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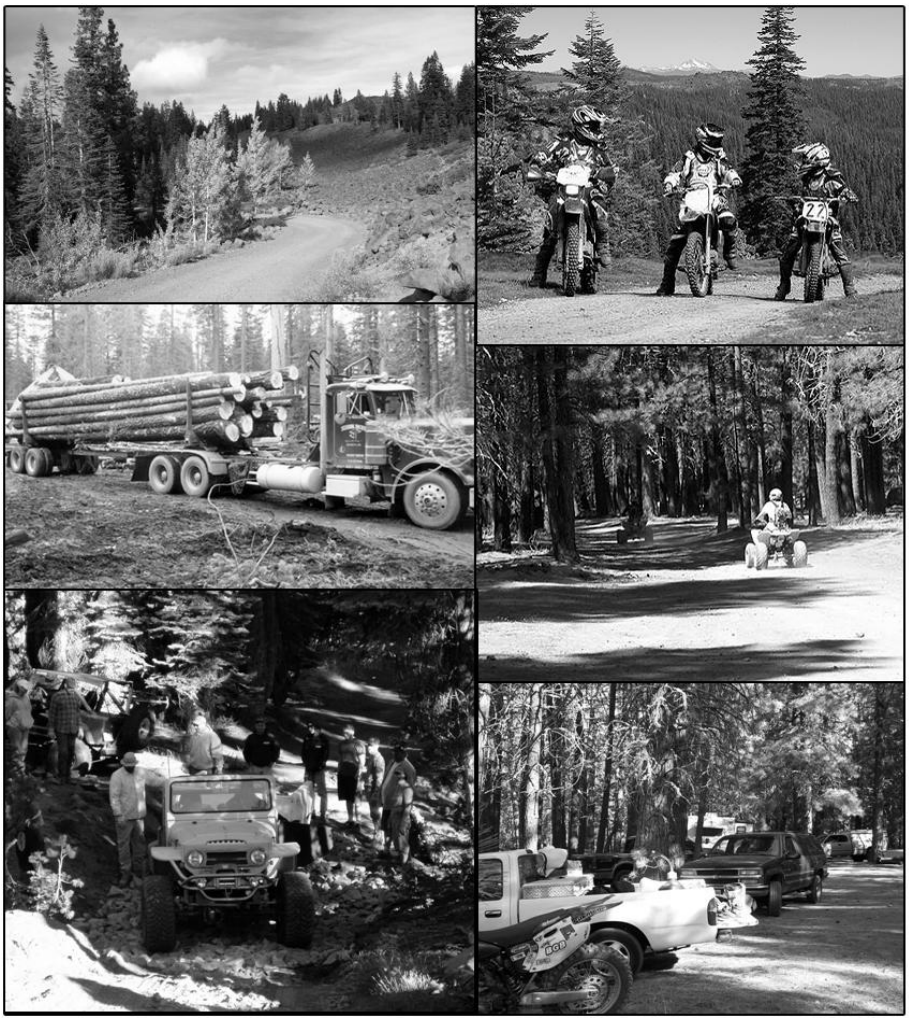
Final Environmental Impact Statement

Motorized Travel Management

Lassen National Forest
Butte, Lassen, Modoc, Plumas, Shasta, Tehama and Siskiyou Counties, California



MOTORIZED TRAVEL MANAGEMENT

Final Environmental Impact Statement

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Abstract: This Final Environmental Impact Statement (FEIS) describes the environmental effects of a No-action Alternative (Alternative 1) and five action alternatives (Alternatives 2-Modified Alternative 5) proposed by the Lassen National Forest. The Lassen evaluated one more alternative between Draft and Final in order to respond to issues raised through the public safety analysis for mixed use and additional routes that were requested by the public. Common to all five action alternatives is the prohibition of motorized travel off designated National Forest System roads and trails, except as allowed by permit or other authorization, and excluding over-snow vehicle use. This prohibition closes approximately 1,072,488 acres to motorized cross-country travel. In Alternatives 2, 4, 5 and Modified 5, where some unauthorized routes are added to the National Forest Transportation System (NFTS), no fewer than 1,072,357 acres are closed to cross-country travel. Alternative 2 is a modified version of the Proposed Action scoped for public comment in the October 25, 2007 Notice of Intent (Federal Register. 72(206): 60618-60624. 25 October 2007). It adds 21 miles of unauthorized routes to the NFTS and proposes changes to 13 miles of roads to allow motorized mixed use by both highway and non-highway legal vehicles. Alternative 3 designates the current National Forest Transportation System and does not add any unauthorized routes or change any vehicle use classes. It provides significant resource protection, but no enhancement of dispersed recreation access or motorized recreational opportunities. Alternative 4 emphasizes resource protection, but connects some off-highway vehicle (OHV) riding loops. It adds 10 miles of unauthorized routes (and their resource impacts), fewer than in Alternatives 2 or 5. Alternative 4 also adds 367 miles of seasonal

closures (80 for resource protection and 287 for enhancing winter, hiking, and hunting recreation). Objective maintenance levels are reduced on 79 miles of roads under Alternative 4 to allow OHV use on some connections between riding loops, but these do not generally add access to dispersed recreation sites. Alternative 5 was the Preferred Alternative in the Draft Environmental Impact Statement; however, Modified Alternative 5 is the new Preferred Alternative. Alternative 5 emphasizes improved access to dispersed recreation sites and improved motorized recreation opportunities by adding the largest number of unauthorized routes (53 miles) to the NFTS; reducing objective maintenance levels on 79 miles of roads; and analyzing another 51 miles of roads for mixed use by highway and non-highway legal vehicles. Alternative 5 also incorporates the additional seasonal closures described in Alternative 4. Modified Alternative 5 is identical to Alternative 5; except that it proposes slightly more additions to the NFTS, 2.7 miles and changes the objective maintenance level on 0.6 miles more than Alternative 5. It changes the designation of Maintenance Level 3 roads to allow for mixed use of non-highway and highway legal vehicles on 9.3 miles due to safety concerns that were presented in the analysis of the designated routes in Alternative 5.

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Summary

Between the Draft and Final Environmental Impact Statement the Forest decided to analyze a new alternative in detail, Modified Alternative 5. The analysis is provided in order to assist the Deciding Officer and the public in understanding the effects of this new Preferred Alternative. Additionally, many points of clarification were added through out the document to improve readability and understanding based on response to comments.

Background

For many visitors, highway- and non-highway-legal vehicles represent an integral part of their recreational experience. Passenger cars, pickup trucks, off-highway vehicles, motorcycles, trailers, and other recreational vehicles are used by visitors to access roads, trails, campsites, and other destinations on National Forests. Recreational motor vehicle use is a legitimate and appropriate way for people to enjoy the Forest – in the right places, at the right times, and with proper management.

During the past few decades, the use of off-highway vehicles (**OHV**) in the United States increased tremendously. California is experiencing the highest levels of OHV use of any state in the Nation. In 2004, almost 800,000 non-highway legal all terrain vehicles (**ATVs**) and motorcycles were registered in California. That figure represents a 330% increase for California OHV registrations since 1980. In addition, over 3,000,000 four-wheel drive vehicles, including Sport Utility Vehicles (**SUV**) were sold in California between 1989 and 2002.

In response to rising OHV use in California, the Forest Service entered into a Memorandum of Intent (**MOI**) with the Off-Highway Motor Vehicle Recreation Commission and Off-Highway Motor Vehicle Recreation Division of the California Department of Parks and Recreation (USDA FS et al. 2003). The intent of the OHV MOI was for the involved agencies to improve management of public motor vehicle use on National Forest System (**NFS**) lands in California. The OHV MOI set in motion an effort to designate roads, trails, and any specifically defined open areas for motorized vehicles on maps of the 17 National Forests and Lake Tahoe Basin Management Unit in California by 2007.

Unmanaged OHV use on NFS lands across the Nation has resulted in unplanned roads and trails, erosion, watershed and habitat degradation, and impacts to cultural resource sites. In 2004, unmanaged recreation was identified by the Chief of the Forest Service as one of “Four Key Threats Facing the Nation’s Forests and Grasslands” (USDA FS 2004a). Rising OHV use and associated resource impacts prompted the Forest Service to develop new direction for providing sustainable motor vehicle travel opportunities on NFS lands.

On November 9, 2005, the Forest Service published final travel management regulations in the Federal Register (USDA FS 2005h). Code of Federal Regulations (**CFR**) 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 NFTS may be designated for motorized use. Designations are made by class of vehicle and, if appropriate, by time of year. Part 261 – Prohibitions, 36 CFR 261.13 Subpart A 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 are not consistent with the designations.

The Lassen National Forest (the Forest) has generally been open to cross-country motor vehicle travel. However, repeated cross-country travel by motor vehicles has resulted in the development of unauthorized roads and trails. While some of these routes were created as a result of OHV use, most unauthorized routes were initially developed as temporary roads for timber sales during the 1950s, 60s and 70s; many were not decommissioned after the timber sales were closed. Further development and use of these temporary roads generally continued without environmental analysis, but they do not have the same status as NFS roads or NFS trails included in the NFTS. The original intent of these roads was not for public use; however, no formal prohibition was in place and varying levels of public use has occurred on many of these temporary road segments. Some of these unauthorized routes are well-sited, provide opportunities for outdoor recreation by motorized and non-motorized users, and would enhance our current system. Other unauthorized routes are poorly located and are causing ongoing environmental impacts. If any of these unauthorized routes are to be designated, Federal regulation requires that they first be added to the NFTS.

In 2005, the Forest completed an inventory of unauthorized routes on NFS lands as described in the OHV MOI. After this task was completed, Lassen NF worked with the public to identify any additional routes that were not located during the original inventory. After review, the final inventory totaled approximately 1,089 miles of unauthorized motor vehicle routes within the project area. The Lassen NF then used an interdisciplinary process to conduct travel analysis and identify proposals for changes to the existing NFTS. This FEIS proposes to make changes to the Lassen NFTS in order to fulfill implementation requirements of the 2005 Travel Management Rule per 36 CFR Part 212, Subpart B.

In accordance with the Travel Management Rule and following a decision on this environmental analysis, the Lassen NF will publish a Motor Vehicle Use Map (**MVUM**) identifying all NFTS roads and trails that are designated for motor vehicle use. The MVUM shall specify the classes of vehicles and the times of year for which use is designated. Unauthorized routes and areas not included in this FEIS are not precluded from future consideration for addition to the NFTS and inclusion in a MVUM. Future decisions associated with changes to the MVUM and the NFTS may trigger the need for additional environmental analysis, public involvement, and documentation. Until a decision is published in the Federal Register, motor vehicle use is temporarily prohibited off existing routes and areas by Temporary Forest Order #06-09-01 which went into effect July, 2006 and was renewed on May 27, 2009.

Travel Management on the Lassen National Forest

The Lassen NF currently manages and maintains approximately 3,558 miles of NFTS roads and 57 miles of NFS motorized trails. The NFTS was developed over many decades to meet a variety of needs including vegetation management, fuel treatment, access to private in-holdings, fire control, public utilities, special uses management and public recreation access. Harvesting of special forest products such as ornamental greenery, firewood, mushrooms and plants are among the many opportunities afforded by the NFTS. The NFTS is managed and maintained to various road standards, ranging from paved highways to roughly graded high-clearance roads, depending on the type of access necessary. The NFTS is displayed on the Forest Transportation Atlas. Details concerning the management of individual roads and trails are maintained in the Forest Service Infrastructure database (**INFRA**).

In 2002, Lassen NF recorded NFS roads in INFRA database by examining previous records (maintenance plans, maintenance expenditures, existing road and trail atlases, Forest maps, etc.) to capture the entire NFTS, transfer the necessary information into INFRA, and verify the Forest Transportation Atlas. Roads or trails that had no record of being mapped or maintained for a specific use were not included in the NFTS.

Since 2002, adjustments to the Transportation System and Road Atlas and INFRA database have been made to account for NFTS roads that were either newly constructed or overlooked in the 2002 accounting effort. The current Transportation System and Road Atlas identifies the existing NFTS, as well as management objectives for each transportation facility. The NFTS is regularly changing based upon contemporary resource needs and management concerns.

The current proposal is just one of many in the Forest Service's continuing effort to manage the transportation system in a sustainable and cost-effective manner. Previous administrative decisions may have reduced or added to the number of miles of NFTS roads and NFTS trails available for motor vehicle use. These previous decisions have resulted in road closures, seasonal restrictions, and decommissioning of selected routes. These past actions have been accomplished through Forest planning, vegetation management projects, watershed restoration projects, fuels treatment projects, trail construction projects, trail management decisions, landscape analysis, watershed analysis, and recommendations from the Roads Analysis Process (**RAP**). All of these previous efforts have contributed to improving management of the Lassen NFTS. Ongoing efforts to manage the Lassen NFTS in a more sustainable manner include: (1) the Temporary Forest Order (Temporary Forest Order #06-09-01, May 27, 2009), which prohibits cross-country travel off existing routes pending completion of this project; (2) project-specific efforts to reduce the impacts associated with non-system routes; and (3) addressing impacts associated with the current NFTS through the Forest's road operation and maintenance program. Implementation of this road and trails designation project is one additional step towards overall management of motor vehicle travel on the Lassen NF.

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 implementing Subpart B of the Travel Management Rule. Previous decisions concerning road construction, road reconstruction, road closures, road decommissioning, trail construction and land suitability for motorized use are outside of the scope of this proposal. The responsible official is limited as to staff and funding and, by necessity, must limit the scope of any project to that which is within his or her means to accomplish. Through travel analysis, the Forest identifies discreet projects, prioritizes them, and builds them into the future program of work. Only those projects within the capability of the Forest are brought forward by the Responsible Official and carried forward in accordance with the purpose and need for action.

The infrastructure of a National Forest will always have room for improvement and the Forest welcomes suggestions for improving the current NFTS and restoring the environment. Such suggestions are considered within the context of the overall mission of the Forest and will be considered as availability of staff and funding allows. Scoping for this project resulted in many suggestions for improving the NFTS through reconstruction, decommissioning, NFS road and trail closures, restoration projects, etc. These ideas and suggestions have been captured in the Scoping Report and may be considered in future travel management analyses.

Project Location

As shown on the Vicinity Map 0 (Map Package), Lassen NF is located in northeastern California and totals approximately 1.2 million acres in size. The Forest is located within seven counties: Butte, Lassen, Modoc, Siskiyou, Shasta, and Tehama. Administratively, Lassen NF is divided into three ranger districts: Almanor, Eagle Lake and Hat Creek. It is bordered by the Plumas NF to the southeast, Modoc NF to the north, and the Shasta-Trinity NF to the northwest. The project area includes all NFS lands, existing NFS motor vehicle routes and inventoried unauthorized routes within the identified project area except for designated wilderness areas. The project area does not include any other Federal, State, private or tribal lands.

The Lassen NF includes approximately 78,240 acres of wilderness within the Forest administrative boundary; Caribou Wilderness (20,546 ac), Ishi Wilderness (41,399 ac) and Thousand Lakes Wilderness (16,355 ac). The Lassen NF administrative boundary, minus these three wilderness areas and forenamed other land ownerships, is considered the project area for this analysis.

In 2008, the Lassen National Forest began analysis and planning for two popular recreation areas on the Forest–High Lakes and Front Country. The popularity of these areas has led to degradation of natural resources and reduced quality of the recreation experience

for motorized and non-motorized users alike. Comprehensive plans for these two areas will follow publication of this FEIS, the Final Environmental Impact Statement (**FEIS**) and Record of Decision (**ROD**) for designation of NFS roads and trails. Analysis and implementation of these management area plans will be conducted through a collaborative process, that address many issues including: (1) the location of developed and dispersed camp sites at the more popular lakes; (2) the location and extent of trail head developments; (3) the location of sanitation facilities; (4) establishment of group size; (5) establishment of carrying capacity levels for the area and at high use lakes; (6) signs to educate and direct travelers in the area; (7) plans to protect adjacent private property; (8) inventories of non-motorized trails; and (9) determination of the need for visitor permits and whether there would be a user fee.

Purpose and Need

The following needs have been identified for this proposal:

Purpose #1: Cross-country Travel

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 NFS roads, NFS 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 this national direction, implementation of Subpart B of the travel management rule for the Lassen NF is scheduled for completion in 2009.

Purpose #2: Dispersed Recreation, Diversity of Recreation Opportunity and Reduce Cost Associated with Maintenance

There is a need for changes to the Lassen's NFTS to:

Purpose #2a. 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 spurs 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.

Purpose #2b. 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)) (FSM 2006a). Implementation of Subpart B of the Travel Management Rule will dramatically 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 such as additional routes, changes in vehicle class and season of use.

Purpose #2c. Reduce cost associated with maintenance of the NFTS. The types of use allowed on NFS roads and NFS trails impacts the need for maintenance and administration of the transportation system.

The specific criteria for designation of National Forest System roads, trails and areas from Subpart B of the Travel Management Rule published in the Federal Register (36 CFR 212.55 Vol.70, No. 216) are outlined in two sections the general criteria require that the Responsible Official consider effects on:

Travel Rule 212.55 (a) 1	Impacts to natural and cultural resources.
Travel Rule 212.55 (a) 2	Public safety.
Travel Rule 212.55 (a) 3	Provide for recreational opportunities.
Travel Rule 212.55 (a) 4	Access to public and private lands.
Travel Rule 212.55 (a) 5	Conflicts among uses of National Forest System lands.
Travel Rule 212.55 (a) 6	Need for maintenance and administration of roads, trails and areas that would arise if the uses under consideration are designated. (The Forest has a maintenance backlog for trails and roads of $182 million).

Specific Criteria for designation of trails and areas, in addition to the criteria listed above also include minimizing:

Travel Rule 212.55 (b) 1	Damage to soil, watershed, vegetation, and other forest resources.
Travel Rule 212.55 (b) 2	Harassment of wildlife and significant disruption of wildlife habitat.
Travel Rule 212.55 (b) 3	Conflicts between motor vehicles and existing or proposed recreational uses of NFS lands or neighboring Federal lands.

Travel Rule 212.55 (b) 4	Conflicts among different classes of motor vehicle uses on NFS lands or neighboring Federal lands.
Travel Rule 212.55 (b) 5	Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factors.

Specific Criteria for designation of NFTS roads, in addition to the criteria listed above also include minimizing:

Travel Rule 212.55 (c) 1	Speed, volume, composition and distribution of traffic on roads.
Travel Rule 212.55 (c) 2	Compatibility of vehicle class with road geometry and road surfacing.
Travel Rule 212.55 (c) 3	Maintaining valid existing rights of use and access (rights-of-way).

Significant Issues

The Forest Service identified the following significant issues during scoping:

Issue 1: The originally Proposed Action (in the NOI) unreasonably restricts motorized recreation use by prohibiting cross-country travel. The proposed addition of only 30 miles of NFTS roads and 7 miles of NFTS trails to the NFTS provides insufficient public access to Lassen NF lands and unfairly limits motorized recreation.

Discussion: Concerns were raised that restricting cross-country travel across the entire Forest severely impacts motorized recreation opportunities and unfairly restricts access for hunting, fishing, camping, and a host of other outdoor activities. The original route inventory identified 1,145 miles of unauthorized routes. The Proposed Action (in the NOI) would only retain 37 miles of these unauthorized routes. This would be an insufficient amount of available routes to maintain a quality motorized recreation experience on the Lassen NF.

Issue 2: The Lassen NF NFTS is already too large to provide adequate maintenance and administration. Current maintenance backlogs should be addressed before proposing the addition of new routes to an already overburdened system.

Discussion: Concerns were expressed about how the types of use allowed on NFS roads and NFS trails would impact the need for maintenance and administration. It was expressed that some types of use result in higher maintenance costs due to resource damage caused by such uses. In addition, commenters felt that increasing the opportunities for such uses by designating additional routes would result in an increased need for Forest Service administration of these roads and trails to prevent unauthorized off-road travel, resolve user conflicts, or provide for

public safety. It was also expressed that certain mixes of use, if allowed in the same area, would increase the need for maintenance and administration of these areas. Some commenters suggested that maintenance cost could be reduced by restricting access on NFTS routes that provide little or no recreational value, thereby allowing new routes to be added to the system without increasing overall maintenance cost.

Alternatives Considered in Detail

Four action alternatives (Alternatives 2, 3, 4 5 and Modified 5) and a No-action Alternative (Alternative 1) are analyzed in detail in this FEIS. Maps 1-5 in the Map Package graphically summarize these alternatives.

Commonalities Among the Action Alternatives

Four Types of Actions

This section describes each of the six alternatives considered in detail. Each alternative is described in the context of the four actions described below. Maps, illustrating relevant actions for each alternative, can be found in the Map Package appended to this FEIS.

1) Cross-country Travel: All of the action alternatives prohibit motor vehicle travel by the public off designated NFTS roads, NFTS motorized trails, and areas 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. Including the area covered by all the unauthorized routes (but not the current Forest Transportation System), the analysis area for cross-country travel is approximately 1 million acres excluding Wilderness Areas; however it varies by alternative. As previously mentioned, the project area for the alternatives includes National Forest System (NFS) lands on Lassen NF. It does not include any private, state, or other Federal lands. Each alternative assumes that other adjacent Federal lands, such as those administered by the Bureau of Land Management, would be managed according to their existing management plans and applicable Federal laws. Each alternative also assumes that private lands would meet applicable state and Federal land use regulations. For this FEIS analysis the estimated foot print attributed to existing unauthorized routes is 2,640 acres as calculated using a 20 foot width; approximate width of a vehicles two-track plus one vehicle-length perpendicular to the route.

Currently, the Forest has a Temporary Forest Order in place prohibiting motorized cross-country travel and confining motor vehicles to existing routes (authorized and unauthorized). This prohibition remains in effect until July 12, 2010 at which time it expires and may have to be extended until a Record of Decision is completed. For this analysis it is assumed that unless one of the action alternatives implementing the Travel Management Rule is selected, the Temporary Forest Order prohibiting motorized cross-country travel would expire and motorized cross-country travel would resume under the No-action Alternative.

