average Costs for Annual Road and Trail Maintenance

Operational Maintenance Level	Current NFTS Miles	Annual Cost per Mile	Annual Maintenance Cost
OML 1 – Stored Road	122	$225	$27,450
OML 2 - High clearance	845	$543.33	$459,117
OML 3 – Passenger Car. Low Degree of User Comfort	277	$10,870	$3,010,990
OML4 – Passenger Car. Moderate Degree of User Comfort.	97	$14,106.67	$1,368,347
OML 5 – High Degree of User Comfort	0	N/A	N/A
All NFTS Roads	1,341	N/A	$4,865,904
NFTS Motorized Trail	36	$1,000	$36,000
All NFTS Roads and motorized trails	1,377	N/A	$4,901,903
NFTS Roads open to Traffic	1,219	N/A	N/A

Implementation costs for the proposed changes to the NFTS are shown for road and trails in the Affordability Indicator table. The costs shown are based on estimates for the types of work typically needed to complete the changes. Costs may include safety, resource improvements on the NFTS, and work needed to bring unauthorized routes to acceptable standards for use by motor vehicles.

3.18.2.2 Data Sources

The data sources used for this analysis included the infrastructure database for roads (INFRA), local road data sheets, the Six Rivers Forest Roads Analysis for ML 3-5 roads completed in 2003, Motorized Mixed Use Engineering Report, and specialist data sets collected for this travel management plan.

3.18.2.3 Transportation Facilities Measurement Indicators

Estimated effects of implementing the alternatives on transportation facilities are evaluated on the basis of public safety and transportation affordability. Direct and indirect

measurement indicators for these two elements are described in the following section. Public safety is measured in miles of road/trail change and affordability is measured in dollars.

Measurement Indicators for Public Safety

1A. Miles of motorized trail converted to non-motorized. Converting motorized to non motorized use would increase public safety by eliminating hazards such as collision potential and loss of control on over steepened side slopes**.** Converting motorized use to non motorized use would be beneficial to public safety by eliminating hazards such as collision potential, riding control loss on over steepened side slopes.

1B. Miles of unauthorized trails added to the NFTS. Unauthorized trails with safety concerns proposed for inclusion in the NFTS would be identified and corrected to conform to the National Quality Standards for Trails and design parameters associated with the trail class and user type. Trail work would include signing identified hazards, hazard tree removal, tread work for safety and ease of passage, etc.

1C. Miles of NFTS trails with proposed changes to the season of use. This change may affect public safety by reducing the risk of exposure to adverse conditions resulting from wet surfaces or winter weather situations.

Measurement Indicators for Transportation Affordability

2A. **Annual Maintenance**: Displays the estimated annual costs to maintain the existing NFTS of roads and trails. Appropriated funding history for roads and trails for the Six Rivers National Forest from 2005-2009 is displayed in table 3.18-5.

2B Implementation Costs: Displays the estimated costs of implementing the proposed additions and changes to the existing system. Included are estimated costs of mitigations for public safety and resource protection. More specifically these costs cover estimated annual road and trail maintenance, additions to the NFTS, trails co-located on closed NFTS roads, proposed mixed use, passenger car roads reduced to high clearance road, motorized trail converted from motorcycle to <=50" wheeled vehicles, removing motorized use from trails and the cost of producing a motor vehicle use map. See Table 3.18-3 Affordability Measurement table below.

3.18.3 Affected Environment

President Harry S. Truman established the Six Rivers National Forest by Presidential proclamation on June 3, 1947. The new Forest's initial 900,000 acres were carved from the western portion of the Klamath and Trinity National Forests and the southern portion of the Siskiyou National Forest. The 1947 Six Rivers National Forest roads "Situation Report" listed only 281 miles of roads that were deemed to be in "satisfactory" condition (Conners, 1997). This transportation system was not designed to cope with or promote movement to the coast; instead most of the forest roads were oriented to sawmills, transportation systems, and markets in Grants Pass and California's Central Valley. The Six Rivers National Forest struggled with its marginal and eastward-oriented infrastructure for many years. There were few county and state roads which were mostly of low standards.