2) Additions to the NFTS: Some action alternatives include unauthorized roads and trails proposed for addition to the NFTS, and identify vehicle class and, if appropriate, season of use for those proposed additions. 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 of these roads and trails is identified by a unique number. All road additions have a proposed road management objective (**RMO**). All trail additions have a proposed trail management objective (**TMO**). Each road or trail and their season of use is addressed individually in Appendix A.

3) Changes to NFTS–Vehicle Class: The action alternatives may include limited changes to the vehicle class allowed on existing NFTS roads and/or trails. Vehicle class indicates the type of vehicle (highway-legal-vehicles, including passenger cars, street-legal 4WD pickups; non-highway-legal vehicles, including all-terrain vehicles; and motorcycles) allowed to operate on a road or trail. Some alternatives may add vehicle classes to roads and/or trails where that use is currently prohibited. Changes in road vehicle class to accommodate off-highway vehicles may be accomplished in one of two ways. The first way is to maintain the current road maintenance standard while designating the class of vehicles that may be allowed on a certain segment of road. For example, a ML 3 road currently open only to highway-legal-vehicles could be changed to allow non-highway-legal vehicles through a change to the vehicle class designation. This situation is called motorized mixed use. The second way is to reduce the road maintenance standard, physically changing the maintenance level from a ML 3 to a ML2. An ML 3 road is typically one where a low-clearance passenger car can drive safely, often at higher speeds. An ML 2 road is typically roughly graded, requiring a high clearance vehicle and slower speeds.

In order for a vehicle class change to occur on an ML 3/ML 4 road the Forest must first conduct an engineering analysis of motorized mixed use. This report will assess the crash risks involved with allowing different vehicle classes on the roadway, and recommends mitigation measures and alternatives to allow these uses. These documents are to be reviewed by the Responsible Official and inform decisions regarding motorized mixed use. If the Responsible Official chooses to designate for motorized mixed use, the applicable road segments may also require mitigation measures. If the road segment is to remain at a higher maintenance standard to accommodate passenger car vehicles, warning signing indicating that non-highway-legal vehicles may be present will be needed. If the road segment is to be designated for motorized mixed use, but at a lower maintenance standard, then a change in the condition of the road is needed to indicate that passenger car vehicles are discouraged and slow vehicle traffic. The road would be allowed to weather and be monitored; once the appropriate objective maintenance level was implemented the appropriate designation would be included on the MVUM.

Changes in vehicle class for trails are based on existing trail width and design features, which are based on management objectives for each trail. This action responds to the need to provide a diversity of wheeled motorized recreation opportunities and access.

4) Changes to NFTS–Season of Use: The action alternatives may include limited changes to the season of use on existing NFTS roads and/or trails. Season of use indicates the time of year vehicles are allowed to operate on a road or trail. Changes to the NFTS season of use are considered in order to respond to a variety of criteria, including minimizing damage to soil, vegetation, and other forest resources; minimizing harassment to wildlife; and availability of resources for maintenance and administration of roads, trails and areas that would arise if the uses under consideration are designated.

Description of the Alternative

Alternative 1–No-Action

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 No-action Alternative represents the continuation of cross-country travel. Under the No-action Alternative, no changes would be made to the NFTS and there would be no prohibition of cross-country travel (Table 1). 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. Motor vehicle travel by the public would not be limited to designated routes. Unauthorized routes would continue to have no status or authorization as NFTS facilities.

Alternative 2–Modified Proposed Action

The Modified Proposed Action includes the following, as described in the NOI published in the Federal Register on October 25, 2007 (USDA FS 2007b): prohibition of cross-country motorized travel, proposed changes to the existing NFTS, and additions to the NFTS (Table 1). This alternative was developed during the course of a year's worth of public meetings, including workshops where the public identified important routes for addition. The focus of this alternative was to meet OHV recreation needs by adding some unauthorized routes and providing for some mixed use opportunities. However, the alternative largely assumes existing OHV recreation opportunities are adequate for most user needs and also attempts to meet the need of limiting road maintenance costs. Routes that do not have resource concerns are proposed for addition to the NFTS. Public input subsequent to NOI publication suggests that this alternative in fact offers fewer OHV recreation opportunities than desired by OHV user groups and individuals.

Alternative 3

Alternative 3 meets the objective prohibiting cross-country travel, but proposes no new additions to the NFTS. This alternative also provides a baseline for comparing the impacts

of other alternatives that propose changes to the NFTS in the form of new facilities (roads or trails) (Table 1). None of the unauthorized roads or trails would be added to the NFTS under this alternative.

Alternative 4

Alternative 4 addresses access, economics and natural resource protection. This alternative was developed to meet the need of providing diverse OHV riding opportunities by attempting to improve existing riding opportunities rather than add additional routes. Under this alternative a combination of vehicle class changes and minimal addition of unauthorized routes to the NFTS are used to address concerns about both dispersed recreation access and OHV riding opportunities, while constraining the resource and economic impacts from addition of routes (Table 1). It adds a few unauthorized routes and makes some changes to the maintenance level (ML) of some system roads. Improvements focused on providing unauthorized routes and vehicle class changes on existing roads to better link ML 2 roads. This would create riding opportunities of increased length, allowing a diversity of riding opportunities of varying length and riding duration. Improving linkages between roads already available for OHV use also allows for increased access to dispersed recreation opportunities via OHVs. Winter, wet weather and hunting closures were developed to meet the need of providing diverse recreation opportunities and reducing user conflicts by protecting winter Over-snow Vehicle trails and providing hunting access during limited times of the year. Wet weather closures meet the need of reducing road maintenance costs by limiting damage from motorized use.

Alternative 5

Alternative 5 addresses access, motorized recreation opportunity, economics, as well as resource concerns in its recognition that Lassen NF's ML2 road system provided over 2,500 miles of OHV riding opportunity that could be improved upon by linking the system. In this way, the alternative meets the needs of access to dispersed recreation and diverse riding opportunities. During scoping, Lassen NF received suggestions for additional routes and alternative routes that would improve access to dispersed recreation and motorized recreation opportunities. These routes were reviewed for their access to dispersed recreation, ability to provide linkages between ML2 roads and lack of resource concerns. Unauthorized routes that met these criteria were considered for addition to the NFTS (Table 1). In addition there were opportunities to provide further linkages by proposing Maintenance Level changes on some ML3 and 4 roads to accommodate OHVs and to propose some mixed-use that would provide further links. Maintenance Level changes also served to meet the need of reducing overall road maintenance costs. As with Alternative 4, winter, wet weather and hunting closures were developed to meet the need of providing diverse recreation opportunities and minimizing user conflicts by protecting winter Over-snow Vehicle trails and providing hunting access during limited times of the year. Wet weather

closures meet the need of reducing road maintenance costs by limiting damage from motorized use.

Modified Alternative 5 (Preferred Alternative)

Modified Alternative 5 was designed to enhance and improve motorized recreation across the Lassen NF, while addressing economics. In analyzing Alternative 5 (the Preferred Alternative for the DEIS), it was recognized that the Forest has an extensive road system, 78 percent of which is already available to non-highway legal vehicles as well as passenger cars, trucks, and jeeps. However, what is missing is an explicit design for loop systems and linkages of short segments of routes to provide the type of off-road driving experience visitors are looking for and enjoy. This alternative responds to the need for providing diverse riding opportunities without compromising safety. The mixed use safety analysis conducted by the Forest Engineers as part of the planning process demonstrated that all of the NFTS road segments proposed for mixed use exhibit either moderate or high probability of a severe crash. The routes with moderate probability of high severity crash are analyzed in this alternative and the high probability routes are dropped.

Table 1 List of Alternatives Considered in Detail

Alternative 1: (No-action)	No prohibition of cross-country motorized travel Adds no (0) routes to the NFTS infrastructure Retains current seasonal restrictions on motorized use on 271 miles of winter recreation NFTS roads and NFTS trails
Modified Alternative 2: (Proposed Action)	Prohibits cross-country motorized travel Adds 5 miles of motorized NFTS trails Adds 16 miles of NFTS roads Allows non-highway-legal vehicle use on 13 miles of NFTS roads Retains current seasonal restrictions on motorized use on 271 miles of winter recreation NFTS roads and NFTS trails
Alternative 3: Cross-country travel prohibition	Prohibits cross-country motorized travel Adds zero (0) miles of route to the NFTS infrastructure Retains current seasonal restrictions on motorized use on 271 miles of winter recreation NFTS roads and NFTS trails
Alternative 4	Prohibits cross-country motorized travel Adds 10 Miles of NFTS roads Allows non-highway-legal vehicle use on an additional 79 miles of NFTS roads Seasonally restricts use on an additional 275 mi. of NFTS roads for winter recreation Seasonally restricts use on 80 mi. of NFTS roads during wet-weather Seasonally opens use on 12 mi. of NFTS roads for hunting access
Alternative 5	Prohibits Cross-Country Motorized Travel Adds 43 miles of motorized NFTS trails Adds 10 miles of NFTS roads Allows non-highway-legal vehicle use on 136 mi. of NFTS roads Seasonally restricts use on an additional 275 mi. of NFTS roads for winter recreation Seasonally restricts use on 88 mi. of NFTS roads during wet-weather Seasonally opens use on 12 mi. of NFTS roads for hunting access
Modified Alternative 5 (Preferred Alternative)	Prohibits Cross-Country Motorized Travel Adds 45.7 miles of motorized NFTS trails Adds 10.3 miles of NFTS roads Allows non-highway-legal vehicle use on 95 mi. of NFTS roads Seasonally restricts use on an additional 275 mi. of NFTS roads for winter recreation Seasonally restricts use on 88 mi. of NFTS roads during wet-weather Seasonally opens use on 12 mi. of NFTS roads for hunting access

Summary of Environmental Consequences

Table 2 Comparison of Alternatives with regards to Purpose and Need for Action, the Issues raised in Public Scoping, and route designation criteria in Subpart B of the Travel Management Rule.

Resource Area	Ratings for Alternatives, averaged across indicators					
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod Alt 5
Purpose and Need/Issue Measures						
Prohibition on Cross-Country Travel[PN1]	1	5	5	5	5	5
Motorized Dispersed Recreation Access[PN2a]	5	2	1	3	4	4
Diversity of Motorized Recreation Opportunities[PN2b]	5	2	1	3	4	4
Need for maintenance and administration of roads, trails and areas that would arise if the uses under consideration are designated.[PN2c, I2, TR(a)6,]	1	2	1	3	5	5
Restriction of Access to Motorized Recreation[I1]	5	4	1	3	4	4
Conflicts between motor vehicles and existing or proposed recreational uses of NFS lands or neighboring Federal lands. (Non-motorized Recreation)[TR(b)3]	1	3	5	4	2	2
Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factors.[TR(b)5]	1	3	5	4	2	2
Provide Public Safety[TR(a)2]	1	2	5	4	3	4
Effects to Resources						
Cultural Resources[TR(a)1]	1	4	5	4	3	3
Botanical Resources[TR(b)1]	3	4	5	4	4	4
Soil Resources[TR(b)1]	2	4	5	4	4	4
Hydrologic Resources[TR(b)1]	2	4	4	5	4	4
Noxious Weeds[TR(b)1]	1	4	5	4	4	4
Aquatic Biota[TR(b)2]	1	4	5	4	4	4
Wildlife Resources[TR(b)2]	1	4	5	4	4	4
Visual Resources	1	4	5	4	4	4
Air Quality	1	5	5	5	5	5
Overall Rating	**2**	**4**	**4**	**4**	**4**	**4**

Note: The ratings are as follows: 1 = Not as good for the resource or opportunity and 5 = Very good for the resource or opportunity.

Decision Framework

The Forest Supervisor for Lassen National Forest is the Responsible Official who will sign the Record of Decision. The Forest Supervisor will decide whether to adopt and implement the Proposed Action, an alternative to the Proposed Action, or take no action to prohibit

cross-country motorized vehicle travel by the public off the designated system and make changes to the existing Lassen National Forest Transportation System.

CHAPTER 1. PURPOSE OF AND NEED FOR ACTION

Changes Between DEIS and FEIS

This section was updated throughout by adding clarifying language and some restructuring to the sections for readability and brevity. The Project Location and Scope of the Analysis were separated apart and clarifying language regarding the Scope of the Analysis was added to the document. A numbering system was added to the Purpose and Need, distinguishing Purpose and Need 1 from 2a and 2b. The purpose and need to reduce cost associated with maintenance of the National Forest Transportation System (**NFTS**), was removed. It was not in the original scoped purpose and needs and the Travel Management Rule 212.55(a)6 addresses as one of the general criteria that the Responsible Official should consider in designating new roads, trails and areas. The actual language and citation to the Travel Management Rule objectives and criteria for adding roads and trails to the system was added in order to more closely make the linkage to the Comparison of Alternatives in Chapter 2. Additional laws and regulations were added demonstrating the Travel Management Rule and Roadless Area Conservation connection to the analysis. A complete revision of the Public Involvement section was performed in order to more accurately reflect the extensive public involvement that the Forest has undergone since 2004.

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 six 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 comparing 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.

Chapter 5. Glossary of Terms and Acronyms: The glossary provides a list of terms in a special subject, field, or area of usage, with accompanying definitions. Acronyms are also defined as they first occur and are bolded to highlight their first use.

Chapter 6. Cited references: References cited through out the various chapters are provided. References are available upon request as part of the project record.

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

Index: The index provides page numbers by document topic.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at: Lassen National Forest Supervisor's Office, 2550 Riverside Drive, Susanville, CA 96130.

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 FS 2004a).

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." Since that

time the Forests have completed the inventory and are in the process of doing the environmental analysis necessary to designate these unauthorized routes.

On November 9, 2005, the Forest Service published final travel management regulations in the Federal Register (USDA FS 2005h), 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 (i.e. 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 LNF has 1.2 million acres currently open to cross-country travel by motor vehicles. In 2005, the LNF completed an extensive inventory of unauthorized routes (roads and trails) on NFS lands open to cross-country travel by motor vehicles as described in the MOI. Approximately 1,089 miles of unauthorized routes were identified. The LNF 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. This process included review of the LNF land and resource management plan, 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, trails, and areas that are part of the existing LNF transportation system 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 (roads and trails), seasonal restrictions, etc.) to the LNF NFTS

roads, NFTS trails, and/or areas on NFS lands 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 LNF will publish a Motor Vehicle Use Map (MVUM) identifying all LNF NFTS roads, trails, and areas 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 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 (roads and trails) 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.

Travel Management on the Lassen National Forest

The Lassen NF currently manages and maintains approximately 3,558 miles of NFTS roads and 57 miles of NFS motorized trails. The NFTS was developed over many decades to meet a variety of needs including vegetation management, fuel treatment, access to private in-holdings, fire control, public utilities, special uses management and public recreation access. Harvesting of special forest products such as ornamental greenery, firewood, mushrooms and plants are among the many opportunities afforded by the NFTS. The NFTS is managed and maintained to various road standards, ranging from paved highways to roughly graded high-clearance roads, depending on the type of access necessary. The NFTS is displayed on the Forest Transportation Atlas. Details concerning the management of individual roads and trails are maintained in the Forest Service Infrastructure database (**INFRA**).

In 2002, Lassen NF recorded NFS roads in the INFRA database by examining previous records (maintenance plans, maintenance expenditures, existing road and trail atlases, Forest maps, etc.) to capture the entire NFTS, transfer the necessary information into INFRA, and verify the Forest Transportation Atlas. Roads or trails that had no record of being mapped or maintained for a specific use were not included in the NFTS.

Since 2002, adjustments to the Transportation System and Road Atlas and INFRA database have been made to account for NFTS roads that were either newly constructed or overlooked in the 2002 accounting effort. The current Transportation System and Road Atlas identify the existing NFTS, as well as management objectives for each transportation facility. The NFTS is regularly changing based upon contemporary resource needs and management concerns.

The current proposal is just one of many in the Forest Service's continuing effort to manage the transportation system in a sustainable and cost-effective manner. Previous administrative decisions may have reduced or added to the number of miles of NFTS roads and NFTS trails available for motor vehicle use. These previous decisions have resulted in road closures, seasonal restrictions, and decommissioning of selected routes. These past actions have been accomplished through Forest planning, vegetation management projects, watershed restoration projects, fuels treatment projects, trail construction projects, trail management decisions, landscape analysis, watershed analysis, and recommendations from the Roads Analysis Process (**RAP**). All of these previous efforts have contributed to improving management of the Lassen NFTS. Ongoing efforts to manage the Lassen NFTS in a more sustainable manner include: (1) the Temporary Forest Order (Temporary Forest Order #06-09-01, May 27, 2009), which prohibits cross-country travel off existing routes pending completion of this project; (2) project-specific efforts to reduce the impacts associated with non-system routes; and (3) addressing impacts associated with the current NFTS through the Forest's road operation and maintenance program. Implementation of this road and trails designation project is one additional step towards overall management of motor vehicle travel on the Lassen NF.

Project Location

As shown on the Vicinity Map 0 (Map Package), Lassen NF is located in northeastern California and totals approximately 1.2 million acres in size. The project area includes all NFS lands, with the exception of designated wilderness areas which are already prohibited from motorized cross-country travel and do not have any proposed additions to the NFTS within them. The project area includes land administered by the Lassen National Forest for the Shasta Trinity National Forest and does not include land administered by the Plumas for the Lassen National Forest. The Lassen NF includes approximately 78,240 acres of wilderness within the Forest administrative boundary: Caribou Wilderness (20,546 ac), Ishi Wilderness (41,399 ac) and Thousand Lakes Wilderness (16,355 ac). The Lassen NF administrative boundary, minus these three wilderness areas and forenamed other land ownerships, is considered the project area for this analysis. The project area does not include any other Federal, State, private or tribal lands.

High Lakes and Front Country

The Responsible Official, for the purposes of this decision, has decided to postpone adding any unauthorized routes in High Lakes and Front Country project areas due to on-going planning efforts for these two areas. Planning in these two areas was initiated in 2008. Any unauthorized routes will be designated during the planning process for these two decisions. However, the Responsible Official will not delay the decision to prohibit motorized cross-country travel in these two areas.

1.3. Purpose and Need

The following needs have been identified for this proposal:

Purpose #1: Cross-country Travel

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 NFS roads, NFS 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 this national direction, implementation of Subpart B of the travel management rule for the Lassen NF is scheduled for completion in 2009.

Purpose #2: Dispersed Recreation and Diversity of Recreation Opportunity

There is a need for changes to the Lassen's NFTS to:

Purpose #2a. 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 spurs 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.

Purpose #2b. 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)) (FSM 2006a). Implementation of Subpart B of the Travel Management Rule will dramatically 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 such as additional routes, changes in vehicle class and season of use.

The specific criteria for designation of National Forest System roads, trails and areas from Subpart B of the Travel Management Rule published in the Federal Register (USDA FS 2005h) are outlined in two sections the general criteria require that the Responsible Official consider effects on:

Travel Rule 212.55 (a) 1	Impacts to natural and cultural resources.
Travel Rule 212.55 (a) 2	Public safety.
Travel Rule 212.55 (a) 3	Provide for recreational opportunities.
Travel Rule 212.55 (a) 4	Access to public and private lands.
Travel Rule 212.55 (a) 5	Conflicts among uses of National Forest System lands.
Travel Rule 212.55 (a) 6	Need for maintenance and administration of roads, trails and areas that would arise if the uses under consideration are designated. (The Forest has a maintenance backlog for trails and roads of $182 million).

Specific Criteria for designation of trails and areas, in addition to the criteria listed above also include minimizing:

Travel Rule 212.55 (b) 1	Damage to soil, watershed, vegetation, and other forest resources.
Travel Rule 212.55 (b) 2	Harassment of wildlife and significant disruption of wildlife habitat.
Travel Rule 212.55 (b) 3	Conflicts between motor vehicles and existing or proposed recreational uses of NFS lands or neighboring Federal lands.
Travel Rule 212.55 (b) 4	Conflicts among different classes of motor vehicle uses on NFS lands or neighboring Federal lands.
Travel Rule 212.55 (b) 5	Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factors.

Specific Criteria for designation of NFTS roads, in addition to the criteria listed above also include minimizing:

Travel Rule 212.55 (c) 1	Speed, volume, composition and distribution of traffic on roads.
Travel Rule 212.55 (c) 2	Compatibility of vehicle class with road geometry and road surfacing.
Travel Rule 212.55 (c) 3	Maintaining valid existing rights of use and access (rights-of-way).

1.4. Proposed Action as Described in the Notice of Intent

This is a description of the original proposal by Lassen NF for meeting the purpose and need as described in the Notice of Intent **(NOI)** published in the Federal Register October

25, 2007 (USDA FS 2007b). The original Proposed Action had several modifications resulting in a Modified Proposed Action (Alternative 2), these changes area outlined in the Alternatives Considered but Eliminated from Detailed Study (Section 2.5). A complete list of proposed changes to the NFTS under each action alternative, including the revised Modified Proposed Action (Modified Alternative 2), is provided in Chapter 2.

Cross-Country Travel: Public motor vehicle travel off designated NFTS roads and trails would be prohibited on approximately 1,072,440 acres except as allowed by permit or other authorization.

Additions to the NFTS: A total of 37 miles of unauthorized route would be added to the NFTS as ML 2 roads (30 miles) or as motorized NFS trails (7 miles). These 37 miles would be designated for highway- and non-highway-legal motor vehicles. No other unauthorized routes would be added to the NFTS.

Changes to the NFTS Vehicle Class: Thirteen miles of Maintenance Level 3 (ML 3) and ML 4 roads would be designated for motorized mixed use by both highway- and non-highway-legal motor vehicles. In effect, 13 miles of ML 3 and 4 roads would be changed from a classification of only being open to highway-legal vehicles.

Changes to the NFTS Season of Use: Only those seasonal restrictions specified in the existing, annually-recurring Forest Orders would be continued. Under the original Proposed Action, motorized travel would not change from the current restrictions on 275 miles of roads groomed for winter snow-mobile recreation. These roads would remain open to public motorized travel between April 1 and December 25.

The Proposed Action described above would be reflected as a designated system of NFS roads and NFS trails, as portrayed on the newly generated the Forest MVUM for the project area.

1.5. Principle Laws and Regulations that Influence the Scope

NEPA requires that all major Federal actions significantly affecting the human environment be analyzed to determine the magnitude and intensity of those impacts, that the results are shared with the public and that the public be given opportunity to comment. The regulations implementing NEPA further require that to the fullest extent possible, agencies shall prepare environmental impact statements concurrent 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 such as, the Clean Air Act of 1955; the Clean Water Act of 1948; and the Forest and Rangeland Renewable Resources Planning Act of 1974. Principle among these legal statutes are the Multiple Use and Sustained Yield Act of 1960; the National Forest Management Act of 1976 as expressed through the Lassen National Forest Land and Resource Management Plan and Record of Decision (**ROD**) (1993), as amended by the by

the Northwest Forest Plan FEISs, FSEIS and RODs (1994, 2000, 2001, 2004, 2007) and the Sierra Nevada Forest Plan Amendment FEIS and ROD (2001), FSEIS and ROD (2004). This Lassen NF Travel Management FEIS, and forthcoming FEIS and ROD are intended to specifically implement the requirements of the November 5, 2005, Rule for Travel Management as described in 36 CFR Section 212, Subpart B.

Roadless Area Conservation: On September 19, 2006, the U.S. District Court, Northern District of California set aside the 2005 State Petitions Rule and re-instated the 2001 Roadless Rule ((36 CFR 294, Subpart B (USDA FS 2001b)).

Travel Management Rule (36 CFR 212, 251, 261 and 295): The LNF Travel Management EIS is designed specifically to implement the requirements of the November 5, 2005 Rule for Travel Management;

1.6. Decision Framework

The Forest Supervisor for Lassen National Forest is the Responsible Official who will sign the Record of Decision. The Forest Supervisor will decide whether to adopt and implement the Proposed Action, an alternative to the Proposed Action, or take no action to prohibit cross country motorized vehicle travel by the public off the designated system and make changes to the existing Lassen National Forest Transportation System.

This proposal is not intended to revisit previous decisions that resulted in the current NFTS. This proposal is narrowly focused on implementing 36CFR 212, Subpart B of the Travel Management Rule. Previous administrative decisions concerning road construction, road reconstruction, road closures, road decommissioning, trail construction and land suitability for motorized use on the existing NFTS are outside the scope of this analysis.

1.7. Public Involvement

The Off-Highway Vehicle Route Designation process has been posted on the Schedule of Proposed Actions since April 1st, 2005.

The Responsible Official and Interdisciplinary Team (IDT) relied on public involvement to ensure that a full range of alternatives, representing a broad array of perspectives, would be analyzed. Public involvement occurred during three key periods: first during the public collaboration process that began in 2004; second during the 36-day public scoping period for the NOI; and third during meetings with public groups to explore issues they raised during scoping.

The public involvement process began in 2004 and 2005 with public meetings in several key locations around the Forest. Initial meetings held at Susanville, Chico, Fall River Mills and Chester in 2004 were designed to provide the public with key information on the travel management process. Discussion topics at these meetings included an overview of the Travel Management Rule, the proposed Roadless Rule, the route designation process and ways in which the public could be involved. Additional public meetings in Chico and

Susanville were provided to update the public on the travel management process and to provide the public with information on application process and timelines for OHV grants. During 2004 and the first half of 2005 presentations were also made twice to the Lassen County Board of Supervisors, and once to the Tehama, Plumas and Modoc County Boards of Supervisors to inform them of the travel management process. During this time Forest staff also consulted with area tribes, including the Susanville Indian Rancheria, Pit River Tribe and Greenville Rancheria on the travel management process. During this period consultation with the tribes occurred on seven separate occasions.

In mid 2005, public meetings were held again at Chico, Chester, Susanville, Fall River Mills, Shingletown and Redding. The purpose of these meetings was to present route maps; provide instruction to the public on how to read route inventory maps and provide the public with an opportunity to comment on any routes that were missed. This on-the-ground training provided the public with the knowledge and tools necessary to locate and map their favorite riding areas and routes so that they could effectively provide that information to the Forest Service. As a result of this public involvement, an additional 320 miles of routes were added to the Forest inventory. During this period, similar consultations were made with the Pit River Tribe, Susanville and Greenville Rancherias on four separate occasions.

In April of 2006, the Forest once again held public meetings to continue updating the public on the travel management process and to provide training and instruction on developing input to the Forest. Meetings held in Chico, Fall River Mills, Redding, Susanville and Chester were designed to 1) present the Forest Service's new National rule requiring designation of roads, trails and open areas for all types of motorized vehicle travel; 2) discuss the specific criteria for road and trail designation in the rule; and 3) explain the Temporary Forest Order (effective July, 2006) that restricted motorized vehicle use to mapped roads and trails and provide a 60-day public notification period. The Greenville Rancheria, Susanville Indian Rancheria and Pit River Tribe were also consulted on continued developments in the travel management process in mid-2005. In September, 2006 public workshops were held to provide the public with an opportunity to help the Forest develop a transportation plan that accommodated OHV recreation while minimizing resource and social impacts. These were held at Fall River Mills, Susanville, Chico, Chester and Redding. The workshops offered individuals or groups a format to identify the opportunities and benefits of their favorite routes as well as provide a forum for discussion of potential risks and concerns. Maps and tools needed to provide feedback were made available via the web or by CD for those individuals who could not make one of the workshops.

From October to November 2006, Lassen NF asked for the public's help, through release of a "route designation feedback form" made available via the Forest website, to identify which unauthorized routes should be added to the FTS for motor vehicle travel. The public was asked to provide the following specific information on the forms: which non-system routes should be added, what type of vehicles should be allowed to use that route and why

that particular route should be added. Forms were originally due to the Forest by November 3rd, however, in late October, the Forest extended the feedback comment period another 35 days to better accommodate public involvement. Approximately 3,700 feedback forms were received, which provided comments on unauthorized routes and identified resource concerns. The Forest used this information to assist in development of the original Proposed Action for the NOI. During this time, tribal consultations with the Susanville Indian Rancheria and the Pit River Tribe on travel management also occurred.

Additional public open house meetings were held in Chester and Burney in July of 2007. The purpose of these meetings was to provide an opportunity for the public to comment on the "discussion draft" of the Forest's proposed transportation system. The discussion draft identified proposed routes, loop opportunities and access to recreation locations and also included route evaluation criteria.

Scoping for the Notice of Intent

In October 2007, the Forest Service completed the "Proposed Action and NOI to Prepare an Environmental Impact Statement" which was published in the Federal Register, October 25, 2007 (USDA FS 2007b). Thus the scoping period began on October 25, 2007, and ended November 24, 2007. Presentations to a variety of groups, phone calls, news releases, website postings, and e-mails were used to alert the public of the initiation of scoping. Public meetings were held in Redding, Susanville, and Chico to explain the Proposed Action. The agency received 2,309 responses (including letters, e-mails, and faxes), of which 152 contained original language. The remaining 2,157 responses were organized response campaign (form) letters. All of this is summarized in the Scoping Report and the Content Analysis Report, Lassen National Forest, Travel Management Plan NOI, hereby incorporated by reference and found in the Project Record. Using the comments from the public, other agencies, and agency resource specialists, the IDT developed a list of issues to address.

56-Day Draft Environmental Impact Statement Comment Period

Following four years of work and over 45 public meetings, tribal consultations and local government presentations, the Draft Environmental Impact Statement (DEIS) was released for public comment.

Interested parties, tribes and reviewing agencies were sent a letter (via email or by mail) on May 20, 2009. The DEIS and maps were posted on the web the same day at http://www.fs.fed.us/r5/lassen/projects/NEPA_projects/route/downloads.php. Hard copies and/or CDs of the DEIS were sent to tribes, reviewing agencies and any individuals or organizations that requested one. All agencies, tribes and individuals received a summary and website location for downloading documents and maps. The notice of availability was published by the Environmental Protection Agency in the Federal Register on June 5, 2009,

which initiated the 45-day comment period. A legal notice was published in the Lassen County Times on June 2, 2009. Public open house meetings were held in June in Susanville and Chico to provide the public with an opportunity to comment and to ask questions regarding the DEIS.

The Lassen NF received several comments requesting an extension to the comment period. The Forest Supervisor decided to extend the comment period an additional 11 days. On July 21, 2009, a legal notice explaining the extension was published in the Lassen County Times. A letter was also sent to interested parties, reviewing agencies and tribes on July 20, 2009. The Environmental Protection Agency published an amended notice in the Federal Register extending the comment period on July 24, 2009.

The Lassen NF received 268 total responses to the DEIS, including 252 original responses and 16 form letters. An executive summary of the comments appears in Appendix J.

The Temporary Forest Order #06-09-01, banning cross-country travel and restricting motorized travel to the inventoried unauthorized routes was revised on May 27, 2009, lasting through July 12, 2010.

Identification of Issues

Comments from the public, other agencies, Pit River Tribe, Susanville Indian Rancheria and Greenville Rancheria 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 these issues into two groups: significant issues and non-significant issues. 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 without supporting scientific or factual evidence. The Council on Environmental Quality (**CEQ**) NEPA regulations explain this delineation in Section 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)… " A summary of issues, comments, questions, and suggested alternatives is located in the Scoping Report, which is incorporated by reference in the Project Record.

Significant Issues

The Forest Service identified the following significant issues during scoping:

Issue 1: The original Proposed Action (in the NOI) unreasonably restricts motorized recreation use by prohibiting cross-country travel. The proposed addition of only 30 miles of NFTS roads and 7 miles of NFTS trails to the NFTS provides insufficient public access to Lassen NF lands and unfairly limits motorized recreation.

Discussion: Concerns were raised that restricting cross-country travel across the entire Forest severely impacts motorized recreation opportunities and unfairly restricts access for hunting, fishing, camping, and a host of other outdoor activities. The original route inventory identified 1,145 miles of unauthorized routes. The Proposed Action (in the NOI) would add 37 miles of unauthorized routes to the NFTS. This would be an insufficient amount of available routes to maintain a quality motorized recreation experience on the Lassen NF.

Issue 2: The Lassen NF NFTS is already too large to provide adequate maintenance and administration. Current maintenance backlogs should be addressed before proposing the addition of new routes to an already overburdened system.

Discussion: Concerns were expressed about how the types of use allowed on NFS roads and NFS trails would impact the need for maintenance and administration. It was expressed that some types of use result in higher maintenance costs due to resource damage caused by such uses. In addition, commenters felt that increasing the opportunities for such uses by designating additional routes would result in an increased need for Forest Service administration of these roads and trails to prevent unauthorized off-road travel, resolve user conflicts, or provide for public safety. It was also expressed that certain mixes of use, if allowed in the same area, would increase the need for maintenance and administration of these areas. Some commenters suggested that maintenance cost could be reduced by restricting access on NFTS routes that provide little or no recreational value, thereby allowing new routes to be added to the system without increasing overall maintenance cost.

CHAPTER 2: THE ALTERNATIVES

Changes Between DEIS and FEIS

A new alternative was analyzed in detail in the FEIS, Modified Alternative 5. The reasons for this are explained in 'How the Alternative was Developed'. This section was updated throughout by adding clarifying language and some restructuring to the sections for readability. The Forest has determined that there are up to two Non-significant Forest Plan Amendments that should be discussed in the final decision if either Alternative 4 or Alternative 5 (Preferred Alternative) is chosen. Mitigation measures were added to the Engineering and Watershed resource areas. A more comprehensive Monitoring Strategy was developed. A more illustrative section regarding "Changes to the NFTS—Vehicle Class" was added to the descriptions common of the action alternatives, describing the two ways that vehicle class changes may occur. Additional language clarifying "How the Alternative was Developed" was added to each alternative, including moving the information from the Summary regarding the Modifications to the original Proposed Action to this Chapter. Additional clarifying language was added to the "Description of Alternatives" as well. A calculation error was corrected to the number of NFTS miles with seasonal closures in Alternative 5 from 80 to 88. Similarly, the seasonal closures applied to the proposed additions were also displayed correctly for each alternative. A strengthened connection between the Travel Management Rule objectives and how each alternative meets those objectives was added to Table 10. The original ranking system for the comparison of alternatives was changed into a rating system. This allowed resource specialists to more accurately reflect when alternatives were very similar with one another in terms of effects or opportunities. Additional measures were added to the Comparison of Alternatives (Table 11) strengthening the linkage to the Purpose and Needs, Issues and Travel Management Rule.

2.1 Introduction

This chapter describes and compares the alternatives considered for the Lassen National Forest Motorized Travel Management FEIS. It describes alternatives considered in detail and those eliminated from detailed study. Each action alternative is designed specifically to implement the Travel Management Rule (36 CFR 212 Subpart B). The alternatives are summarized tabular format so actions and environmental impacts can be readily compared between each alternative.

Based on the issues identified through public comment on the Proposed Action, the Forest Service developed four action alternatives 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.

This chapter has four additional sections:

Part 2.2 describes how the alternatives were developed.

Section 2.3 presents the alternatives considered in detail, including proposed Forest plan amendments. This section includes an overview of the mitigation measures and monitoring strategies designed to ensure compliance with the Travel Management Rule and Forest Plan.

Section 2.4 provides a comparison of alternatives. It describes how each action alternative meets the purpose and need, and how each action alternative addresses the significant issues and their projected effects.

Section 2.5 presents the alternatives that were considered but eliminated from detailed analysis. This section includes the rationale for eliminating these alternatives.

2.2 How the Alternatives Were Developed

The four action alternatives were developed to meet the purpose and need and address a range of issues as described in Chapter 1. During the planning stages of the travel management program for the Lassen National Forest (Lassen NF or Forest), members of the public recommended changes to the existing National Forest Transportation System (NFTS) with a focus on unauthorized routes. During the 30-day public scoping process for the NOI, several alternatives, as well as recommendations on individual routes, were submitted for consideration. A complete list of the alternatives, including site-specific road and trail suggestions, can be found in the Public Scoping Report in the Project Record. After the scoping period concluded, the Forest Service reviewed and gave due consideration to the proposals. The resulting alternatives incorporate these and other proposals, as well as information offered by the public. The disposition of these routes fell into two categories: routes brought forward for detailed study in one or more alternatives and routes eliminated from detailed study. These decisions were made by the Responsible Official based upon the purpose and need, the scope of the FEIS, and issues raised by the public and the resource and management concerns identified by the IDT.

The purpose and need for the Proposed Action, as discussed in Chapter 1, identifies: 1) a need for regulation of unmanaged cross-country motor vehicle travel by the public, and 2) a need for changes and additions to the NFTS to (a) provide motor vehicle access for dispersed recreation activities, as well as, (b) a need for providing a diversity of motorized recreation opportunities. In meeting these needs, other factors were considered including protection of cultural and natural resources, providing for public safety and where possible, reducing the road maintenance backlog. In addition, public comments on the Proposed Action revealed two significant issues to be addressed in development of alternatives. First,

concerns were raised that the Proposed Action restricted access across the Forest and was insufficient to provide adequate recreation opportunities; second, concerns were raised that the current NFTS was already too large for the existing budget and addition of more routes would unnecessarily increase Forest administration and maintenance costs.

In addition to public comments on the NOI, the Forest utilized information provided in its recently completed Travel Analysis Process (**TAP**) (USDA FS PSW Region 2008c) to aid in the development of alternatives. The Forest had previously conducted a Roads Analysis Process (**RAP**) for the NFTS roads maintained for passenger cars (Maintenance Level 3, 4, 5). The RAP, completed in July 2006, was conducted in accordance with Forest Service Publication FS-643: Roads Analysis: Informing Decisions about managing the NFTS, August 1999. In 2008, the Forest conducted a focused TAP that expanded on the 2006 Roads Analysis by including roads maintained for high clearance vehicles (Maintenance Level 2 (ML 2)), roads with no public motorized vehicular access (Maintenance Level 1 (ML 1)), as well as inventoried unauthorized routes. One objective of the 2008 TAP was to review NFTS ML 1 and ML 2 roads and identify any changes that could be made to them based on their motorized recreation value and/or resource concerns. In this respect, the TAP aided development of alternatives to the Proposed Action. The information is also incorporated into the route information for each unauthorized route that is proposed for addition to the NFTS under the various alternatives (Appendix A).

In order to determine potential impacts to resources, resource specialists reviewed the data on proposed routes that had been incorporated into GIS layers from recent field visitation or previous field trips. Routes commented upon by the public or added to an alternative by the IDT were individually visited to determine the nature of potential issues and/or identify possible mitigation measures. The routes listed in Table A-2 (Appendix A) were developed from route cards designed to record this information. Each route, road or trail considered in an alternative is addressed in the Lassen NF TAP and/or individual route cards, where site-specific reviews by resource specialists are documented. The TAP and route cards are included in the Project Record and hereby incorporated by reference.

The majority of unauthorized routes proposed for addition to the NFTS in the action alternatives require no mitigations beyond road maintenance. See “maintenance” in the glossary for a list of such activities. Where mitigations are proposed to protect resources prior to adding a route to the NFTS, they are listed in Table E-1 (see Appendix E). Several proposed routes would require minor mitigation measures to protect natural resources. During development of alternatives for this FEIS, individual routes were dropped from consideration if ground-disturbing road work would be needed outside of the current route prism (Ch. 5, Glossary) to bring them to a safe or environmentally sustainable condition.

In developing alternatives to the Proposed Action, the Forest further considered options in the context of the 3,335 miles of existing NFTS that are already available for motorized vehicle use. It was recognized that the issues of access and recreation primarily concern

OHV use on the Forest and that alternative development should be driven by the need to enhance this opportunity within the constraints related to the costs of maintaining the system. With that in mind, the Forest determined that approximately 4,000 miles including NFTS roads (3,000 miles) and unauthorized routes (1,000 miles) were available for consideration. Furthermore, the majority of NFTS roads, approximately 2,500 miles (83%), are ML 2 and already open to OHV use. The problem, as identified by public comments, was that these roads were not sufficiently linked to provide contiguous riding opportunities and access across the Forest. Alternatives to the Proposed Action were developed primarily from the standpoint of attempting to better link the existing system of ML 2 roads to accommodate these needs. This was accomplished by proposing route additions or road classification changes in strategic locations that would link the existing ML 2s. Road classification changes include reducing maintenance levels on some Maintenance Level 3 (ML 3) roads to accommodate OHV use, changing some ML 1 to NFTS motorized trails, and analyzing for the possibility of mixed use on some ML 3 and Maintenance Level 4 (ML 4) sections.

It was quickly realized that the Proposed Action would not adequately meet the purpose and need as perceived by the broader public. For further discussion on this see the section for Alternative 2 entitled “How the Alternative was Developed”. Comments and issues generated were used in conjunction with travel analysis information, route card information and internal agency discussions for development of thirteen alternatives. The Proposed Action was modified for the DEIS as described in the beginning of the Summary section and four other alternatives were analyzed in detail. Nine additional alternatives were considered but eliminated from detailed analysis.

2.3 Alternatives Considered in Detail

Four action alternatives (Alternatives 2, 3, 4 and 5) and a No-action Alternative (Alternative 1) were analyzed in detail in the DEIS. Between the Draft and Final EIS, a new Modified Alternative 5 was analyzed in detail by the specialists. This new alternative was analyzed in response to comments and due to a finalized safety analysis on the ML 3 and ML 4 routes that were proposed for mixed use in Alternative 5. Maps 1-5 in the Map Package graphically summarize these alternatives.

Commonalities Among the Action Alternatives

Implementing the Motor Vehicle Use Map (MVUM)

The Forest will implement a three tiered process for placing proposed routes on the MVUM and changes to the NFTS.

- **Tier I**: Tier I will be completed immediately by creating the MVUM with all of the proposed routes and NFTS changes that do not require mitigations measures and prohibiting cross-country travel.
- **Tier II**: For all proposed route additions requiring mitigation, those mitigation measures will be implemented prior to the route being placed on the MVUM in a Tier II process; this could take from 1-5 years depending on the mitigation and available funding. For example, routes that simply need signing, or a barricade placed, should be mitigated relatively quickly and added to the MVUM within this timeframe. Also, in Tier II, but potentially taking 10 or more years to implement are the roads that require weathering in order to have their operational maintenance levels meet the objective criteria for ML 2. A subsequent safety analysis for a vehicle class change would also need to be completed to allow for mixed use. Due to the flat topography and relatively dry conditions, weathering on the east side could take up to 10 years or more before the operational maintenance level reaches the point at which a high clearance vehicle would be required. On the west side of the Forest, the operational maintenance level should reach this point much sooner due to the steeper terrain and wetter conditions.
- **Tier III**: Routes that user groups feel strongly about getting on the MVUM sooner, may require further planning (i.e., more NEPA) due to ground disturbing activities such as pulling culverts. The user groups may choose to work with the Forest to identify these routes and bring them on sooner using a Tier III process of additional planning to bring the route on more quickly.

Four Types of Actions

This section describes each of the five alternatives considered in detail. Each alternative is described in the context of the four actions described below. Maps, illustrating relevant actions for each alternative, can be found in the Map Package appended to this FEIS.

1) Cross-country Travel: All of the action alternatives prohibit motor vehicle travel by the public off designated NFTS roads, NFTS motorized trails, and areas 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. The analysis area for cross-country travel is approximately 1 million acres excluding Wilderness Areas; however it varies by alternative (Table 9). As previously mentioned, the project area for the alternatives includes National Forest System (NFS) lands. It does not include any private, state, or other Federal lands. Each alternative assumes that other adjacent Federal lands, such as those administered by the Bureau of Land Management, would be managed according to their existing management plans and applicable Federal laws. Each alternative also assumes that private lands would meet applicable state and Federal land use regulations. For this

FEIS analysis the estimated foot print attributed to existing unauthorized routes is 2,640 acres as calculated using a 20 foot width; approximate width of a vehicles two-track plus one vehicle-length perpendicular to the route.