Beginning in the 1950s with the national emphasis on commodity production a concerted effort to provide a more functional transportation system on the Six Rivers National Forest was begun. The majority of the National Forest roads on the Lower Trinity and Mad River Districts were constructed and maintained between 1960 and 1990 in support of the robust timber

program. These roads were Forest Service (FS) designed and generally constructed under a timber sale contract by the purchaser. These roads by and large were well located, well designed and well constructed. Most of these roads were typically designed with an out-sloped road prism, thereby reducing the concentration of road surface runoff. Typically, until the 1980s, most timber sale roads were surfaced to improve road integrity, reduce road maintenance and provide for a diversity of long term uses.

In the 1980s, the agency began a shift in emphasis away from commodity outputs to a more holistic approach of resource management. With deficit timber sales in the 1980s and 1990s road construction standards were modified. Due to high road construction costs surface rocking was used on a site specific bases. New NFTS roads were out sloped, water barred and spot rocked. Gates or metal barricades were installed as resource mitigations. Many of these roads were high clearance vehicle roads.

By the mid to late 1990s the timber program had stalled and new permanent road construction had ceased except for the occasional short spur needed to access individual timber stands. The majority of arterial and collector system roads were in place. With timber harvest decreased and road maintenance budgets decreased, maintenance of the transportation system became an issue.

Current appropriated road maintenance funding is insufficient to cover current annual road maintenance needs. As a result annual maintenance is being reduced, maintenance cycles are extended, repairs are prioritized to mitigate public safety concerns and prevent resource damage. Major repairs and non NFTS facilities are funded by special appropriations outside the yearly Forest budget. Current and projected funding does not cover deferred maintenance, which means that the deferred maintenance backlog grows annually. Table 3.18-4 displays funding history. Current trail maintenance funding (both internal and external funding) has been adequate to cover the highest priority trail maintenance needs.

Currently Lower Trinity and Mad River Ranger Districts have a network of 1341 miles of NFTS road; 36 miles of NFTS motorized trail and 255 miles of non-system or unauthorized motorized routes within their boundaries. These unauthorized motorized routes are being analyzed for inclusion to the NFTS.

3.18.4 Environmental Consequences

See the effects methodology section above regarding how this analysis was conducted.

Alternative 1

Alternative 1, the No Action Alternative, provides a baseline for comparing the other alternatives. No changes and or additions to the NFTS system of roads or trails would occur. The year long season of use would not change. There would be no prohibition of cross country travel. No Motorized Visitor Use Map (MVUM) would be printed.

1. Direct/Indirect effects of prohibition of cross-country wheeled motorized vehicle travel:

Public Safety: No short or long term direct effects would result.

Long-term indirect effects: While unauthorized routes would remain available for motorized use, they would not be inventoried or maintained to Forest Service standards. Trail

conditions would likely deteriorate over time. Safety hazards would not be identified and as a result would not be mitigated. Routes would not be mapped to aid users or emergency personnel. Without maintenance, signs, updated maps, or seasonal use restrictions users could become stranded, lost, injured or worse. Search and rescue would not have maps of unauthorized routes if needed. Traffic signs that warn users of hazards, skill level or changing vehicle use would not be present. Dangerous intersections between unauthorized trails and NFTS roads would not be identified and mitigated.

Affordability: No short or long term direct effects would result.

Long-term indirect effects: With appropriated funds only allowed to be spent on the NFTS roads and trails, other funding sources would have to be obtained for restoring of user created routes as well as the potential costs for future restoration.

2. Direct/indirect effects of adding facilities (unauthorized trails) to the NFTS.

Public Safety: No new facilities would be added in this alternative. No short or long term direct effects would result.

Affordability: No new facilities would be added in this alternative. No short or long term direct effects would result.

3. Direct/indirect effects of changing the vehicle class and season of use on the NFTS.

Public Safety: There would be no change under this alternative therefore no short or long term direct effects would result.

Affordability: There would be no change under this alternative therefore no short or long term direct effects would result.

Alternative 2

Alternative 2 prohibits cross-country travel; proposes to add approximately 56 miles of unauthorized routes to the NFTS; co-locates 7 miles motorized trails on NFTS stored roads; proposes mixed use on specified NFTS roads; changes vehicle class, removes motorized use from NFTS trails, season of use will be established, and publishes a Motorized Visitor Use Map.

1. Direct/Indirect effects of prohibition of cross-country wheeled motorized vehicle travel:

Public Safety: The prohibition of cross-country travel would have a beneficial effect on public safety. These benefits are described below in adding unauthorized trails to the NFTS.

Affordability: No short or long term direct effects would result.

2. Direct/indirect effects of adding facilities (unauthorized trails) to the NFTS.

Public Safety: Alternative 2 proposes the addition of 56 miles of unauthorized motorized trails to the NFTS. Long term this would enhance user safety when these motorized trails become part of the managed trail system. Trail hazards would be assessed and prioritized for correction during trail inventory and maintenance. Trail signage and maps would be available to inform users of skill level and location, thereby reducing the hazard of being lost or stranded. Maps would be available to search and rescue personnel. Any hazardous intersections with system roads would be identified and corrected.

Affordability: Short-term the additional estimated costs to implement alternative 2 would be approximately $360,000. Approximately 85 per cent of this cost would be to bring the proposed 56 miles of unauthorized motorized trails onto the NFTS. Table 3.18-3 displays all costs to implement this alternative.

Long-term: Trails added to the system could be maintained using NFTS funds or other funding sources (e.g., grants, partnerships, volunteers, etc.) although the additional motorized trails will further impact the limited annual maintenance dollars as displayed in table 3.18-4. There would be future funding needs to update the MVUM map, trail bed maintenance and replace damaged or missing signs.

3. Direct/indirect effects of changing the vehicle class and season of use on the NFTS.

Public Safety: Two motorized trails for a total of 6 miles, on Mad River District, are proposed to remove motorized use. Long-term this would increase safety for both motorized and non-motorized users by eliminating motorized user conflicts on a trail that is steep and narrow with high consequences for potential injury. In this alternative 12 miles of NFTS motorized trails would have an allowed season of use from June 1 through October 31. The safety concerns of motorized users becoming stuck or stranded during inclement weather would be lessened.

Affordability: Season of use restrictions would reduce the likelihood of wheel rutting and water channeling thereby reducing some annual maintenance costs**.**

Alternative 3

Alternative 3 responds to the issue of access and motorized recreation opportunity. It includes all actions identified for Alternative 2 and adds an additional 7 miles of inventoried unauthorized routes to the NFTS.

1. Direct/Indirect effects of prohibition of cross-country wheeled motorized vehicle travel:

Public Safety: Same as alternative 2.

Affordability: No short or long term direct effects would result.

2. Direct/indirect effects of adding facilities (unauthorized trails) to the NFTS.

Public Safety: Same as alternative 2.

Affordability: Short term the additional estimated costs to implement Alternative 3 would be approximately $460,000. Approximately 86 per cent of this cost would be to bring the proposed 64 miles of unauthorized motorized trails onto the NFTS. Table 3.18-3 displays all costs to implement this alternative.

Long-term: Long term effects would be the similar to alternative 2 but somewhat more costly with 7 additional miles of motorized trail needing maintenance.

3. Direct/indirect effects of changing the vehicle class and season of use on the NFTS.

Public Safety: Two motorized trails for a total of 6 miles, on Mad River District, are proposed to remove motorized use. Long-term this would increase safety for both motorized and non-motorized users by eliminating motorized user conflicts on a trail that is steep and narrow

with high consequences for potential injury. In this alternative 12 miles of NFTS motorized trails would have an allowed season of use from June 1 through October 31. The safety concerns of motorized users becoming stuck or stranded during inclement weather would be lessened.