Currently, the Forest has a Temporary Forest Order in place prohibiting motorized cross-country travel and confining motor vehicles to existing routes (authorized and unauthorized). This prohibition remains in effect until July 12, 2010 at which time it expires and may have to be extended until a Record of Decision is completed. For this analysis it is assumed that unless one of the action alternatives implementing the Travel Management Rule is selected, the Temporary Forest Order prohibiting motorized cross-country travel would expire and motorized cross-country travel would resume under the No-action Alternative.

2) Additions to the NFTS: Some action alternatives include unauthorized roads and trails proposed for addition to the NFTS, and identify vehicle class and, if appropriate, season of use for those proposed additions. 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 of these roads and trails is identified by a unique number. All road additions have a proposed road management objective (**RMO**). All trail additions have a proposed trail management objective (**TMO**). Each road or trail and their season of use is addressed individually in Appendix A. Many of the routes may need mitigations in order to bring them onto the MVUM in Tier II (See Mitigation Measures discussion later in Ch. 2 and Appendix E, Table E-1).

3) Changes to NFTS–Vehicle Class: The action alternatives may include limited changes to the vehicle class allowed on existing NFTS roads and/or trails. Vehicle class indicates the type of vehicle (highway-legal-vehicles, including passenger cars, street-legal 4WD pickups; non-highway-legal vehicles, including all-terrain vehicles; and motorcycles) allowed to operate on a road or trail. Some alternatives may add vehicle classes to roads and/or trails where that use is currently prohibited. Changes in road vehicle class to accommodate off-highway vehicles may be accomplished in one of two ways. The first way is to maintain the current road maintenance standard while designating the class of vehicles that may be allowed on a certain segment of road. For example, a ML 3 road currently open only to highway-legal-vehicles could be changed to allow non-highway-legal vehicles through a change to the vehicle class designation. This situation is called motorized mixed use. The second way is to reduce the road maintenance standard, physically changing the maintenance level from a ML 3/ML 4 to a ML2. An ML 3 road is typically one where a low-clearance passenger car can drive safely at higher speeds. An ML 2 road is typically roughly graded, requiring a high clearance vehicle and slower speeds.

In order for a vehicle class change to occur on an ML 3/ML 4 road the Forest must first conduct an engineering analysis of motorized mixed use by a qualified engineer who is designated by the Director of Engineering to perform safety analysis in a Tier II process.

This report will assess the crash risks involved with allowing different vehicle classes on the roadway, and recommends mitigation measures and alternatives to allow these uses. These documents are to be reviewed by the Responsible Official and inform decisions regarding motorized mixed use. If the Responsible Official chooses to designate for motorized mixed use, the applicable road segments may also require mitigation measures. If the road segment is to remain at a higher maintenance standard to accommodate passenger car vehicles, warning signing indicating that non-highway-legal vehicles may be present will be needed. If the road segment is to be designated for motorized mixed use, but at a lower maintenance standard, then a change in the condition of the road is needed to indicate that passenger car vehicles are discouraged in order to reduce vehicle speeds. Mixed-use (highway legal and non-highway vehicle classes allowed on same road) would not be allowed until the road condition has degraded (i.e., due to road wear, wet weather, reduced maintenance, etc.) to a condition suitable for high clearance vehicles only. Based on observations of road wear and maintenance needs on similar roads and soil types, it is estimated that with reduced maintenance, roads become suitable for only high clearance vehicles in about 5-10 years. At that time, the road will be designated for mixed use on the Forest MVUM and the road will be signed accordingly. Prior to designation, a qualified road engineer will assess the actual road condition and determine whether high-clearance vehicle conditions have developed sufficiently to safely allow mixed use.

4) Changes to NFTS–Season of Use: The action alternatives may include limited changes to the season of use on existing NFTS roads and/or trails. Season of use indicates the time of year vehicles are allowed to operate on a road or trail. Changes to the NFTS season of use are considered in order to respond to a variety of criteria, including minimizing damage to soil, vegetation, and other forest resources; minimizing harassment to wildlife; and availability of resources for maintenance and administration of roads, trails and areas that would arise if the uses under consideration are designated.

Ongoing Management Currently Being Implemented on Lassen NF

There are several ongoing management actions that are common to all alternatives and would either be continued under each alternative or be incorporated into the Lassen NF Motor Vehicle Use Map (MVUM) as described here:

National Forest System Land Only: Travel management options considered in this FEIS pertain only to NFS lands and routes under jurisdiction of the Forest Service. Existing or new routes on private, state, or Federal lands within or adjacent to Lassen NF would be designated as part of the NFTS only when rights-of-way have been obtained for the purposes of public access.

Maintenance Level 1 Roads: Public access on ML 1 roads is currently open only to non-motorized travel.

Special Orders: The Forest Supervisor has authority to issue special orders limiting or changing motor vehicle access for protection of natural resources, wildlife, or safety, regardless of the decision made as a result of this analysis.

New Construction: Any new road or trail construction would require future site-specific NEPA analysis before being added to the NFTS and designated for motor vehicle use.

Ground Disturbing Activities: For NFTS roads no ground-disturbing activities outside the road (or route) prism and beyond routine maintenance activities are proposed in this analysis.

Osprey Management Area: Forest Order No. 88-1, Occupancy and Use, Osprey Management Area. This order currently closes the Osprey Management Area on the west shore of Eagle Lake to motor vehicle use all year. The area is open to pedestrian traffic from March 1 to September 15. This direction follows the 1971 management plan for the Eagle Lake Osprey Management Area, as specified in the LRMP. Under the action alternatives this Forest Order would be superseded by the MVUM.

Bald Eagle Nesting: Lassen Land Management Plan 1992, Bald Eagle Nesting. Three miles of NFTS roads have current seasonal closures to prohibit disturbance of bald eagle nesting sites. These 3 miles would be open to vehicle use from August 1 through November 30. This Forest directive would be incorporated into the MVUM.

Winter Recreation: Forest Order No. 06-07-07 for Winter Recreation. Motor vehicles are seasonally restricted on specific NFTS roads groomed for snowmobile and cross-country ski use during winter months. These roads are open to motor vehicle use from April 1 through December 25. Table A-1 (Appendix A) lists the routes and mileages currently restricted during the winter months. This seasonal restriction is illustrated on Map 7 (Alternative 1, 2 and 3 Seasonal Restrictions, Map Package). Under the action alternatives this Forest Order would be incorporated into the MVUM. (Note: The Lassen NF winter grooming program includes a number of roads maintained by local counties. While these roads are groomed as part of the winter recreation program, the Forest Service does not have authority to close these roads to motorized travel. County roads included in the winter recreation program, with County jurisdiction for maintenance, are not considered as part of proposed seasonal closures.)

Management Actions Common to Alternatives 2, 3, 4, 5, and Modified 5

There are several actions that are common to all action alternatives. To avoid redundancy, these actions are mentioned below as applying to Alternatives 2, 3, 4, 5, and Modified 5

Vehicles Exempted from Prohibition of Cross-country Travel: The following vehicles and uses would be exempted from the prohibition of cross-country travel described in 36 CFR Section 212.51(a): 1) aircraft; 2) watercraft; 3) over-snow vehicles (see 36 CFR § 212.81); 4) limited administrative use by the Forest Service; 5) use of any fire, military, or law enforcement vehicle for emergency purposes; 6) authorized use of any combat or combat support vehicle for national defense purposes; 7) law enforcement response to violations of law, including pursuit; and 8) use and occupancy of National Forest System lands and resources pursuant to a written authorization issued under Federal law or regulations. Note: emergency access and law enforcement pursuit do not necessarily require Forest Supervisor permission.

Inclusive Aspects of Road or Trail Designation: Designation of a road or trail includes all terminal facilities, trailheads, parking lots, and turnouts associated with the designated NFTS road or NFTS trail. The designation also includes parking a motor vehicle so that all parts of the vehicle are within one vehicle-length from the edge of the route surface when it is safe to do so and without causing damage to NFS resources or facilities (FSM 2009c). This also applies to parking for the purposes of dispersed camping. There are no proposed restrictions on general dispersed camping by non-motorized means.

Cross-country Travel for Big Game Retrieval: Cross-country travel for big game retrieval would be prohibited. Off-route driving and parking for activities such as forest product gathering would continue to be regulated by Forest Products Permit or other type of permit.

Authorized Cross-country Travel: Motor vehicle use that is specifically allowed under a written authorization issued by Lassen NF would be exempt from the designations on the MVUM. Access for permitted activities (e.g., livestock operations, wood-cutting, mineral exploration and development, maintenance of water developments, utility maintenance, timber management, and recreation events) on NFS lands is independent of general public access. Individuals or groups with Special Use Permits are allowed to conduct business according to conditions specified in those permits. If a permit does not stipulate exemptions to Lassen NF's general travel regulations, the general travel regulations apply.

Road Drain Ways: Road drain ways may be deepened at the entry to road sections being re-classified from ML 3 to ML 2 so that the vehicle operator is given an expectation that the road section is intended for high clearance vehicles.

Description of the Alternatives

Alternative 1–No-action

How the Alternative was Developed

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 No-action Alternative represents the continuation of cross-country travel. 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. Motor vehicle travel by the public would not be limited to designated routes. Unauthorized routes would continue to have no status or authorization as NFTS facilities. Table 3 displays a summary of the actions proposed in this alternative. Table A-2 (Appendix A) lists roads and trails to be added to the NFTS under this alternative along with route and resource information.

Description of Alternative 1—No-action

Cross-Country Travel: Public motor vehicle travel off designated NFTS roads, NFTS trails, and areas would continue on 1,072,488 acres except as otherwise prohibited. Note that implementation of Alternative 1 would not prevent the Forest from establishing cross-country closures in areas for purposes of safety, resource protection or other issues as determined by proper administrative action and appropriate public input.

Additions to the NFTS: No additions would be made to the NFTS under this alternative.

Changes to the NFTS – vehicle class: No change would be made to the NFTS – vehicle class, neither mixed use only or ML changes, under this alternative.

Changes to the NFTS – season of use: Only those winter seasonal restrictions specified in existing, annually-recurring Forest Orders would be continued (Table G-1, Appendix G) and Map 7 (Alternatives 1, 2 and 3 Seasonal Restrictions, Map Package). Under the No-action Alternative (Alternative 1), motorized travel would not change from the current restrictions on 271 miles of roads groomed for winter snow-mobile recreation. These roads would be open to public motorized travel between April 1 and December 25.

Amendments to the Forest Plan: No amendments would be made to the Forest Plan.

Table 3 Alternative 1 - Summary of Actions

Action Type		Action Proposed
1. Cross-country Travel		
Status of cross-country travel		No change to current management
2. Additions to the NFTS (Routes)		**Miles**
Trails added (All vehicle classes)		0
Roads added (All vehicle classes)		0
3. Changes to the Existing NFTS		
Vehicle Class Changes		**Miles**
Allowing highway and non-highway vehicles (Mixed Use) to use the same roads through vehicle class changes. 1	System roads currently closed to motorized use by the public - to be designated as motorized trails (< 50" motorized trail)	0
	Roads currently managed to passenger car standards (ML 3 or 4 – highway legal vehicles only) that will be allowed to degrade to high clearance standards (ML2). These roads will then be designated for both highway and non-highway vehicles.	0
	Roads currently managed to passenger car standards (ML 3 or 4 - highway legal vehicles only) where the vehicle class will be changed to allow both highway legal and non-highway legal vehicles (mixed use - licensed drivers only)	0
New Seasonal Restrictions		
Reason for restriction	**Open period**	**Miles**
None	No new restrictions	0

Source: GIS query March 22, 2009.

Alternative 2–Modified Proposed Action

How the Alternative was Developed

The original Proposed Action was modified for the DEIS. The original Proposed Action, published in the NOI, included prohibition of motor vehicle travel off designated National Forest Transportation System (NFTS) roads, trails, and areas by the public except as allowed by permit or other authorization. In addition, the NOI indicated that there were 1,145 miles of unauthorized routes inventoried on the Forest that were receiving motorized use. The NOI further proposed the addition of 10 motorized Open Riding Areas totaling 26 acres and vehicle class changes on 13 miles of NFTS roads that would allow both highway-legal and non-highway-legal vehicle use. In the twelve months since publication of the NOI and

Proposed Action, additional information has been made available from field visitations, updated data sources, and comments from scoping which led to minor adjustments to the original Proposed Action and further clarifying assumptions that are incorporated into this analysis. Due to these findings, the Forest Service recognized a need to describe three key changes between the NOI and this FEIS.

The changes to the Proposed Action are as follows:

Project Area Clarification: The project area for this analysis is defined as National Forest System lands within the Lassen NF administrative boundary with the exceptions of Wilderness Areas. The Ishi, Thousand Lakes, and Caribou Wilderness Areas total approximately 79,000 acres within the Forest administrative boundary. These areas are managed for their primitive, Roadless characteristics and are not considered as part of the project area for this analysis.

Field Verification: As a consequence of field reviews between the NOI and this FEIS, the GIS layers were updated providing further accuracy in mapping and delineating route miles.

a. Approximately 56 miles of unauthorized routes, originally discussed in the NOI, could not be located or did not provide a recreational opportunity. As a result, a mapping update in April 2008 changed the originally stated 1,145 miles of unauthorized routes to the more accurate 1,089 miles of unauthorized routes. As a result, the updated amount of 1,089 miles is used throughout this environmental analysis when describing unauthorized routes that would be available for designation.

b. Under the NOI, 37 miles of unauthorized routes were proposed additions to the National Forest Transportation System (NFTS); 30 as NFTS roads and seven as NFTS trails. As a consequence of field reviews, 16 of these 37 miles of unauthorized routes could not be field verified. Therefore, the updated number of 21 miles (16 miles as NFTS roads and five miles as NFTS trails) is proposed for additions to the NFTS in this alternative.

c. Field reviews of the proposed 10 motorized Open Riding Areas indicated a need for substantial engineering analysis to ensure that boundary locations were accurate, resource damage concerns addressed, and safety features adequate for these areas. It was realized that these mitigations would require additional site-specific analysis and implementation before open areas could be safely utilized. Given the timing of our decision and the scope of our analysis, it was recognized that establishing these areas as part of a designated system at this time could not be done. For this reason, the ten motorized Open Riding Areas were not brought forward into the alternatives developed throughout this FEIS.

The Modified Proposed Action includes the following, as described in the NOI published in the Federal Register on October 25, 2007 (USDA FS 2007b): prohibition of cross-country motorized travel, proposed changes to the existing NFTS, and additions to the NFTS. This alternative was developed during the course of a year's worth of public meetings, including workshops where the public identified important routes for addition. The focus of this alternative was to meet OHV recreation needs by adding some unauthorized routes and providing for some mixed use opportunities. However, the alternative largely assumes existing OHV recreation opportunities are adequate for most user needs. Routes that do not have resource concerns are proposed for addition to the NFTS.

Description of Alternative 2—Proposed Action

Cross-Country Travel: Public motor vehicle travel off designated NFTS roads and trails on approximately 1,072,440 acres would be prohibited, except as allowed by permit or other authorization.

Additions to the NFTS: A total of 21 miles of unauthorized routes, comprised of 78 route segments would be added to the NFTS as ML 2 roads (16 miles) or as motorized NFTS trails (5 miles). Proposed additions are summarized in Table 4 below and listed in Table A-1, Appendix A. These 21 miles would be designated for both highway legal and non-highway-legal motor vehicles. Winter Recreation season of use would be applied to 4 miles of proposed additions. Wet weather season of use would be applied to 0.8 miles of proposed additions. Map 8 (Alternative 2 (Proposed Action) Additions to the NTFS, Map Package) identifies the locations of these routes within the project area.

Changes to the NFTS – vehicle class: Thirteen miles of ML 3 and 4 roads would be analyzed for designation as motorized mixed use by both highway- and non-highway-legal motor vehicles. In effect, 13 miles of ML 3 and 4 roads would be proposed for removal from a classification of open to highway-legal vehicles only and re-classified as open to both highway and non-highway legal vehicles. These proposed changes are summarized in Table 4 below, and listed in Table G-3, Appendix G. Map 9 (Alternative 2 (Proposed Action), Map Package) identifies the locations of road segments proposed for motorized mixed use.

Changes to the NFTS – season of use: Only those winter seasonal restrictions specified in existing, annually-recurring Forest Orders would be continued (Table G-1, Appendix G) on the NFTS and Map 7 (Alternatives 1, 2 and 3 Seasonal Restrictions, Map Package). Under Alternative 2, motorized travel would not change from the current restrictions on 271 miles of roads groomed for winter snow-mobile recreation. These roads would be open to public motorized travel between April 1 and December 25.

Amendments to the Forest Plan: No amendments would be made to the Forest Plan.

Table 4 displays a summary of the actions proposed in this alternative. Table A-2 (Appendix A) lists roads and trails to be added to the NFTS under this alternative along with route and resource information.

Table 4 Alternative 2 - Summary of Actions

Action Type		Action Proposed
1. Cross-country Travel		
Status of cross-country travel		Prohibited on 1,072,440 acres
2. Additions to the NFTS (Routes)		**Miles**
Trails added (All vehicle classes)		5
Roads added (All vehicle classes)		16
3. Changes to the Existing NFTS		
Vehicle Class Changes		**Miles**
Allowing highway and non-highway vehicles (Mixed Use) to use the same roads through vehicle class changes. 1	System roads currently closed to motorized use by the public - to be designated as motorized trails (< 50" motorized trail)	0
	Roads currently managed to passenger car standards (ML 3 or 4 – highway legal vehicles only) that will be allowed to degrade to high clearance standards (ML2). These roads will then be designated for both highway and non-highway vehicles.	0
	Roads currently managed to passenger car standards (ML 3 or 4 - highway legal vehicles only) where the vehicle class will be changed to allow both highway legal and non-highway legal vehicles (mixed use - licensed drivers only)	13
New Seasonal Restrictions		
Reason for restriction	**Open period**	**Miles**
Proposed additions winter recreation	Apri 1 to December 25	4.0
Proposed additions wet weather	May 1 to November 30	0.8
None for the NFTS	No new restrictions	0

Source: GIS query March 22, 2009.

Alternative 3

How the Alternative was Developed

Alternative 3 meets the objective prohibiting cross-country travel and addresses economics by proposing no new additions to the NFTS. This alternative also provides a baseline for comparing the impacts of other alternatives that propose changes to the NFTS in the form of new facilities (roads or trails). None of the unauthorized roads or trails would be added to the NFTS under this alternative.

Description of Alternative 3

Cross-Country Travel: Public motor vehicle travel off designated NFTS roads and trails on approximately 1,072,488 acres would be prohibited, except as allowed by permit or other authorization.

Additions to the NFTS: No unauthorized routes would be added to the NFTS as NFTS roads or NFTS trails under this alternative. Mileage proposed under this alternative would be limited to the existing NFTS classifications and is summarized below in Table 5. Winter Recreation season of use would be applied to 0 miles of proposed additions. Wet weather season of use would be applied to 0 miles of proposed additions. NFTS roads and trails that would be open under this alternative are illustrated on Map 6 (Alternatives 1 and 3 Current System, Map Package).

Changes to the NFTS – vehicle class: No changes to vehicle class restrictions are proposed under this Alternative. No additional motorized mixed use would be proposed. Non-highway-legal motor vehicle travel on all ML 3 and 4 roads would continue to be regulated under the Highway Safety Act 0f 1966 (23USC 402) and 2009 California Vehicle Code (California DMV 2009) and illustrated on Map 6 (Alternatives 1 and 3 Current System, Map Package).

Changes to the NFTS – season of use: Only those winter seasonal restrictions specified in existing, annually-recurring Forest Orders would be continued (Table G-1, Appendix G) and Map 7 (Alternatives 1, 2 and 3 Seasonal Restrictions, Map Package). Under Alternative 3, motorized travel would not change from the current restrictions on 271 miles of roads groomed for winter snow-mobile recreation. These roads would be open to public motorized travel between April 1 and December 25.

Amendments to the Forest Plan: No amendments would be made to the Forest Plan.

Table 5 displays a summary of the actions proposed in this alternative.

Table 5 Alternative 3 - Summary of Actions

Action Type		Action Proposed
1. Cross-country Travel		
Status of cross-country travel		Prohibited on 1,072,488 acres
2. Additions to the NFTS (Routes)		**Miles**
Trails added (All vehicle classes)		0
Roads added (All vehicle classes)		0
3. Changes to the Existing NFTS		
Vehicle Class Changes		**Miles**
Allowing highway and non-highway vehicles (Mixed Use) to use the same roads through vehicle class changes. [1]	System roads currently closed to motorized use by the public - to be designated as motorized trails (< 50" motorized trail)	0
	Roads currently managed to passenger car standards (ML 3 or 4 – highway legal vehicles only) that will be allowed to degrade to high clearance standards (ML2). These roads will then be designated for both highway and non-highway vehicles.	0
	Roads currently managed to passenger car standards (ML 3 or 4 - highway legal vehicles only) where the vehicle class will be changed to allow both highway legal and non-highway legal vehicles (mixed use - licensed drivers only)	0
New Seasonal Restrictions		
Reason for restriction	**Open period**	**Miles**
None proposed for the NFTS	No new restrictions	0

Source: GIS query March 22, 2009.

Alternative 4

How the Alternative was Developed

Alternative 4 addresses access and economics. This alternative was developed to meet the need of providing diverse OHV riding opportunities by attempting to improve existing riding opportunities rather than add additional routes. Under this alternative a combination of vehicle class changes and minimal addition of unauthorized routes to the NFTS are used to address concerns about both dispersed recreation access and OHV riding opportunities, while constraining the resource and economic impacts from addition of routes. It adds a few unauthorized routes and makes some changes to the maintenance level (ML) of some system roads. Improvements focused on providing unauthorized routes and vehicle class changes on existing roads to better link ML 2 roads. This would create riding opportunities of

increased length, allowing a diversity of riding opportunities of varying length and riding duration. Improving linkages between roads already available for OHV use also allows for increased access to dispersed recreation opportunities via OHVs. Winter, wet weather and hunting closures were developed to meet the need of providing diverse recreation opportunities and reducing user conflicts by protecting winter OSV trails and providing hunting access during limited times of the year. Wet weather closures meet the need of reducing road maintenance costs by limiting damage from motorized use. Tables A-1 and A-2 (Appendix A) lists roads and trails to be added to the NFTS under this alternative, along with route and resource information.

Description of Alternative 4

Cross-Country Travel: Public motor vehicle travel off designated NFTS roads and trails on approximately 1,072,464 acres would be prohibited, except as allowed by permit or other authorization.

Additions to the NFTS: A total of 10 miles of unauthorized routes, comprised of 44 route segments would be added to the NFTS as ML 2 roads. Proposed additions are summarized in Table 6 below and listed in Table A-1 (Appendix A). These 10 miles would be designated for highway- and non-highway-legal motor vehicles. Winter Recreation season of use would be applied to 6.7 miles of proposed additions. Wet weather season of use would be applied to 0.7 miles of proposed additions. Map 10 (Alternative 4 (Resource Protection), Map Package) identifies the locations of these routes within the project area. No other unauthorized routes would be added to the NFTS

Changes to the NFTS – vehicle class: Objective Maintenance Levels would be reduced to ML 2 on 79 miles of roads currently managed as ML 3. This action would serve to increase the amount of NFTS miles available for use by non-highway legal motor vehicles and provide additional connectivity between riding loops for longer riding opportunities. These roads are summarized below in Table 6, and listed in Table G-3, (Appendix G). These proposed changes to the existing NFTS are illustrated on Map 11 (Alternative 4, Vehicle Class Changes, Map Package).

Changes to the NFTS – season of use: In addition to the 271 miles of annual seasonal restrictions on groomed winter recreation trails, an additional 367 miles would be seasonally restricted, totaling 638 miles. There are three categories of restrictions that would apply under this alternative. Map 12 (Alternatives 4 and 5-Seasonal Restrictions, Map Package) identifies all seasonal restrictions proposed under Alternative 4.

a. **Winter Recreation**: Use of motor vehicles would remain seasonally restricted on NFTS roads groomed for snowmobile and cross-country ski use during winter months. These 271 miles of NFTS roads would remain open to motor vehicle use from April 1 through December 25 (Table A-1, Appendix A and Table G-1, Appendix G). In addition to groomed trails, 275 miles of other routes identified on

the Lassen NF Winter Recreation Guide would become seasonally restricted during winter months. These include routes identified as un-groomed snowmobile trails; dedicated cross-country ski trails, and recommended cross-country ski trails during winter months. These combined 546 miles of roads would become open to motor vehicle use from April 1 through December 25. The additional miles of routes proposed for winter motor vehicle use restrictions are listed below in Table 6 and Table A-1 (Appendix A).

b Wet Weather: Use of motor vehicles would become seasonally restricted on 80 miles of NFTS roads, to limit damage to roads from severe rutting due to motor vehicle operation during periods when road beds are water-saturated and easily impacted. These 80 miles would be open to motor vehicle use from May 1 to November 30. Roads with seasonal motor vehicle use restrictions during wet weather are listed in Table 6 below, and Table A-1 (Appendix A).

c. Hunting Access: Use of motor vehicles would be seasonally restricted on 12 miles of NFTS roads to provide non-motorized hiking opportunities near Susanville, except to allow access during the fall hunting season. These 12 miles of road would become open to motor vehicle use from August 1 through October 31. Routes designated for motor vehicle use only during the fall hunting season are summarized below in Table 6, and Table G-2 (Appendix G).

Amendments to the Forest Plan: One Non-significant Plan Amendment to the Lassen LRMP (1992) would be necessary under this alternative, to address the 0.10 miles of route 270326UC14 being added to the Deer Creek, Eligible Wild and Scenic River. Along with other wildlife that typically use Northern Sierra streams, Deer Creek has resident rainbow, as well as steelhead and spring-run Chinook salmon that migrate to and from the Pacific Ocean. The character of the area remains primitive and the lower section near Deer Creek Flats contains the historic Yahi-Yana Indian site known as Ishi Caves.

The Amendment will shift the eastern boundary of the “Wild” portion of Deer Creek Eligible Wild and Scenic River so that the 0.10 miles will now be in the “Scenic” portion rather than in the “Wild” portion of the Eligible Wild and Scenic River. The current boundary appears to be a mapping error. The intent when the original boundaries were drawn was to go around the end of the road and the associated dispersed campground. This Non-significant Forest Plan Amendment will allow continued use of this route and the associated dispersed recreation. Appendix E, Wild and Scenic Rivers Evaluation, Table E-2 of the LRMP displays Segment Number 4, a Scenic segment as being 2.5 miles in length; this adjustment would make the river segment 2.8 miles in length. Correspondingly, Segment Number 5, a Wild segment would be displayed as 9.5 miles in length instead of 10.0 miles (the LRMP rounded to the nearest 0.5 miles, so the actual value to begin with was 9.8 miles without rounding).

Table 6 displays a summary of the actions proposed in this alternative. Appendix A lists road, and trails to be added to the NFTS under this alternative, along with route and resource information.

Table 6 Alternative 4 - Summary of Actions

Action Type		Action Proposed
1. Cross-country Travel		
Status of cross-country travel		Prohibited on 1,072,464 acres
2. Additions to the NFTS (Routes)[a]		**Miles**
Trails added (All vehicle classes)		0
Roads added (All vehicle classes)		10
Reason for restriction	**Open period**	**Miles**
Proposed additions winter recreation	Apri 1 to December 25	6.7
Proposed additions wet weather	May 1 to November 30	0.7
3. Changes to the Existing NFTS		
Vehicle Class Changes [a]		**Miles**
Allowing highway and non-highway vehicles (Mixed Use) to use the same roads through vehicle class changes. [1]	System roads currently closed to motorized use by the public - to be designated as motorized trails (< 50" motorized trail)	0
	Roads currently managed to passenger car standards (ML 3 or 4 – highway legal vehicles only) that will be allowed to degrade to high clearance standards (ML2). These roads will then be designated for both highway and non-highway vehicles.	79
	Roads currently managed to passenger car standards (ML 3 or 4 - highway legal vehicles only) where the vehicle class will be changed to allow both highway legal and non-highway legal vehicles (mixed use - licensed drivers only)	0
New Seasonal Restrictions		
Reason for restriction	**Open period**	**Miles**
Winter recreation	April 1 to December 25	275
Wet weather	May 1 to November 30	80
Hunting	August 1 to October 31	12

[a]All routes added or changed to allow mixed use will be open to all forms of motorized vehicles; Source: GIS query March 22, 2009.

Alternative 5–Preferred Alternative

How the Alternative was Developed

Alternative 5 addresses access, motorized recreation opportunity and economics, in its recognition that Lassen NF's ML2 road system provided over 2,500 miles of OHV riding opportunity that could be improved upon by linking the system. In this way, the alternative meets the needs of access to dispersed recreation and diverse riding opportunities. During scoping, Lassen NF received suggestions for additional routes and alternative routes that would improve access to dispersed recreation and motorized recreation opportunities. These routes were reviewed for their access to dispersed recreation, ability to provide linkages between ML2 roads and lack of resource concerns. Unauthorized routes that met these criteria were considered for addition to the NFTS. In addition there were opportunities to provide further linkages by proposing Maintenance Level changes on some ML3/4 roads to accommodate OHVs and to propose some mixed-use that would provide further links. Maintenance Level changes also served to meet the need of reducing overall road maintenance costs. As with Alternative 4, winter, wet weather and hunting closures were developed to meet the need of providing diverse recreation opportunities and minimizing user conflicts by protecting winter Over-snow Vehicle (**OSV**) trails and providing hunting access during limited times of the year. Wet weather closures meet the need of reducing road maintenance costs by limiting damage from motorized use. Tables A-1 and A-2 (Appendix A) lists roads and trails to be added to the NFTS under this alternative, along with route and resource information.

Description of Alternative 5

Cross-Country Travel: Public motor vehicle travel off designated NFTS roads and trails on approximately 1,072,345 acres would be prohibited, except as allowed by permit or other authorization.

Additions to the NFTS: A total of 53 miles of unauthorized routes, comprised of 207 route segments would be added to the NFTS as ML 2 roads (10 miles) or as motorized NFTS trails (43 miles). Proposed route additions are summarized below in Table 7, and specific routes are listed in Table A-1 (Appendix A). Winter Recreation season of use would be applied to 6.7 miles of proposed additions. Wet weather season of use would be applied to 6.6 miles of proposed additions. To see an illustration of these proposed additions to the NFTS, refer to Map 13 (Alternative 5 (Preferred Alternative), Map Package).

Changes to the NFTS – vehicle class: Objective Maintenance Levels would be reduced to ML 2 on 79 miles of roads currently managed as ML 3. This action would serve to increase the amount of NFTS miles available for use by non-highway legal motor vehicles and provide additional connectivity between riding loops for longer riding opportunities. In addition, 45 miles of ML 3 roads and 6 miles of ML 4 roads are proposed for motorized mixed use by both highway and non-highway legal vehicles for the same purpose.

Additionally, Six miles of roads that are currently closed to public motor vehicle use through Maintenance Level 1 designation will be converted to Maintenance Level 2 roads and managed as Four-Wheel Driveway Trails allowing all vehicle use. Changes to the NFTS are summarized below in Table 7, and listed in Table A-1 (Appendix A). These proposed changes to the existing NFTS are illustrated on Map 14 (Alternative 5 (Preferred Alternative) Vehicle Class Changes, Map Package).

Changes to the NFTS – season of use: In addition to the 271 miles of seasonal restrictions as specified in the existing Forest Orders, an additional 375 miles would be seasonally restricted, totaling 646 miles. There are three categories of restrictions that would apply under this alternative. Map 12 (Alternatives 4 and 5-Seasonal Restrictions, Map Package) identifies all seasonal restrictions proposed under Alternative 5:

a. **Winter Recreation**: Use of motor vehicles would remain seasonally restricted on NFTS roads groomed for snowmobile and cross-country ski use during winter months. These 271 miles of NFTS roads would remain open to motor vehicle use from April 1 through December 25. In addition to groomed trails, 275 miles of other routes identified on the Lassen NF Winter Recreation Guide would become seasonally restricted during winter months (Table A-1, Appendix A and Table G-1, Appendix G). These include routes identified as un-groomed snowmobile trails; dedicated cross-country ski trails, and recommended cross-country ski trails during winter months. These combined 546 miles of roads would become open to motor vehicle use from April 1 through December 25. The additional miles of routes proposed for winter motor vehicle use restrictions are listed below in Table 7.
b. **Wet Weather**: Use of motor vehicles would become seasonally restricted on 88 miles of NFTS roads, to limit damage to roads from severe rutting due to motor vehicle operation during periods when road beds are water-saturated and easily impacted. These 88 miles would be open to motor vehicle use from May 1 to November 30. Roads with seasonal motor vehicle use restrictions during wet weather are listed in Table 7 below, Table A-1 (Appendix A) and Table G-2 (Appendix G).
c. **Hunting Access**: Use of motor vehicles would be seasonally restricted on 12 miles of NFTS roads to provide non-motorized hiking opportunities near Susanville, except to allow access during the fall hunting season. These 12 miles of road would become open to motor vehicle use from August 1 through October 31. Routes designated for motor vehicle use only during the fall hunting season are summarized below in Table 7 and Table G-2 (Appendix G).

Amendments to the Forest Plan: One Non-significant Plan Amendment to the Lassen LRMP (1992) would be necessary under this alternative, to address the 0.10 miles of route 270326UC14 being added to the Deer Creek, Eligible Wild and Scenic River. Along with

other wildlife that typically use Northern Sierra streams, Deer Creek has resident rainbow, as well as steelhead and spring-run Chinook salmon that migrate to and from the Pacific Ocean. The character of the area remains primitive and the lower section near Deer Creek Flats contains the historic Yahi-Yana Indian site known as Ishi Caves.

Table 7 displays a summary of the actions proposed in this alternative. A complete listing of roads and trails to be added into the NFTS, including the vehicle class and, if applicable, seasonal use restrictions, can be found in Table A-1, Appendix A.

Table 7 Alternative 5 - Summary of Actions

Action Type		Action Proposed
1. Cross-country Travel		
Status of cross-country travel		Prohibited on 1,072,345 acres
2. Additions to the NFTS (Routes)[a]		**Miles**
Trails added (All vehicle classes)		43
Roads added (All vehicle classes)		10
Reason for restriction	**Open period**	**Miles**
Proposed additions winter recreation	Apri 1 to December 25	6.7
Proposed additions wet weather	May 1 to November 30	6.6
3. Changes to the Existing NFTS		
Vehicle Class Changes [a]		**Miles**
Allowing highway and non-highway vehicles (Mixed Use) to use the same roads through vehicle class changes. 1	System roads currently closed to motorized use by the public - to be designated as motorized trails (< 50" motorized trail)	6
	Roads currently managed to passenger car standards (ML 3 or 4 – highway legal vehicles only) that will be allowed to degrade to high clearance standards (ML2). These roads will then be designated for both highway and non-highway vehicles.	79
	Roads currently managed to passenger car standards (ML 3 or 4 - highway legal vehicles only) where the vehicle class will be changed to allow both highway legal and non-highway legal vehicles (mixed use - licensed drivers only)	51
New Seasonal Restrictions		
Reason for restriction	**Open period**	**Miles**
NFTS winter recreation	Apri 1 to December 25	275
NFTS wet weather	May 1 to November 30	88
NFTS hunting	August 1 to October 31	12

[a]All routes added or changed to allow mixed use will be open to all forms of motorized vehicles; Source: GIS query March 22, 2009

Modified Alternative 5 (Preferred Alternative)

How the Alternative was Developed

Modified Alternative 5 was designed to enhance and improve motorized recreation across the Lassen NF, while addressing economics. In analyzing Alternative 5 (the Preferred Alternative for the DEIS), it was recognized that the Forest has an extensive road system, 78 percent of which is already available to non-highway legal vehicles as well as passenger cars, trucks, and jeeps. However, what is missing is an explicit design for loop systems and linkages of short segments of routes to provide the type of off-road driving experience visitors are looking for and enjoy. This alternative responds to the need for providing diverse riding opportunities without compromising safety. The mixed use safety analysis conducted by the Forest Engineers as part of the planning process demonstrated that all of the NFTS road segments proposed for mixed use exhibit either moderate or high probability of a severe crash. The routes with moderate probability of high severity crash are analyzed in this alternative and the high probability routes are dropped.

During the scoping period for this project, the Lassen NF received suggestions on a number of unauthorized routes to be added to the NFTS. These routes were reviewed to determine the degree to which they added recreational value–either by providing access to dispersed recreation or by linking segments of the existing road system–and the environmental sensitivity associated with proposing the route addition for motorized use. In addition to the unauthorized routes being added in Alternative 5, an additional 2.7 miles of unauthorized routes that were found to have important recreational value and minimal or mitigated resource concerns were considered for addition to the NFTS for addition in this alternative. As we looked for ways to create the riding loops people told us they wanted; we identified 9.3 lesser-used ML 3 road segments where mixed use could be designated and 79.6 miles where ML 3 objective maintenance levels could be reduced to ML 2, this is an increase of 0.6 miles over Alternative 5. It was discovered in the process of conducting the mixed use safety analysis on routes in Alternative 5 that one of the segments, 0.6 miles of 28N70, proposed in that alternative had already operationally changed from a ML3 to a ML2. Over time, all 79.6 miles of these roads will be made available for non-street-legal vehicles and link currently disconnected ML 2 road segments to form continuous OHV circuits.

Seasonal closures were included in Modified Alternative 5 to address the need for providing diverse recreation opportunities and to minimize user conflicts. Winter closures protect Over-snow Vehicle (**OSV**) trails. Other seasonal closures are designed to provide hunting access during limited times of the year. Wet weather closures prevent resource damage in erosion-prone areas and also meet the need to reduce road maintenance costs by limiting damage to the road bed.

Cross-Country Travel: Public motor vehicle travel off designated NFTS roads and trails on approximately 1,072,364 acres would be prohibited, except as allowed by permit or other authorization.

Additions to the NFTS: A total of 56 miles of unauthorized routes, comprised of 207 route segments would be added to the NFTS as ML 2 roads (10.3 miles) or as motorized NFTS trails (45.7 miles). Winter Recreation season of use would be applied to 6.6 miles of proposed additions. Wet weather season of use would be applied to 8.2 miles of proposed additions. Proposed route additions are summarized below in Table 8 and specific routes are listed in Table A-1 (Appendix A). To see an illustration of these proposed additions to the NFTS, refer to Map 32.

Changes to the NFTS – vehicle class: Objective Maintenance Levels would be reduced to ML 2 on 79.6 miles of roads currently managed as ML 3. This action would serve to increase the amount of NFTS miles available for use by non-highway legal motor vehicles and provide additional connectivity between riding loops for longer riding opportunities. In addition, 9.3 miles of ML 3 roads are proposed for motorized mixed use by both highway and non-highway legal vehicles for the same purpose. Additionally, six miles of roads that are currently closed to public motor vehicle use through Maintenance Level 1 designation will be converted to Maintenance Level 2 roads and managed as trails allowing all vehicle use. Changes to the NFTS are summarized below in Table 8, and listed in Table A-1 (Appendix A). These proposed changes to the existing NFTS are illustrated on Map 33 (Vehicle Class Changes) and Map 34 (Circuits and Loop Opportunities).

Changes to the NFTS – season of use: In addition to the 271 miles of seasonal restrictions as specified in the existing Forest Orders, an additional 375 miles would be seasonally restricted, totaling 646 miles. There are three categories of restrictions that would apply under this alternative. Map 31 identifies all seasonal restrictions proposed under Modified Alternative 5:

a. Winter Recreation: Use of motor vehicles would remain seasonally restricted on NFTS roads groomed for snowmobile and cross-country ski use during winter months. These 271 miles of NFTS roads would remain open to motor vehicle use from April 1 through December 25. In addition to groomed trails, 275 miles of other routes identified on the Lassen NF Winter Recreation Guide would become seasonally restricted during winter months (Table A-1, Appendix A and Table G-1, Appendix G). These include routes identified as un-groomed snowmobile trails; dedicated cross-country ski trails, and recommended cross-country ski trails during winter months. These combined 546 miles of roads would become open to motor vehicle use from April 1 through December 25. The additional miles of routes proposed for winter motor vehicle use restrictions are listed below in Table 8.

b. Wet Weather: Use of motor vehicles would become seasonally restricted on 88 miles of NFTS roads, to limit damage to roads from severe rutting due to motor vehicle operation during periods when road beds are water-saturated and easily impacted. These 88 miles would be open to motor vehicle use from May 1 to November 30. Roads with seasonal motor vehicle use restrictions during wet weather are listed in Table 8 below, Table A-1, Appendix A and Table G-1, Appendix G.

c. Hunting Access: Use of motor vehicles would be seasonally restricted on 12 miles of NFTS roads to provide non-motorized hiking opportunities near Susanville, except to allow access during the fall hunting season. These 12 miles of road would become open to motor vehicle use from August 1 through October 31. Routes designated for motor vehicle use only during the fall hunting season are summarized below in Table 8 and listed in Table A-1, Appendix A and Table G-1, Appendix G.

Amendments to the Forest Plan: One Non-significant Plan Amendment to the Lassen LRMP (1992) would be necessary under this alternative, to address the 0.10 miles of route 270326UC14 being added to the Deer Creek, Eligible Wild and Scenic River. Along with other wildlife that typically use Northern Sierra streams, Deer Creek has resident rainbow, as well as steelhead and spring-run Chinook salmon that migrate to and from the Pacific Ocean. The character of the area remains primitive and the lower section near Deer Creek Flats contains the historic Yahi-Yana Indian site known as Ishi Caves.

The Amendment will shift the eastern boundary of the “Wild” portion of Deer Creek Eligible Wild and Scenic River so that the 0.10 miles will now be in the “Scenic” portion rather than in the “Wild” portion of the Eligible Wild and Scenic River. The current boundary appears to be a mapping error. The intent when the original boundaries were drawn was to go around the end of the road and the associated dispersed campground. This Non-significant Forest Plan Amendment will allow continued use of this route and the associated dispersed recreation. Appendix E, Wild and Scenic Rivers Evaluation, Table E-2 of the LRMP displays Segment Number 4, a Scenic segment as being 2.5 miles in length; this adjustment would make the river segment 2.8 miles in length. Correspondingly, Segment Number 5, a Wild segment would be displayed as 9.5 miles in length instead of 10.0 miles (the LRMP rounded to the nearest 0.5 miles, so the actual value to begin with was 9.8 miles without rounding).

Table 8 displays a summary of the actions proposed in this alternative. A complete list of roads and trails to be added into the NFTS, including the vehicle class, if applicable, and seasonal use restrictions, can be found in Table A-1 (Appendix A).