Affordability: Season of use restrictions would reduce the likelihood of wheel rutting and water channeling thereby reducing some annual maintenance costs**.**

Alternative 4

Alternative 4 would prohibit cross-country travel: no additional routes are proposed to be added to the NFTS. Cross-country travel is prohibited. Season and type of use for routes will be established. A Motorized Vehicle Use Map (MVUM) of the existing NFTS roads and trails would be published. Mixed use on passenger car roads would not be allowed.

1. Direct/Indirect effects of prohibition of cross-country wheeled motorized vehicle travel:

Public Safety: The prohibition of motorized cross-country travel would have a beneficial effect on public safety by eliminating potential conflicts between users.

Affordability: No short or long term direct effects would result.

2. Direct/indirect effects of adding facilities (unauthorized trails) to the NFTS.

Public Safety: Alternative 4 proposes no changes to the NFTS.

Long-term: Alternative 4 proposes no new trails added to the NFTS and prohibits cross county travel. Users would be concentrated on fewer NFTS trails resulting in relatively higher use. This could have a negative effect on long term user safety and may increase user conflicts.

Affordability: The additional estimated costs to implement Alternative 4 would approximately $40,050. This cost would be to develop and distribute the Motorized Vehicle Use Map (MVUM) and replace signs on existing NFTS roads and trails. No new routes would be added to the existing NFTS.

Long-term: There would be future funding needs to update the MVUM map and replace damaged or missing signs.

3. Direct/indirect effects of changing the vehicle class and season of use on the NFTS.

Public Safety: No changes to vehicle classes are proposed in alternative 4. The Devil's Backbone and Bradburn trails would remain motorized. Safety on these trails would not change. In this alternative 12 miles of existing NFTS motorized trails would have an allowed season of use from June 1 through October 31. The safety concerns of motorized users becoming stuck or stranded during inclement weather would be lessened.

Affordability: Season of use restrictions would reduce the likelihood of wheel rutting and water channeling thereby reducing some annual maintenance costs**.**

3.18.5 Cumulative Effects:

Safety: There would be no significant cumulative effects on public safety in any of the alternatives, although alternatives 2-4 would develop a cohesive trail management plan for the current unmanaged unauthorized routes within the Lower Trinity and Mad River Districts. This

would be beneficial to long term user safety. Mixed use is currently occurring on the system roads proposed for mixed use as well as other passenger car roads on the two Districts. There is no history of mixed use related accidents in the project area. Even with the highest use, the use received on the Districts is normally light (0-25 vehicles per week) on the NFTS roads and trails.

Affordability: Tables 3.18-3 and 3.18-4 show the cumulative economic effect of each alternative in terms of the additional monetary resources needed to complete routine maintenance when new facilities (currently unauthorized routes) are added to the existing NFTS. Table 318-3 also compares mitigation costs to implement (e.g., signage, weed removal, erosion control, cultural resource mitigations and MVUM publication) for each of the four alternatives. For Fiscal Year (FY) 2009 it is estimated that Lower Trinity and Mad River Ranger Districts will receive 1.2 million dollars (based on ½ Six Rivers NF total NFTS road and trail budget). This includes all projected funding for NFTS roads and trails. Table 3.18-3 shows the two districts would need approximately 4.87 million dollars to complete all routine maintenance on the existing NFTS, hence a shortfall of 3.67 million dollars. Alternative 1 would no change this deficit. All the action alternatives (alt 2-4) would increase the maintenance funding shortfall from current levels as follows: Alternative 2 by $366,581; Alternative 3 by $457,631; and Alternative 4 by $37,800. All of the uncompleted maintenance would be added to the current Six Rivers National Forests deferred maintenance total which was estimated to be over 113.4 million dollars in FY2008.