Table 8 Modified Alternative 5 - Summary of Actions

Action Type		Action Proposed
1. Cross-country Travel		
Status of cross-country travel		Prohibited on 1,072,364 acres
2. Additions to the NFTS (Routes)[a]		**Miles**
Trails added (All vehicle classes)		45.7
Roads added (All vehicle classes)		10.3
Reason for restriction	**Open period**	**Miles**
Proposed additions winter recreation	Apri 1 to December 25	8.2
Proposed additions wet weather	May 1 to November 30	6.6
3. Changes to the Existing NFTS		
Vehicle Class Changes [a]		**Miles**
Allowing highway and non-highway vehicles (Mixed Use) to use the same roads through vehicle class changes.	System roads currently closed to motorized use by the public - to be designated as motorized trails (< 50" motorized trail)	6
	Roads currently managed to passenger car standards (ML 3 or 4 – highway legal vehicles only) that will be allowed to degrade to high clearance standards (ML2). These roads will then be designated for both highway and non-highway vehicles.	79.6
	Roads currently managed to passenger car standards (ML 3 or 4 - highway legal vehicles only) where the vehicle class will be changed to allow both highway legal and non-highway legal vehicles (mixed use - licensed drivers only)	9.3
New Seasonal Restrictions		
Reason for restriction	**Open period**	**Miles**
Winter recreation	Apri 1 to December 25	275
Wet weather	May 1 to November 30	88
Hunting	August 1 to October 31	12

[a]All routes added or changed to allow mixed use will be open to all forms of motorized vehicles; Source: GIS query October, 2009

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/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, trail, or area, the Responsible Official, in accordance

with 36 CFR 212.52(2) shall immediately close that road, trail or area to motor vehicle use until the Responsible Official determines that such adverse effects have been mitigated or eliminated and that measures have been implemented to prevent future reoccurrence.

A monitoring strategy should provide information that is (1) helpful for making effective management decisions in the future, and (2) feasible to implement. The monitoring strategy listed below identifies a number of measures that may lead to future monitoring or incorporate ongoing resource assessments. See Appendix D for more detail.

Water resources monitoring: Monitoring of water and soils will occur on a portion of proposed additions to the NFTS as roads or trails with drainage upgrades. Proposed additions to the NFTS with seasonal closures for wet weather use will be monitored according to E20 (BMPEP; Management of Roads during Wet Periods, Appendix I) for effectiveness of wet season closures per Region 5 protocols.

Soil Resources Monitoring: GYR monitoring will be implemented on all routes added as roads or motorized trails to the NFTS for which an erosion hazard rating of 'very high' or 'high' was designated based on soil surveys (Soil Resources Section) (Poff 2004).

Rare plant monitoring: Monitoring would occur in areas of the Forest where known occurrences of Sensitive and Special Interest (rare) plant sites have been identified along open routes. These areas have the greatest potential for adverse effects from the continued use of motor vehicles.

Noxious weed monitoring: Noxious weed occurrences for which mitigations are proposed would be monitored annually to assess treatment efficacy.

Cultural monitoring: Future work in support of the selected alternative is outlined in the Motorized Recreation Programmatic Agreement between Forest Service and the California State Historic Preservation Office (SHPO). Included in the agreement is development of a monitoring plan for at-risk historic sites in order to measure effects.

Road and Condition Monitoring: Monitor the condition of roads and trails as identified in Chapter Five of Land and Resource Management Plan (**LRMP**). A random sample of roads would be inventoried annually.

Recreation monitoring: The National Visitor Use Monitoring (NVUM) survey is replicated on Lassen NF at 5-year intervals, most current survey will begin October 1, 2009 (Fiscal Year 2010). Additionally, routes that access dispersed recreation sites on the Eagle Lake District will be visually monitored annually for three years.

Mitigation Measures

Mitigation measures required for motor vehicle routes proposed for addition to the NFTS and changes to the NFTS are contained in Appendix E. Mitigations will be performed for Botany, Cultural Resources, Recreation, Engineering, Watershed and Soils Resources. See Table E-1 for specific road/route mitigations. Mitigation measures fall into the following general categories:

Botany: Mitigation measures in this category include items such as protection of sensitive and special interest plants and habitats as well as limiting the spread of invasive species.

Cultural: Mitigation measures in this category include activities needed to protect historic and prehistoric sites adjacent to routes being added to the NFTS.

Recreation: Mitigation measures in this category include items such as placing signs and/or barriers to keep users on designated routes.

Engineering: Mitigation measures in this category include items such as encroachment rights-of-way and signing. All ML3 roads proposed for motorized mixed use under any of the alternatives will have signing installed for safety. Roads proposed for Objective Maintenance Level changes from ML3 to 2 will require, at a minimum, an engineering analysis of motorized mixed use before the operational maintenance level and allowed vehicle class are changed to allow OHV use.

Watershed: Mitigation measures include items such as placing drainage control structures (i.e. waterbars and/or rolling dips) and hardening surfaces to minimize erosion; protect water quality and aquatic resources. Certain alternatives add a seasonal closure to specific routes to protect water quality and minimize erosion.

2.4 Comparison of Alternatives

Chapter 3 describes the environmental consequences of each alternative in detail. This section of Chapter 2 compares the alternatives with a summary of key differences between the alternatives, a comparison of alternatives as they relate to purpose, need, and significant issues, and provides a summary of the effects analysis for all alternatives. Table 9 provides summary mileage comparisons of proposed additions, changes, and seasonal restrictions by each alternative.

Table 10 provides a relative comparison of how the alternatives meet the Purpose and Need for Action, the Issues raised in Public Scoping, and road and trail designation criteria in Subpart B of the Travel Management Rule 212.55(a,b). All of the action alternatives meet the purpose and need, address the issues and Travel Management Rule Subpart B. The No-action Alternative only meets the criteria for dispersed recreation and access.

Table 11 provides a comparison of alternatives rating each of the alternatives with regards to Purpose and Need for Action, the Issues raised in Public Scoping, route designation criteria in Subpart B of the Travel Management Rule. This Table shows the relative rating of each alternative. A rating of ‘1’ indicates the greatest potential negative impact to that resource or opportunity among all alternatives; a rating of ‘5’ indicates the least potential impact to that resource or opportunity. Ratings are provided as a brief overview of relative effects based on analyses conducted for each resource. Ratings do not, however, indicate degrees of difference. For instance, Alternative 1 (allowing the continuation of cross-country travel) would perpetuate significant impacts on natural

resources, whereas the differences between the four action alternatives (2-5) are much smaller and subject to mitigation. The Table has been broken into two parts, the opportunities are summarized in the top half of the Table and the resource effects are summarized in the bottom half. An overall rating is provided that combines the two sections.

Table 9 Summary Comparison of Alternatives

Action Type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod. Alt 5
1. Cross-country Travel		**Action**					
Status of cross-country travel		No change	Prohibited on 1,072,440 acres	Prohibited on 1,072,488 acres	Prohibited on 1,072,464 acres	Prohibited on 1,072,345 acres	Prohibited on 1,072,364 acres
2. Additions to the NFTS (Routes)a		**Miles**					
Trails added (All vehicle classes)		0	5	0	0	43	45.7
Roads added (All vehicle classes)		0	16	0	10	10	10.3
Reason for restriction	**Open period**	**Miles**					
Proposed Additions Winter recreation	April 1 to December 25	0	4.0	0	6.7	6.7	8.2
Proposed Additions Wet weather	May 1 to November 30	0	0.8	0	0.73	6.6	6.6
3. Changes to the Existing NFTS							
Vehicle Class Changes [a]		**Miles**					
Allowing highway and non-highway vehicles (Mixed Use) to use the same roads through vehicle class changes. [a]	System roads currently closed to motorized use by the public - to be designated as motorized trails (< 50" motorized trail)	0	0	0	0	6	6
	Roads currently managed to passenger car standards (ML 3 or 4 – highway legal vehicles only) that will be allowed to degrade to high clearance standards (ML2). These roads will then be designated for both highway and non-highway vehicles.	0	0	0	79	79	79.6
	Roads currently managed to passenger car standards (ML 3 or 4 - highway legal vehicles only) where the vehicle class will be changed to allow both highway legal and non-highway legal vehicles (mixed use - licensed drivers only)	0	13	0	0	51	9.3

Action Type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod. Alt 5
New Seasonal Restrictions							
Reason for restriction	**Open period**	**Miles**					
NFTS Winter recreation	April 1 to December 25	0	0	0	275	275	275
NFTS Wet weather	May 1 to November 30	0	0	0	80	88	88
NFTS Hunting	August 1 to October 31	0	0	0	12	12	12

[a]All routes added or changed to allow mixed use will be open to all forms of motorized vehicles; Source: GIS query March 22, 2009.

Table 10 Comparison of how the alternatives meet the Purpose and Need for Action, the Issues raised in Public Scoping, and route designation criteria in Subpart B of the Travel Management Rule

Source[a]	Criteria	Alt[b] 1	Alt 2	Alt 3	Alt 4	Alt 5 and Mod. Alt 5
PN 1	Regulate unmanaged cross-country motor vehicle travel by the public	0	+	+	+	+
PN 2a	Provide motor vehicle access to dispersed recreation opportunities	+	+	+	+	+
PN 2b	Provide a diversity of motorized recreation opportunities	+	+	+	+	+
PN 2c	Reduce cost associated with maintenance of the NFTS[c]	0	+	+	+	+
Issue 1	Avoid unreasonable restrictions to motorized recreation use	+	+	+	+	+
Issue 2	Reduce costs of administration and maintenance	0	+	+	+	+
TR(a)1	Impacts to natural and cultural resources.	0	+	+	+	+
TR(a)2	Public safety	0	+	+	+	+
TR(a)3	Provide for recreational opportunities	+	+	+	+	+
TR(a)4	Access to public and private lands.	+	+	+	+	+
TR(a)5	Conflicts among uses of National Forest System lands.	0	+	+	+	+
TR(a)6	Need for maintenance and administration of roads, trails and areas that would arise if the uses under consideration are designated.	0	+	+	+	+
TR(b)1	Minimize damage to soil, watershed, vegetation, and other forest resources.	0	+	+	+	+
TR(b)2	Minimize harassment of wildlife and significant disruption of wildlife habitat	0	+	+	+	+
TR(b)3	Minimize conflicts between motor vehicles and existing or proposed recreational uses of NFS lands or neighboring Federal lands.	0	+	+	+	+
TR(b)4	Conflicts among different classes of motor vehicle uses on NFS lands or neighboring Federal lands.	0	+	+	+	+
TR(b)5	Ensure motor vehicle use is compatible with existing conditions in populated areas, taking into account sound, emissions, and other factors	0	+	+	+	+

[a]**PN**=Purpose and Need, Issues are from public scoping of the Notice of Intent, and **TR**=Travel Rule, Subpart B (specific criteria for designating trails)212.5 (a-b); [b]A "+" indicates the Alternative meets the criterion to some extent and a "0" indicates the Alternative does not meet the criterion.

Table 11 Comparison of Alternatives with regards to Purpose and Need for Action, the Issues raised in Public Scoping, and route designation criteria in Subpart B of the Travel Management Rule.

Resource Area	Ratings for Alternatives, averaged across indicators					
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod Alt 5
Purpose and Need/Issue Measures						
Prohibition on Cross-Country Travel[PN1]	1	5	5	5	5	5
Motorized Dispersed Recreation Access[PN2a]	5	2	1	3	4	4
Diversity of Motorized Recreation Opportunities[PN2b]	5	2	1	3	4	4
Need for maintenance and administration of roads, trails and areas that would arise if the uses under consideration are designated.[PN2c, I2, TR(a)6,]	1	2	1	3	5	5
Restriction of Access to Motorized Recreation[I1]	5	4	1	3	4	4
Conflicts between motor vehicles and existing or proposed recreational uses of NFS lands or neighboring Federal lands. (Non-motorized Recreation)[TR(b)3]	1	3	5	4	2	2
Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factors.[TR(b)5]	1	3	5	4	2	2
Provide Public Safety[TR(a)2]	1	2	5	4	3	4
Effects to Resources						
Cultural Resources[TR(a)1]	1	4	5	4	3	3
Botanical Resources[TR(b)1]	3	4	5	4	4	4
Soil Resources[TR(b)1]	2	4	5	4	4	4
Hydrologic Resources[TR(b)1]	2	4	4	5	4	4
Noxious Weeds[TR(b)1]	1	4	5	4	4	4
Aquatic Biota[TR(b)2]	1	4	5	4	4	4
Wildlife Resources[TR(b)2]	1	4	5	4	4	4
Visual Resources	1	4	5	4	4	4
Air Quality	1	5	5	5	5	5
Overall Rating	**2**	**4**	**4**	**4**	**4**	**4**

Note: A rating of 5 indicates the alternative has the least impact for the specified resource; a rating of 1 indicates the alternative is the most impact for specified resource, a rating of 3 indicates that the effect is neutral. The overall rating was averaged across all of the values in each alternative.

2.5 Alternatives Considered but Eliminated from Detailed Study

Public comments received in response to the Proposed Action contained issues and/or provided suggestions for alternative methods of achieving the purpose and need. The analysis of public comments to the Proposed Action is contained in the Public Scoping Report included in the project record.

Federal agencies are required by the National Environmental Policy Act to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR § 1502.14). All suggestions were considered and discussed during the development of alternatives to the agency's Proposed Action.

The Responsible Official recognized that alternatives may meet purpose and need to varying degrees and may meet one need and not the other need. Consequently, in order to help sort those alternatives that substantially meet the purpose and need for action from those alternatives that do not, the Responsible Official established measures as a means to differentiate between the two. These measures were designed to help compare alternatives in order to separate alternatives to be fully analyzed in detail from those that would be dropped from detailed study.

These measures include:

- Regulation of unmanaged motor vehicle use
- Prohibition of cross-country travel
- Providing for public safety
- Addressing cultural and natural resource concerns
- Providing for dispersed recreational opportunities
- Providing for a diversity of motorized recreational experiences

Alternatives 6 through 13 were developed in response to public comments to the Proposed Action. Only Alternatives 6 and 7 contained enough detail to allow these alternatives to be mapped and quantified using GIS, so that the above measures could be assessed. Maps and tables of roads for Alternatives 6 and 7 are in the project record. Alternatives 8 through 13 were developed based on general concepts provided by the public. These alternatives did not have data that could be mapped and quantified using GIS, therefore no maps developed. Rationale for eliminating alternatives from detailed study is contained in the discussion of each alternative below.

Alternative 6

Alternative 6 reflects an alternative proposed by the Recreation Outdoor Coalition. This alternative was refined with comments about specific routes gathered at public meetings attended by members Recreation Outdoor Coalition, the Blue Ribbon Coalition, and other interested individuals who requested high levels of vehicle recreation opportunities and

access across the Lassen National Forest. In this alternative, motor vehicle travel off designated NFTS roads and NFTS trails would be prohibited by the public except as allowed by permit or other authorization. A total of 126 miles of unauthorized route segments would be added to the NFTS as ML 2 roads (20 miles) or as motorized NFTS trails (106 miles). Vehicle class changes to the existing NFTS would occur on a total of 330 miles. Of these 323 miles of ML 3 and 4 would be proposed for motorized mixed use by both highway- and non-highway-legal motor vehicles. Five miles of routes currently classified as ML 1 roads and not open for motor vehicle use would be changed to motorized NFTS trails as trails. In addition, two miles of non-motorized trail (foot trail) would be converted to motorized NFTS trails.

Many of the proposed additions to the NFTS presented in this alternative had wildlife, botany, soil, watershed and aquatic resource concerns, as well as private land access issues and public safety. Those proposed additions that did not have resource issues were brought forward in Alternative 5 and Modified 5. These criteria were established for consideration by the Travel Management Rule. Alternative 6 does not provide for public safety, because it includes a large number of ML 3 and 4 road miles proposed for motorized mixed use that are greater than 3 miles in length. Segments greater than 3 miles in length are considered highways for the purposes of the California Vehicle Code and therefore prohibited from mixed use. The Forest has chosen to abide by this code. The ML 3 and ML 4 that meet this code restriction that the Forest felt would most benefit recreation were added to Alternatives 4 and 5. Modified 5 is a refined version of Alternative 5, in large part because so many of the routes that were under 3 mile and felt to present a recreation opportunity for users were deemed in the end to be unsafe. The commenter was very concerned with loop opportunities and Alternative 4, 5 and Modified 5 were designed with that in mind and analyzed in detail. All of the proposed additions to the NFTS that did not cause resource concerns were added to Alternative 5.

Recreation Outdoor Coalition commented on the DEIS with various additional suggests for a variety of aspects of this alternative with the particular intent to expand recreational use by OHV users. The Lassen County Board of Supervisors supported ROCs suggestion. They suggested that big game retrieval with OHVs be allowed. The Forest is already heavily roaded, with ample opportunity to retrieve game without traveling cross-county. Therefore, this nuance was not considered in detail. Additionally, there was the desire to use OHVs for fuel wood gathering other than with a special use permits, a similar logic train applies, the Forest is heavily roaded and there should not be a need to go off road to gather fuel wood. ROC also requested widespread mixed use of ML3-5 roads. Each of the routes proposed for mixed use were looked at closely by the engineering staff some of the roads were part of a well established Back Country Byway others were County roads, had private access issues with rights-of-way, etc. Most of the suggestions were considered in more detail in the response to comments in Appendix J.

Alternative 7

Alternative 7 was developed in response to comments from the public calling for expansion of quiet, non-motorized recreation opportunities and a greater emphasis on resource protection, by reducing the miles of NFTS routes on Lassen NF. Such comments were submitted by the Wilderness Society, the Pacific Crest Trail Association, Sierra Club, Trout Unlimited and many more. This alternative would prohibit cross-country travel, add no routes to the NFTS and proposes vehicle class changes would decommission 995 miles of ML2 and ML 3-5 roads. Alternative 3 adds no routes to the NFTS and prohibits cross-country travel. Motor vehicle use would be limited to the NFTS. Decommissioning on this scale at this time was not considered in detail because it would involve a large amount of ground disturbing activity. Decommissioning is best addressed on a project by project level to assure that all of the resource issues are addressed adequately (See Alternative 10). This alternative does not meet the purpose and need for motorized access because it sharply curtailed the number of existing roads and trails that would be available to recreation users and adds no additional routes. Although dispersed camping could continue along remaining NFTS routes and non-motorized access would continue, overall access would decrease from its current level. This alternative does not meet the purpose and need for providing a diversity of recreation opportunities due to no route additions and decommissioning 995 miles.

Alternative 8

This alternative was developed to provide for designated areas where motorized and non-motorized activities do not overlap, such as areas selected specifically for motorized and non-motorized recreational use, or for event-only use.

Banning cross-country travel in any of the action alternatives will create large areas of non-motorized use and some areas, such as wilderness, already preclude motorized vehicle use. This alternative does not meet the purpose and need for motorized access because it sharply curtailed the number of existing roads and trails that would be available to recreation users and adds no additional routes. Although dispersed camping could continue along remaining NFTS routes and non-motorized access would continue, overall access for motor vehicle use would decrease significantly from its current level. This alternative does not meet the purpose and need for providing a diversity of recreation opportunities due to no route additions and sharply curtailing access in the National Forest.

Alternative 9

This alternative was designed to designate areas for cross-country travel to facilitate big game retrieval, since cross-country travel is prohibited under each action alternative.

Designating areas across the entire Lassen NF for big game retrieval would be unmanageable. Alternatives 4 and 5 do provide for motorized hunting and camping access

during hunting season on 12 miles of roads otherwise seasonally closed for non-motorized recreation opportunities near Susanville. This access was in response to specific public comments. The LNF is considered to be a heavily roaded Forest, providing ample opportunity to retrieve game without traveling cross-country. Region 5 developed guidance regarding parking and dispersed camping that precludes big game retrieval as part of designations and recommended a process for careful consideration by the Responsible Official to make those decisions as appropriate on their individual travel management actions. On the LNF the decision was made to not allow cross-country motorized vehicle travel for the purposes of retrieving big game. Therefore, designating areas for cross-country travel for big game retrieval was not identified as part of the purpose and need for this project and is outside the scope of this project. Therefore, Alternative 9 was eliminated from detailed study.

Alternative 10

This alternative was designed to decommission and close roads, using barricades, to reduce environmental impacts or to restore and enhance forest conditions.

Routes were dropped from consideration if ground-disturbing activities such as road reconstruction were needed to bring them to a safe or environmentally sustainable condition. Decommissioning and/or closing roads usually involves ground-disturbing activities outside the road prism such as re-contouring slopes or excavating dirt or rocks from elsewhere to block access. Such activities typically require site-specific analyses and public input. Decisions to decommission roads require consideration of many other management activities and objectives, such as forest health and fuels management, non-motorized recreation access, which are not part of this proposal at this time. As part of Motorized Travel Management analysis, the Lassen NF completed a Travel Analysis Process (TAP), which included working with the public to determine whether any unauthorized routes should be proposed for addition to the NFTS. The TAP included a number of routes which could be considered for decommissioning in future decisions on Lassen NF, at the discretion of the Responsible Official. Since road decommissioning was not identified as part of the purpose and need for this project, Alternative 10 was eliminated from detailed study.

Alternative 11

The California Office of the Environmental Protection Agency requested that the Lassen NF expand the scope of our action to consider additional seasonal and permanent closures of selected NFTS roads and trails to reduce known resource impacts and to reduce maintenance needs. They suggested we do this by including Subpart A of the Travel Management Rule in our planning process and fully incorporating the Roads Analysis Process (RAP) and Travel Analysis Process (TAP).

The travel management regulations comprise three parts: Subpart A – Administration of the Forest Transportation System; Subpart B - Designation of Roads, Trails, and Areas for Motor Vehicle Use; and Subpart C – Use by Over-Snow Vehicles. The focus of the current proposal is the implementation of the prohibition on cross country travel and the designation of a system of roads, trails, and areas for motor vehicle use as required under Subpart B. The Forest Service is fully committed to implementing the travel management regulations. However, there is no requirement that the agency implement Subpart A as a precondition to, or a part of, the current proposed action. The Lassen National Forest decided to implement Subpart B because:

It believes the greatest urgency lies in prohibiting cross country travel and establishing a designated system of roads, trails, and areas for motor vehicle use. See the discussion of Subpart B in the Federal Register, Volume 70, No. 216, at 68264-65 and in Chapter 1 of the FEIS. In 2006, the Chief of the Forest Service directed the Lassen National Forest to complete the designation of roads, trails, and areas on a motor vehicle use map as required by Subpart B.

The prohibition of cross country travel and the clear identification of roads, trails, and areas for motor vehicle use will protect forest resources and improve management of motor vehicle use on the Lassen National Forest. The permanent prohibition of motor vehicle travel off of designated roads, trails, and areas (36 CFR 261.13) will also aid enforcement by substituting a regulatory prohibition for closure orders and by providing a motor vehicle use map to the public supplemented by signage. However, this prohibition cannot take effect until designated roads, trails and areas are identified on a motor vehicle use map. Implementing the prohibition without undertaking an analysis of unauthorized routes would cause potentially significant impacts on recreational access to the Forest, because many unauthorized routes have been used by the public for years to access key recreation destinations or because they provide significant recreation experiences.

Subpart A only addresses NFTS roads. However, having a designated system of roads and trails in place prior to undertaking Subpart A of the regulations will allow the Forest to consider the administration of the transportation system as a functioning whole. The current proposal to add unauthorized routes to the transportation system, and prohibit the use of those that are not, may change use patterns on existing NFTS roads. The need for some NFTS roads may increase as motor vehicle use on nearby unauthorized routes is prohibited; conversely, some NFTS roads may no longer be needed for public motor vehicle use as newly designated routes provide access.

The Forest does not “decommission” routes that have no official status, but may undertake work to speed their rehabilitation. The ban on cross country travel will facilitate the natural recovery of unauthorized routes that are not added to the NFTS. Designations of roads, trails, and areas are not permanent. Unforeseen environmental impacts, changes in

public demand, travel analysis, and monitoring may lead the responsible official to revise designations under 36 CFR 212.54.

Alternative 12

This alternative was proposed by the public during scoping, to increase the number of riding areas available for OHV use.

As stated in the NOI and Chapter 1, Purpose and Need, this project was established with a purpose and need for the Forest Service to manage motor vehicle travel, and put an end to including unauthorized route proliferation. Although the Final Travel Management Rule allows for the designation of riding areas, the Lassen NF lacked the time and specialist resources to individually study proposed riding areas. Potential resource damage in these proposed areas on Lassen NF are sufficient that riding areas could not be added, without more extensive planning, and remain consistent with the Travel Management Rule's stipulation to consider impacts. In addition, the proposed alternatives provide more than 2,600 miles of OHV riding opportunity, which was judged currently adequate for the OHV use documented by Lassen NF National Visitor Use Monitoring (NVUM) data (USDA FS 2006b).

Alternative 13

This alternative was proposed by the Blue Ribbon Coalition, and is comprised of a number of suggested alternatives, which follow below. Rather than consider each of these suggestions as individual alternatives, each suggestion is considered individually and briefly addressed as a component of Alternative 13. This alternative proposes to designate, at a minimum, all of the system or facility roads and trails receiving current OHV use unless the individual route is causing a "considerable adverse effect." Designate as many as possible of the important and historic user-created routes identified by the public. If a considerable adverse effect is found, review for mitigation (reroute, maintenance, closure, etc.). Focus on closures of redundant routes or routes causing a considerable adverse effect or routes that have little recreational value. Designate all historic access routes which Lassen NF has spent California OHV division funding ("Green Sticker Grant Funds") on for OHV recreation use or where NEPA decisions approved OHV use on said routes. Review existing ML 3 through Maintenance Level 5 (ML 5) roads and designate appropriate roads as motorized mixed use based on updated legal or administrative interpretation of the California Vehicle Code, Section 38001. Such mixed-use roads should act as connectors between various trail systems and staging areas or offer unique recreational or scenic opportunities to OHV users. Designate several "high-use areas" where use is limited to existing routes. Such areas could be appropriate areas for concentrated All-Terrain Vehicle (**ATV**) or motorcycle use. Review proposed routes and so-called user-created routes submitted by local OHV recreation enthusiasts. Focus on those routes that are legal and have important historic

value or act as connectors between various trails and staging areas. Plan for dispersed camping/game retrieval using the 50 to 300 ft. standard or designate historic camping areas for said use. If needed, develop and implement a rainfall-based wet weather closure plan similar to other rainfall-based closure plans on other National Forests. Avoid long-period Forestwide closures.

Alternative 1 (No-action) incorporates elements from this suggestion to designate a maximum system of routes. The action alternatives were generated in response to public comments. Most unauthorized routes dropped from consideration for additions to the NFTS were redundant routes, routes causing resource damage, or ones having little recreational value.

Alternatives 2, 4, and 5 include and would designate the two motorized NFTS trails, located outside of the High Lakes and Front Country areas of Lassen NF, where “green sticker” funding may have been used.

Alternatives 1 through 5 allow motorized mixed use on ML 2 roads. Alternatives 2, 4, and 5 would also incorporate some motorized mixed use on short segments of ML 3 and 4 roads that provide connectivity of OHV riding loops.

Designating high-use areas where use is limited to existing routes would be done through separate NEPA planning processes, such as for the High Lakes and Front Country areas of Lassen NF (See Alternative 12).

Alternatives 2, 4, 5 and Modified 5 would designate some unauthorized routes for motorized mixed use as ML 2 roads or trails, and Alternatives 2 and 5 also incorporate motorized mixed use on ML 3 and 4 roads. These alternatives provide connector routes for motorized mixed use between existing loops thus creating longer routes. Although Alternative 1 - No-action allows motorized use on unauthorized routes, continuous-loop routes across the entire Forest, for non-highway-legal vehicles, are not possible due to the nature of existing highway-legal vehicle-only routes, such as on Almanor Ranger District. Alternatives 2, 4 and 5 represent an effort to create longer riding loops for non-highway-legal vehicles.

Alternatives 4 through Modified 5 include those routes pertaining to dispersed recreation and hunting access. As stated in Purpose and Need for this project (Chapter 1), “The Travel Management Rule, 36 CFR Part 212, provides policy for ending this trend of unauthorized route proliferation and managing the National Forest Transportation System in a sustainable manner through the designation of NFTS roads and motorized NFTS trails, and the prohibition of cross-country travel.” Using a ‘50- to 300-foot standard’ would not meet the purpose and need for managing cross-country travel. Big game retrieval is discussed further in Alternative 9.

Rainfall-tailored closures were deemed too difficult and expensive to monitor, implement, and communicate effectively to the public relative to the small anticipated benefit.

Alternative 14

Sierra Access Coalition described an alternative that would prohibit cross-country travel and add all unauthorized routes to the NFTS unless they would cause egregious resource damage. They asked that this alternative address a comprehensive plan for addressing resource damage that had occurred from past use of unauthorized routes and that ones causing the egregious damage are decommissioned. They also suggested that the alternative include a provision that cross country travel be allowed on a limited basis to access all dispersed camping areas with no distance limit from the road. Finally, they wanted to include open riding areas of 80+ acres within a 30 minute drive of all the major communities surrounding the Lassen National Forest.

The unauthorized routes that the Lassen included in the alternatives went through a systematic process of selection. The Travel Management Rule requires designation of those roads, trails, and areas that are open to motor vehicle use, but also lists criteria to consider in route selection (See Chapter 1). Prior to the release of the DEIS, the LNF received comments on approximately 768 miles of inventoried unauthorized routes on the Forest. Each route was analyzed by an Interdisciplinary Team. Considerations included safety, cost of maintaining the NFTS, recreational value, potential conflicts with administrative uses, conflicts with the Land Management Plan, presence of inventoried roadless areas, conflicts among user groups, resource impacts, and how readily resource impacts could be mitigated. Routes were brought forward and analyzed under one of the Alternatives in this Environmental Impact Statement if they were considered potentially appropriate given the balance of these considerations. In the planning process for this project, unauthorized routes requiring ground disturbing activities outside the existing road or trail prism, or those noncompliant with law, regulation and policy were not considered in the scope of this action.

The Forest does not “decommission” routes that have no official status, but may undertake work to speed their rehabilitation. The ban on cross country travel will facilitate the natural recovery of unauthorized routes that are not added to the NFTS. If some routes not added to the system are causing ongoing resource damage, they will be addressed on a case by case basis as part of routine Forest Administration or as part of future projects.

Regardless of the alternative selected, the Motor Vehicle Use Map will be revised annually. Routes not added to the NFTS in this action are not precluded from consideration in future actions, but many would require additional mitigation to address resource concerns in order to add them onto the NFTS. Collaboration with user groups to address resource concerns about particular unauthorized routes should help the Forest refine its NFTS to better meet user needs.

The Lassen has designated dispersed camping areas that are identified on the Lassen National Forest Visitor Map. Additionally, during the planning process, the Forest worked with the public to determine what unauthorized routes were being used to access dispersed recreation opportunities (including other camping areas). Alternatives vary in the numbers of

routes that provide access to these opportunities. The Fecreation Section of Chapter 3 analyzes these effects. Most camping areas have short spurs mapped as part of the inventory, and are proposed for addition to the Lassen National Forest Transportation System under one of the alternatives. Additional routes may be added in the future to access dispersed campsites and other dispersed opportunities that were not included in this analysis. Driving cross country for an unspecified distance to any camping area would not meet Purpose and Need # 1 to ban cross-country travel.

The Lassen recognizes that open riding areas are a recreational opportunity that is important to a segment of the OHV community. Indeed, the Forest plans to initiate planning for an open riding area near Potato Butte in the next 5 years. Open riding areas generally involve complex planning efforts and the Lassen NF has elected to address these needs in separate actions so that Subpart B Travel Management Rule can be implemented in a timely manner. Nothing in this action precludes the development of additional riding areas and we welcome collaboration with the riding public to indentify new opportunities.

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCE

3.1 Introduction

This chapter summarizes the social, economic, physical, and biological environments that are affected by the proposed action alternatives, and the effects on the environment that would result from implementation of any of the alternatives. This chapter also presents the scientific and analytical basis for comparison of the alternatives presented in Chapter 2: Alternatives.

The "Affected Environment" section under each resource topic describes the existing, or baseline, condition against which environmental effects were evaluated, from which progress toward the desired condition can be measured. Environmental consequences form the scientific and analytical bases for comparison of alternatives through compliance with standards set forth in the Forest Plan. The environmental consequences discussion centers on direct, indirect, and cumulative effects. Effects can be neutral, beneficial, or adverse. The "Irreversible and Irretrievable Commitments of Resources" section is located at the end of this chapter.

Direct and Indirect Effects

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 but occur later in time or further removed in distance, but are still reasonably foreseeable.

The environmental consequences presented in Chapter 3 address the impacts of actions proposed under each alternative for Lassen NF. This effects analysis was done at the Forest scale. However, the effects findings in this chapter are based on site-specific analyses of the existing National Forest Transportation System (NFTS) with changes in vehicle class and/or season of use, and for additions to the NFTS. Each affected road or trail proposed in the alternatives was reviewed by resource specialists. Readers seeking information concerning the environmental effects associated with specific roads and trails that are not part of this FEIS are directed to the Project Record, where details concerning any mitigation measures or any other findings are documented. Appendix A provides a list of all of the proposed additions and changes to the NFTS. Appendix E provides a list of the season of use changes to the NFTS. A summary of GIS layers, data source tables, and general assumptions regarding modeling and methods incorporated in effects analysis can be found in Appendix B.

As described in Chapter 2, for ease of documentation and understanding, the effects of the alternatives are described separately for three distinct actions. The combination of these

distinct actions is then added to the on-going and reasonably foreseeable actions in the cumulative effects analysis. The three distinct actions common to the action alternatives are:

Cross-country travel: All four action alternatives prohibit cross-country travel. The direct and indirect effects of this action are described generally in each alternative, considering both current conditions and projected trends. Both short- (1 year) and long-term (approximately 20 years) effects are presented.

Additions to the NFTS: Each alternative includes lists of roads and trails proposed for addition to the NFTS. As described above, the impacts of new facilities are addressed in sum total in this chapter, while impacts of individual routes are addressed in the Field Review Forms for Unauthorized Routes. 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.

Changes to the existing NFTS: The alternatives vary in changes to the existing NFTS in terms of vehicle class and/or season of use. Impacts caused by changes to vehicle class and season of use on the existing NFTS are described generally by alternative. For some impacts (e.g., public safety), impacts are also addressed by route. Where impacts associated with individual routes are warranted, the reader is directed to appendices or project files where these data are located.

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 as the project area. Past activities are considered part of the existing condition and are discussed in the “Affected Environment” and “Environmental Consequences” sections under each resource. Appendix C provides a list of on-going and reasonably foreseeable future actions that could potentially contribute to cumulative effects.

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 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 may ignore 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, 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." For these reasons, the analysis of past actions in this section is based on current environmental conditions.

Affected Environment Overview

Unmanaged OHV use has resulted in unplanned roads and trails, erosion, watershed and habitat degradation, and impacts to cultural resource sites. On some National Forest System (NFS) lands, long managed as open to cross-country motor vehicle travel, repeated use has resulted in unplanned and unauthorized roads and trails. Lassen NF currently has a combined motorized route mileage of approximately 4,647 miles. Of that number, 1,089 miles are unauthorized routes. Approximately 1,007 miles (92%) of unauthorized route are a result of past timber management, commercial grazing operations, and mineral extraction.

Approximately 53 miles (5%) of unauthorized routes are attributed to user-created cross-country travel and are often associated with destinations near water or riparian habitats. Lassen NF has established a road network, with well distributed arterial, collector, and local roads that support the timber management program. Temporary roads are generally built for product removal and then obliterated upon project completion. A review of recent past and present vegetation management environmental reports indicate that timber harvest levels on Lassen NF would have a net change of (-)0.03 miles in the Forest Transportation System for every million board feet (**MMBF**) of timber harvested. If Lassen NF has an annual planned harvest of 170 MMBF over the next decade as projected in the SNFPA (USDA FS PSW Region 2004: 319), then there would be a net reduction of 5.1 miles of road per year from the NFTS; a road decommissioning rate of 0.5 percent on temporary or unauthorized roads. This reduction is based on the incorporation of contract requirements to decommission temporary roads upon completion of a timber sale, as well as watershed and wildlife habitat restoration efforts using Knutson–Vandenberg Act (KV) funds. Given the above information,

route proliferation may be static or slightly decreasing. A detailed description of the current road network is provided in the Engineering Resources section of this chapter.

Generally, route miles and densities are highest across the Modoc Plateau, in the north central portion of Lassen NF on Hat Creek Ranger District. Other high density areas are found in the northeastern portion of Lassen NF on Eagle Lake Ranger District. These areas have relatively gentle terrain and are predominately eastside pine forest interspersed with eastside mixed conifer on north facing slopes and ridge tops, as well as bitterbrush-sagebrush shrub lands in the valleys. The areas of gentle terrain and high road density reflect the history of active Forest management and silvicultural practices. This peak in historical growth of the road network found on Lassen NF is typical of other National Forests. Road analysts believe that road density patterns are now beginning to decline on NFS lands as National Forests begin to do more active ecological restoration, habitat protection, and comprehensive transportation planning (Forman et al. 2002).

Assumptions and Limitations

The following assumptions and limitations were applied in the effects analysis in each section:

- This project is not creating a new disturbance on the landscape, as the unauthorized routes already exist on the landscape.
- No NEPA decision is necessary to continue use of the NFTS (e.g., OHV and transportation) as currently managed under the No-action Alternative. These decisions were made previously.
- User-created roads, trails and areas are not NFTS facilities. They are unauthorized. Proposals to add these to the NFTS require a NEPA decision.
- Temporary roads and trails built to support emergency operations or temporarily authorized in association with contracts, permits, or leases are not necessarily intended for public use. Generally, they are not NFTS facilities and are unauthorized for public use. Any proposal to add these temporary routes to the NFTS would require a NEPA decision.
- Any unauthorized routes not included in the action alternatives are not precluded from consideration for addition to the NFTS in future travel management actions.
- Lassen NF would continue to make changes to the NFTS on an ‘as needed’ basis. It would also continue to make decisions about temporary roads or trails on an ‘as needed’ basis associated with contract, permit, lease, or other written authorization.
- 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 should not be part of the proposal (e.g., fuel wood permits, motorized SUP permits, mining activity, timber sales, etc.). Such actions are subject to separate NEPA analysis.

"Designation" of a route in the NFTS is an administrative act which does not trigger NEPA. Designation technically occurs with printing of the MVUM, which does not require NEPA.

For this project, the Federal action triggering NEPA is any change to current restrictions or prohibitions regarding motorized travel by the public (e.g., prohibiting cross-country travel, changing vehicle class or season of use, and any additions to or deletions from the NFTS).

Previous decisions on the NFTS do not need to be revisited to implement the Travel Management Rule or produce the MVUM. That is, the NFTS contains existing roads and motorized trails that either underwent NEPA or predate NEPA (NEPA 1969). Allowing continued motorized use of the facilities in the NFTS in accordance with existing laws and regulations does not require NEPA.

Dispersed recreation activities (i.e., activities that occur after the motor vehicle stops, such as camping, hunting, fishing, hiking, etc.) are not part of the scope of the proposed action. The action alternatives and the analysis focus on motor vehicle use.

Travel analysis is a pre-NEPA transportation planning exercise which informs travel management.

Setting road maintenance levels and changing maintenance levels are administrative and not subject to NEPA. However, changes in allowed vehicle class, season of use, access, and proposals to reconstruct facilities are subject to NEPA.

The NFTS would be maintained to standard and all additions or changes to the NFTS would meet standards prior to availability for public use and inclusion on the MVUM.

A change in maintenance level objective will not involve any ground disturbing activities. Although the road will weather over time, the maintenance interval would be the same as it is for any other ML2 road and therefore maintenance would address any resource problems that may arise, therefore a change in objective maintenance level will not have an effect on watershed condition.

Mixed use changes that do not involve a change in maintenance level will not affect resources since the change is purely administrative and does not involve any changes to conditions on the ground.

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. It is anticipated there will be a higher number of violations to the Travel Management Rule the first few years and the number of violations will decline as the users understand and comply with the rules.

Once the Motor Vehicle Use Map (MVUM) is published, the implementation of the established dedicated network of roads, trails, and areas 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.

For more information about law enforcement, see Appendix H.

Resource Reports

Each section in this chapter provides a summary of project specific reports, assessments, and/or input prepared by Forest Service specialists, that are incorporated by reference into this DEIS. The following reports or memoranda are incorporated by reference: Botanical Biological Assessment/Evaluation (BA/BE); Noxious Weed Risk Assessment; Aquatic Species BA/BE; Terrestrial Wildlife BA/BE; Management Indicator Species (MIS) Report for Aquatic Habitats; MIS Report for Terrestrial Habitats; Hydrology Report; Soils Report; and Cultural Resources Report. These reports or memoranda are part of the project record on file at the Forest Supervisor's Office in Susanville, California. Copies of these reports are available upon request by contacting the Public Services Staff Officer at (530) 257-2151.

Route Tables in Appendix A

As noted throughout the document, the tables in Appendix A list each route proposed for addition to the NFTS and identifies the alternative(s) under which the route is proposed, the type of vehicle(s) allowed, and the season when the route would be open. In addition, the tables in Appendix A identify any resource concerns and planned mitigation measures.

3.2 Transportation Facilities

Changes Between DEIS and FEIS

Safety analyses for proposed mixed use segments of ML3 and ML4 roads were completed and are incorporated into the FEIS. The section was restructured to better mirror the regional template for transportation and engineering. In addition, clarifying language was added throughout the section to better explain concepts and proposals. Finally, maintenance and other costs are restructured to better portray the effect on these for each of the alternatives.

Introduction

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. There are other roads and trails existing on the Forest that are not currently part of the NFTS Changes to NFTS must take into account the need to provide for both adequate public safety and adequate maintenance of any roads and trails that will be designated for wheeled motor vehicle use. The analysis in this section focuses primarily on these two features of the NFTS.

The goal of the NFTS is to provide public and administrative access to Lassen N. F. by providing a safe, economical, and efficient system of roads and trails, while minimizing effects to the local environment. Planning and providing for well-designed access enhances opportunities for public use and enjoyment of the forest.

The NFTS that currently serves motor vehicle users on Lassen NF consists of approximately 3,278 miles of NFS roads and approximately 57 miles of motorized NFS trails. An additional 1,060 miles of unauthorized routes exist upon the landscape. These routes are currently open and available for public use under a temporary forest order prohibiting cross-country travel and travel outside of existing, identified routes. This section primarily addresses the road network and access. See Chapter 3: Recreation Resources, for a detailed discussion of trails.

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

Travel Management Rule

On November 9, 2005, the Forest Service published a new regulation entitled, *Travel Management; Designated Routes and Areas for Motor Vehicle Use; Final Rule* (**Travel Management Rule**), which modified motor vehicle use direction for NFS lands under 36 CFR Sections 212, 251, 261, and eliminated 36 CFR Section 295. The rule provides guidance to the Forest Service on designation and management of motor vehicle use on

NFS lands, and requires formal designation of roads, trails, and areas open to motor vehicle use on each national forest and grassland (USDA FS 2005h).

Other Regulations

Other direction directly influencing road management includes Federal and State laws, the 1966 Memorandum of Understanding (**MOU**) between Federal Highways Administration (**FHWA**) and the Forest Service, Forest Service manuals and handbooks in the 7000 series, and Forest Plan direction.

Forest Service Manual Sections 2350 and 7700 contains agency policy for management of the National Forest Transportation System. Agency 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 for each trail or road and follow the direction in Forest Service Handbook (**FSH**) 2309.18, Trails Management Handbook (FSH 1991b), when developing, reconstructing, or maintaining trails.

The purpose for the trail or road sets the parameters for maintenance standards needed to meet user needs, resource protection and public safety. Forest Service Handbook 7709.59 describe the maintenance management system the Forest Service uses and the maintenance standards needed to meet road management objectives (RMO's) for the road system, with emphasis on public safety (FSH 2009b, 2009a). The California Vehicle Code (CVC) 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.

Regional Forester's letters, file code 7700/2350, dated 08/26/06, 06/20/07, 1/13/09, and 2/13/09 contain procedures national forests in the 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 (MMU - motorized mixed use).