The current level of appropriated and non-appropriated funding is insufficient to complete routine maintenance of the current NFTS without tradeoffs and the accumulation of more deferred maintenance. For Alternatives 2, 3, and 4, adding new facilities to the NFTS will increase the amount of deferred maintenance and increase the maintenance cycle. The maintenance cycle is the frequency at which a road or trail is entered and maintenance is performed.

Future vegetation management and fuel reduction projects would have a beneficial impact on reducing some annual and deferred maintenance costs on NFTS roads within their project areas. Some of the projects on Mad River District are Little Doe Timber Sale, Low Gulch Timber Sale, Beaver Slide Timber Sale, Buck Mountain Timber Sale, Kelsey Peak Timber Sale, and varies roadside fuel reduction projects. On the Six Rivers National Forest under the 2009 American Recovery and Reinvestment Act the Forest received approximately one million dollars for roadside brushing along NFTS roads.

3.18.5 Summary of Effects Analysis Across All Alternatives

Table 3.18-2 Public Safety Measurement Indicator – Proposed Additions and Changes to the Existing Transportation System on the Lower Trinity and Mad River Districts by Alternative

Public Safety Measurement Indicators (Miles)	Alt. 1	Alt. 2	Alt. 3	Alt. 4
1C. Miles of motorized trail converted to non-motorized (miles)	0	6	6	0
1B. Miles of unauthorized trails added to the NFTS	0	57	64	0
1C. NFTS trails with changes to the season of use	0	12	12	12

The affordability table below displays the estimated cost to perform annual maintenance on all existing NFTS roads and trails by alternative. Section 2B displays the estimated implementation changes to the existing NFTS by alternative.

Table 3.18-3 Affordability Measurement Indicator – Proposed Additions and Changes to the Existing Transportation System on the Lower Trinity and Mad River Districts by Alternative

Affordability Measurement Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Existing NFTS Roads (miles)	1341	1341	1341	1340
Existing NFTS Trails (miles)	36	36	36	36
Changes to NFTS Roads (miles)	0	0	0	0
Changes to NFTS Trails (miles)	0	64	73	0
2A. Annual Maintenance Costs of Existing System:	**N/A**	**N/A**	**N/A**	**N/A**
Existing Annual Maintenance for Roads	**$4,865,903**	**$4,865,903**	**$4,865,903**	**$4,865,903**
Annual Maintenance for Trails	**$36,000**	**$36,000**	**$36,000**	**$36,000**
Subtotal	**$4,901,903**	**$4,901,903**	**$4,901,903**	**$4,900,903**
2B. Implementation Costs of Design Features:	**N/A**	**N/A**	**N/A**	**N/A**
Unauthorized routes added as NFTS motorized trails	$0	$304,400	$395,450	$0
Trails co-located on closed NFTS roads	$0	$5,595	$5,595	$0
Cost mixed use on ML3+ roads	$0	$50,500	$50,500	$0
Passenger car roads reduced to high clearance road	0	-($25,563)	-($25,563)	0
NFTS motorized trail converted from motorcycle to <=50”	0	0	0	0
Remove motorized use from trail	0	$(6,000)	$(6,000)	0
Cost of implementing MVUM	$0	$37,800	$37,800	$37,800
Subtotal	**$0**	**$356,581**	**$497,631**	**$37,800**
Total Est. cost by Alternative	**$4,901,903**	**$5,268,484**	**$5,359,534**	**$4,939,703**
Cost Difference from NO ACTION ALTERNATIVE	**$0**	**$366,581**	**$ 457,631**	**$37,800**

Table 3.18-4 displays the **Six Rivers National Forest** annual available funding for NFTS roads and trails from FY 2005 to FY 2009.

Table 3.18-4 Funding History for the Six Rivers N.F.

Year	Roads (CMRD)	Roads (CWFS)	Roads Other	Trails (CMTL)	Trails Other	Total Funds by Year
2009	$1,092,000	$320,000	$734,931	$66,000	$127,537	$2,340,468
2008	$1,028,000	$167,033	$982,181	$149,000	$148,645	$2,475,059
2007	$1,434,000	$283,805	$1,043,435	$77,460	$189,896	$3,028,596
2006	$690,000	$166,000	$0	$191,450	$101,694	$1,423,205
2005	$660,482	$140,000	$413,797	$87,392	$66,565	$1,368,236

Table 3.18-5 Transportation Facilities Effect Summary

	Alt. 1	**Alt. 2**	**Alt. 3**	**Alt. 4**
Public Safety	2	3	3	4
Transportation System Affordability	4	2	1	3

[1] For safety a score of 4 indicates the alternative safest (least risk); a score of 1 indicates the alternative is the least safe (highest risk). For transportation Facilities a score of 4 indicated the alternative least costly; a score of 1 indicates the alternative is most costly (highest risk).

3.18.6 References

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3.19 Special Uses

3.19.1 Affected Environment

Special uses on the Six Rivers National Forest consists of a variety of commercial and individual uses such as hydroelectric power generation; communication sites; power lines; telephone lines; water lines for domestic purposes; road permits for individual access to private lands; recreational events and commercial outfitter guides. These uses on National Forest System lands occur across much of the Forest.

Permitted uses are authorized under a special use permit or other form of authorization either by the Forest Service or some other agency, such as the Federal Energy Regulatory Commission and BLM. These permitted facilities and activities are accessed by either system roads or routes authorized under a special use authorization.

3.19.2 Environmental Consequences

Special uses authorizations allow use of roads and trails that are otherwise not open to the general public. Most special uses issued for road and trail use are associated with necessary access to isolated private parcels within the National Forest boundary or access to permitted communication or power line facilities located on National Forest System lands. Issuance of special use authorizations requires compliance with Forest Service special use authorization policy and on site specific NEPA analysis. The recently promulgated Forest Service Regulations at 36 CFR 212 (Travel Management Rule) specify that motor vehicle use may be authorized as part of a special use authorization, and as such, the permit holder may use the routes that are otherwise not open for general public use. Therefore, the designation of motor vehicle routes for public use as proposed in Alternatives 2 and 3 will not have any direct effects on these uses or activities. Action Alternative 4 would not add any unauthorized routes to the transportation system. Use of all unauthorized routes by the public and permit holders would continue unchanged under No Action. There would be no direct or indirect effects on access for permitted uses under this alternative.

There may be an indirect effect of the action alternatives, in that permit holders may have an increased responsibility for maintenance or protection of those routes not open to the general public. In some cases, permit holders may be using routes not authorized for public motorized use to access their permitted facilities. In cases where routes are not open for public use, permit holders may be responsible for maintaining routes and may need to install and maintain barriers or gates to restrict unauthorized public use.

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Chapter 4: Consultation and Coordination

4.1 Distribution of the DRAFT Environmental Impact Statement

Letters and news releases announcing the availability of this draft EIS have been sent to numerous individuals, Federal agencies, State and local governments, organizations, and media outlets. This draft EIS is being primarily distributed online at *http://www.fs.fed.us/r5/sixrivers/projects/ohv/* and on compact disc or hard copy upon request. The complete mailing list is on file at the Supervisor's Office in Eureka, CA.

This draft EIS has been distributed to Federal agencies as instructed on the current EIS distribution list (*http://www.fs.fed.us/emc/nepa/includes/distlist.pdf*). Copies of the EIS have also been provided to the following federally recognized American Indian Tribes:

- Blue Lake Rancheria, Blue Lake, CA
- Hoopa Valley Tribe, Hoopa, CA
- Round Valley Indian Tribes, Covelo, CA
- Bear River Band of Rohnerville Rancheria, Loleta, CA
- Table Bluff Reservation – Wiyot Tribes, Loleta, CA

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