In a 2009 Memorandum of Understanding (MOU) with the FHWA, the Forest Service agreed to manage a subset of NFTS roads defined as "public roads" (maintained for four wheel passenger car vehicles) as directed in FSM 7730.5 with a definition of "safety requirements" as directed in FSM 7733. These roads are maintained with a Forest Service schedule and frequency assigned as ML 3, 4, and 5. These roads are managed as highways in accordance with the CVC. The Forest Service and FHWA agree that while these NFTS roads are not "public roads" per se, as for example a deeded interstate highway is, most are "open to public travel." "Open to public travel" defines a NFTS road as available for use by the public, except during scheduled periods, extreme weather, or emergency conditions, and passable by four-wheeled standard passenger cars.

Within the context of annual funding (affordability), resource management activity, and priorities established by Congress and the Administration, the Forest Service endeavors to provide a safe experience for users traveling on NFS roads and trails. It is always the ultimate responsibility of users to drive safely and follow all applicable laws. The following publications specifically address the design of NFS roads and NFS trails:

AASHTO: Geometric Design of Very Low-Volume Local Roads (AASHTO 2001)

USDA Forest Service EM-7100-15: Sign and Poster Guidelines (USDA FS 2005d)

USDA Forest Service Forest Service Manual (**FSM**) 7700: Transportation System (FSM 2009b)

USDA Forest Service Forest Service Handbook (**FSH**) 7709.55: Transportation Planning Handbook (FSH 1992)

USDA Forest Service FSH 7709.56: Road Preconstruction Handbook (FSH 2003)

USDA Forest Service FSH 2309.18: Trails Management Handbook (FSH 1991b)

Effects Analysis Methodology

Transportation Specific Assumptions:

Any motor vehicle use authorized by State law is occurring on the NFTS unless there are forest-specific prohibitions.

Motor vehicle use by special use permit or other permitted activities are outside the scope of this proposal (fuel wood gathering, dispersed camping, motorized OHV events, recreation residences, mining activities, grazing, timber sales, etc.)

High-clearance vehicles (4WD, etc.), ATV and motorcycles represent the vehicle classes most likely to use motorized trails. Low clearance, highway-legal vehicles are not prohibited on motorized trails but are not as likely to use them.

Some maintenance costs will be incurred by the Forest Service for any route open to motor vehicle use by the public.

State laws pertaining to motor vehicle operators set the safety standards for drivers and other users of the NFTS.

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 effects on public safety

Transportation System Affordability - 36CFR212.55 requires consideration of the need for maintenance and administration of the designated NFTS. Costs for the NFTS address needed maintenance work that has not been completed for various reasons (deferred maintenance) and maintenance that should be performed routinely to maintain the facility at

its current standard and serviceability (annual maintenance). In addition there may be additional costs associated with proposed changes to the NFTS (implementation costs). These may include costs for improvements to unauthorized routes added to the NFTS, costs associated with addressing public safety when altering the use pattern on existing roads, and costs for seasonally closing routes to restrict motor vehicle use.

Specific Methodology

Approximately 4,400 segments comprising 1,089 miles of unauthorized routes currently exist on Lassen NF. During public feedback on the NOI, the public commented specifically on segments totaling 768 miles of unauthorized routes. These routes were analyzed for possible addition to the FTS in a separate Travel Analysis Process (TAP). An interdisciplinary team examined these route segments for resource risks and recreation opportunities. Team members reviewed the condition of each route and assessed its conformance with the standard and guideline indicators associated with their area of expertise. Resource area specialists used field investigation, GIS data review, and resource area road-logs/field reports to determine their recommendation for each route. Ultimately the forest inventory of unauthorized routes will be reduced by designating some routes as NFTS roads or NFTS motorized trails and decommissioning/rehabilitating the routes that are not selected for designation. The Route Designation process is the first step in accomplishing this goal.

A main consideration when designing and maintaining road systems is safety. Considerations for road use and design are based on modes of travel, amount and variety of use, geography, topography, soils, and weather conditions. Signs, gates, turnouts, surfacing, road widening, road realignment, speed limits, clearing, parallel routes for different modes of travel, and allowing only certain modes of travel (e.g., highway-legal vehicles, OHVs, non-motorized travel) are all ways to mitigate for safety.

The following safety sideboards have been developed to aid in determining feasibility of changing use on specific NFS roads, NFS trails, and Unauthorized Routes on the Lassen NF:

Changing roads managed and maintained for passenger cars to roads managed and maintained for high-clearance vehicles (i.e. ML3→ML2): This change may reduce the likelihood of speed-caused accidents between vehicles; however, it may include hazards to drivers from roadway rocks, wind-thrown trees and danger trees, access and travel time to and from medical treatment facilities, etc.

Roads managed and maintained for high-clearance vehicles changed to managed and maintained for passenger cars (i.e. ML2→ML3): Changes might affect public safety such as increased speeds, ensuring compliant MUTCD road signing, and educating drivers.

Roads changed to Motorized Trails: The use of non-highway-legal vehicles must consistent with the current Forest Plan and the Recreational Opportunity Spectrum (ROS) classification for the area.

Adding unauthorized routes to the NFTS: The route or system of routes added should provide for a quality recreational riding experience, be compatible with Forest Plan direction, and either add to or enhance the opportunities for motorized recreation use on the forest.

Motorized Mixed Use: The California Vehicle Code (CVC) requires that motor vehicles operated on public highways be highway-legal and be operated by licensed drivers. The CVC allows the operation of non highway-legal vehicles operated by unlicensed drivers on roughly graded forest roads and logging roads. The Lassen NF considers roads maintained for high-clearance vehicles (Forest Service maintenance schedule/level of ML 2) to be roughly graded. Operation of OHV's on these roads is consistent with State law. Roads maintained for passenger cars are managed more aggressively to achieve a higher road standard. Forest Service maintenance schedules of ML 3, ML 4, and ML 5 apply to these roads and they are not considered to be "roughly graded" or logging roads. Thus, roads managed in this fashion are considered highways in accordance with the State definition. Motorized mixed use is allowed on short (<3 mile in length) segments on these types of roads provided an engineering safety analysis supports mixed use.

Motorized Mixed Use

In the Travel Management Rule supplementary information, the agency acknowledged the potential need to mix highway-legal and non-highway-legal traffic on some Forest Service ML 3 and ML 4 roads, and directed evaluation of safety and engineering considerations for motorized mixed use. Engineering analyses reports are used to display consequences of these potential designations. The publication, Guidelines for Engineering Analysis of Motorized Mixed Use on National Forest System Roads (USDA FS 2005a) and the Forest Service Handbook (FSH 1992:Chapter 30) outline safety risk analysis procedures when considering authorizing motorized mixed use.

The Lassen NF conducted engineering analyses for motorized mixed use on certain Forest Service ML 3 and 4 road segments. Table G-3 in Appendix G – "Proposed Passenger Car Roads Analyzed for Motorized Mixed Use" is a record of the roads currently managed to high standard that were analyzed in this project to assess the feasibility of allowing use by both highway-legal and non highway-legal vehicles.
Often, these segments are on arterial and collector roads, and thus the main public access routes to the forest. Engineering analyses evaluated the probability of a crash and the severity of a crash.

The crash potential ratings were based on roadway factors, (e.g., driving speeds, closing speeds, emergency situation vehicle maneuvering zones - road shoulders-adjacent areas to road shoulders), surface type and condition, sight distance and vegetation encroachment, road alignment (horizontal and vertical curves), traffic volume and type, and whether operators are required to be licensed or certified.

Crash severity ratings were based on items such as roadside conditions (e.g., natural ground slopes, slope and height of embankments, and large unyielding roadside features), speed, and traffic types (i.e., the larger the differences in vehicle sizes, the greater the crash severity).

Lassen NF conducted engineering field review for motorized mixed use on approximately 85 miles of Forest Service ML 3-4 roads currently open to highway-legal vehicles. These analyses are documented as engineering reports, and will be used to inform Forest Supervisor decisions involving motorized mixed use.

Affected Environment and Environmental Consequences

Affected Environment

Development History and Current Need

The grade of terrain and its influence on ease of travel has affected the choice of travel paths historically and continues to be a primary influence today. The gentlest grades occur along rivers and streams with an average gradient of approximately two percent. Grade is the historical reason that game trails followed rivers and streams, which became indigenous peoples' trade trails and routes, which then became immigrant trails and wagon roads, and later became modern transportation routes such as railroad grades and forest roads. In the latter half of the 20th century, heavy construction and snow removal equipment were designed and built. This enabled the construction and maintenance of cut-and-fill roads, away from the gentle river grades and up the sides and ridges of the Cascade and Sierra Nevada Mountains.

Historical road access needs, such as for gold mining, livestock grazing and production, farm products transport, and timber transport, from forest areas ultimately to metropolitan centers, were the impetus for construction of the present forest, county, and state transportation systems that exist today. Recent surveys (2000-2005) conducted by Lassen NF indicate that the current primary use of the NFTS is to facilitate the economic extraction of timber products, which reduces concentrations of hazardous forest fuels, as directed by the Herger-Feinstein Quincy Library Group Forest Recovery Act (**HFQLG**). The secondary use of the NFTS is recreation activity participation, discussed in Chapter 3: Recreation Resources. The tertiary NFTS use is resource area management access and fire protection and suppression activities.

Access

The reduction of hazardous forest fuels under HFQLG, as discussed in Chapter 3: Forest Vegetation, requires an efficient road network for forest ingress, access, and egress (USDA FS 2003). Roads for direct project access may exist on either a short- or long-term basis, depending on immediate project needs and future administrative needs. Many terminal-type project roads are temporary and are decommissioned and rehabilitated once management activities are completed.

Livestock movement and access to forest products such as firewood similarly require an efficient road network, though on a much smaller scale. National Forest System Roads provide access to private in-holdings and research and development areas, including the three experimental forests on or adjacent to Lassen NF (e.g., Blacks and Swain Mountain, managed by the Pacific Southwest Research Station, and LaTour State Forest managed by the California Department of Forestry). In some instances permits are sometimes issued to individuals and companies for NFS road use to provide access to their approved activities. Finally, the Forest Service and other agencies, such as the California Department of Forestry and Fire Protection, Bureau of Land Management, California Department of Fish and Game, and the counties of Lassen, Shasta, Plumas, Modoc, Siskiyou, Butte, and Tehama, use NFTS roads administratively.

During project initiation (e.g., timber, livestock, or energy), the benefiting commercial operator may construct and maintain the roads needed to access the affected project area. This cooperative arrangement applies only during the construction and operational phases of the project. Many users are authorized to maintain or upgrade NFTS roads in this manner to accommodate their specific needs.

Recreation

This document section considers public access to recreational facilities and general forest areas for highway-legal motor vehicles. Forest access is critical for accommodating recreational uses. The NFTS serves two main types of recreation. One type is destination recreation; the roads provide access to a drop-off point where the recreational activity occurs, begins or becomes accessible by foot (such as a trailhead, scenic view, or fishing, picnic, or camping site). The other type is road-based recreation; when visitors use roads for hiking, biking, horseback riding, pleasure driving in highway-legal vehicles, motorcycling, ATV riding, snowmobiling, and cross-country skiing on groomed trails.

Within the realm of destination recreation access, another aspect of the road network that the Forest is working through with private timberland owners is that of road easement agreements. The NFTS road system is a seamless transportation network across the Forest landscape which encompasses public and private property. Road use agreements and easements are common, are utilized by both forest service and private timberland parties, and are beneficial in a myriad of ways including motorized recreation access. As the initial

MVUM – motor vehicle use map is created, and as future iterations are developed, the forest service, private companies, and the public will continue to develop a cooperative and comprehensive plan of OHV forest use that respects private land owners and their associated easement agreements.

A second analysis component of forest access is whether to authorize mixed vehicle classes of highway- and non-highway-legal vehicles to share certain NFTS roads open to public travel and maintained for passenger car traffic. California Vehicle Code prohibits non-highway-legal motor vehicle use on public roadways maintained for passenger cars, such as Forest Service ML 3–5 roads open to public travel.

Certain NFTS roads have seasonal or year-long use restrictions to protect resources. Some restrictions are directed at protecting the road infrastructure. Un-surfaced roads with soils prone to erosion can be damaged during spring precipitation events, and are prone to rutting during early fall snows. Other road access restrictions to specific geographical portions of the Forest provide an annual safe-zone for wildlife during mating-season/birthing season. Other biologically sensitive areas may be restricted during critical time-periods such as extreme fire danger during fire season.

The MVUM will identify legal motor vehicle uses on Lassen NF, addressing seasonal or yearlong resource protection motor vehicle restrictions. If needed, the Forest Supervisor may issue emergency or temporary forest orders restricting access to protect users and/or resources. As discussed above, such restrictions are commonly implemented to respond to high fire danger and fire suppression, high water, extreme weather conditions, and during eradication of forest pests.

According to Lassen Forest Recreation Use Surveys in 2000 and 2005 (USDA FS 2001a, 2006b), the demographics of drivers on mountain roads in Lassen NF have changed during the last 20 years. Today, many forest drivers are from urban and metropolitan areas, are unfamiliar with mountainous roads, and are therefore less aware of the risks common on different types of forest roads.

Technological advancements in the capabilities of vehicles used to travel forest roads have resulted in increases in the number and variety of vehicles on NFS roads. With these changes come associated safety concerns. Advancements in OHVs allow visitors to travel to more challenging areas with less operating skill than needed in the past. Today visitors driving standard passenger cars may encounter full-size four-wheel-drive vehicles, ATVs, motorcycles, mountain bikes, and/or large commercial trucks, all on the same road.

As described in preceding sections, the NFTS was developed primarily for timber removal, mining access, livestock grazing, and inter-community or intra-regional travel. The existing road network is an inherited system that was physically designed for industrial use by large and slow commercial vehicles. The recreational vehicles in use today did not exist when the roads were constructed. Therefore, some segments of the road network are being force-fitted to accept vehicles and uses they were not designed for (FSH 2003). In essence,

much of the road system was not originally designed to safely accommodate the many types of motor vehicles that are used today to access and travel through Lassen NF.

The mission of the agency has evolved during the past 25 years to include an increasing emphasis in motorized recreation. With this change in use of the transportation system, safety of the motoring public is a priority. The challenge is to keep users of the road system safe when they are no longer driving--for example--dual-sport 90cc motorcycles and surplus military Jeep 4x4 trucks, but are now riding motorcycles with 125 horsepower/1.5 feet of suspension and sport utility trucks that can drive off-road at 60+ MPH. Safety must be a principal factor to consider when deciding what types of motorized use to authorize, and where to authorize the various types of motorized use.

Seasonal of Use

Roughly surfaced roads located in soils prone to erosion can be damaged during wet weather, increasing the potential for rutting, deterioration of the road bed and sedimentation. Therefore, certain NFTS roads have seasonal restrictions to protect soil and water resources and the road infrastructure. Other restrictions limit disturbances to wildlife and other sensitive areas during critical nesting or migration periods.

The MVUM will identify legal motor vehicle uses on Lassen NF, including seasonal restrictions. If needed, the Forest Supervisor may also issue emergency forest orders restricting access to protect users and/or resources. Such restrictions are commonly imposed in response to high fire danger, ongoing fire suppression efforts, high water levels, and extreme weather conditions.

Road Network

Access to Lassen NF begins with two-lane state highways and interconnecting county two-lane roads. There are no U.S. or interstate highways within Lassen NF. State Highways 36, 44, and 299 are the primary east–west routes across Lassen NF. State Highways 89 and 32 are the primary north–south routes across Lassen NF. Due to the ease of access and overall demographic changes, such as population increases in the Sacramento, San Francisco Bay, and Reno areas, several resort-type seasonal-influx communities have grown rapidly along the Highway 36 corridor and along forest roads that connect to Highways 36, 44, and 89. These routes serve the local population for daily commutes and forest access, and are continually upgraded by the State (CALTRANS) to meet the increasing demand.

Numerous county roads are connected to the state highways. Many of these roads have been on the landscape since first constructed by European settlers. Some county roads lead directly into Lassen NF. Roads under county jurisdiction are usually designed to accommodate passenger cars, but may not always be graveled or hard-surfaced. Roads crossing NFS lands may fall under several jurisdictions. The roads located within the national forest are predominately under Forest Service jurisdiction (NFTS roads). However,

as noted above, the forest also contains interconnected county, state, and private roads. To keep track of the myriad of jurisdictional responsibilities, the forest maintains an Access Management/INFRA database inventory of all roads that cross the forest and their jurisdiction and maintenance responsibilities. National Forest Transportation System roads are necessary for the administration, utilization, and management of NFS lands. The counties, State, United States Department of Interior (**USDI**) Bureau of Land Management (**BLM**), and private landowners have received rights-of-way, or in some cases obtained jurisdiction, over some of the roads or road segments on NFS lands. Formal agreements of this nature are not affected by this project.

Functional Class

The NFTS roads are divided into three classes by function. These classes are arterials, collectors, and local roads. The road network can be compared to the structure of a tree. The arterial is akin to the trunk of a tree, the collectors are similar to the intermediate branches leading from the trunk, and the more numerous and less-developed local roads are similar in concept to the smallest branches of the tree.

Arterials are the main trunk roads, designed to handle higher volumes of traffic (ADT – average daily traffic for the NFTS as defined by FSM/FSH are much lower than FHWA low-volume traffic definition of under 400 vehicles per day) and to provide access to key areas of the forest. Some may connect a State highway, a forest community or major watershed drainage system to another. These roads are generally held to higher maintenance standards. Collectors are intermediate branch roads that collect traffic from local roads and connect local roads to arterials. Collectors vary in both volume of traffic and maintenance standard. Local roads are often terminal facilities and were established to service end-of-road needs such as camping, trailhead access and general forest access. Local roads are generally held to lower maintenance standards and receive the lowest volume of traffic. The bulk of the NFTS road network is comprised of local class roads followed by collectors and then arterials.

Administrative Roads

Administrative roads are, by definition, managed for administrative access to the forest by the agency. Maintenance levels for these roads may range from Forest Service ML 2–5, depending on operational needs. These roads may have specified access-related easements or reservations across private lands for Forest Service needs. Administrative roads may also be used by timber purchasers and for access to private land when expressly authorized by the agency. Administrative roads are generally not open to the public.

Unauthorized Routes

Referred to as “unauthorized” or “unclassified”, unauthorized routes are non-permitted roads and trails on NFS lands that are neither managed nor recognized by the Forest Service as

part of the NFTS. Field observations indicate that off-road recreation, including woodcutting and hunting/fishing access, has generated only a small portion of the unauthorized routes on Lassen NF. The majority of these unauthorized routes were originally established by the Forest Service to serve a short-term land management objective which was to be followed by an immediate or scheduled decommissioning of the road. This did not always occur as planned. Examples are former timber sale temporary roads, grazing allotment access routes, mining access routes, and land exchange areas that had previously been roaded and used by private owners.

Temporary timber sale roads are generally used for one season, and do not adhere to NFTS road engineering standards (grade, density compaction, drainage requirements). Temporary roads which were not decommissioned with the timber sale or associated vegetation management project become unauthorized routes and tend to be problematic as annual producers of sediment and agents of resource damage. These routes are commonly single- and two-track travel ways, nine feet wide or less, relatively short – perhaps less than one-quarter mile long – and/or overgrown with vegetation. Over the years, Ranger District efforts have worked through project NEPA protocol to decommission or rehabilitate many of these routes, especially in places of identified resource damage or sedimentation into impaired watersheds or anadramous fisheries.

Unauthorized routes are neither NFTS roads nor NFTS trails, and are not included in the forest transportation atlas. According to the current Lassen NF inventory and Unauthorized Route Travel Analysis (USDA FS PSW Region 2008c), there are currently 1,089 miles of unauthorized routes across the Lassen National Forest.

Access to private property in holdings may be served by duplicate roads/routes, including existing unauthorized routes. These routes may not be added and/or designated as reasonable access may already be provided over the designated NFTS system roads or permitted non-system routes. Commercial road-use permits are utilized for commercial use of a NFTS road and special-use permits may be used for the use of an unauthorized route. During the special-use period the route would not be considered “unauthorized”.

Maintenance of NFTS Roads - Maintenance Levels (ML)

NFS roads are planned, designed and constructed for different modes of travel. These planned modes of travel require an associated maintenance schedule and maintenance intensity which is determined by the planned use, (e.g. fuel reduction projects, recreation residence access), the road management objectives, and road design components, (e.g., design speeds, inter-visible turnouts), for each specific road.

The NFTS road system receives annual and scheduled maintenance with associated internal Forest Service Maintenance Level (ML) designations listed numerically as one through five (1–5) as shown in Table 12. Roads have an Objective ML, which indicates the long-term planned maintenance strategy for that road, and an Operational ML, which is the

current physical condition of the road. Operational and objective maintenance levels may or may not be the same for a given road. In this FEIS, maintenance levels listed for roads are their assigned Objective ML unless otherwise noted. A summary of road miles in each maintenance level is presented in Table 13.

The Lassen NF is relatively dry (basin and range) and flat (volcanic) topography that dominates the Eagle Lake and Hat Creek Ranger Districts with the exception of the Hat Creek Rim (strike-slip fault) and the Pit River channel. Roads on these Districts that receive annual maintenance and/or project pre-haul road maintenance tend to weather-out less and at a slower-rate of erosion and are typically at a higher operational level. This fact is reflected in a higher numerical operational road maintenance level than their assigned planned objective maintenance level.

On the Almanor Ranger District, the topography is quite varied, as is the geology (the confluence of the Cascade volcanic range with the Sierra granitic range). The associated mountainous terrain and terrenes are vertically variable with an associated increase in precipitation (snow and rain) and road weathering. The operational and objective maintenance levels are usually in agreement (e.g., an ML 2 looks like an ML 2, and an ML 3 will require regular maintenance to remain an ML 3).

Currently, NFTS roads are designed by Forest Service engineers and often constructed with the private capital of independent contractors. Just as in cities across this country, private developers use their capital to construct the city streets to enable access to home subdivisions and commercial sites/factories. Once the contractor builds the streets to designed engineering standards, cities are willing to take public ownership to maintain these streets, all of which allows the city to grow and prosper. The same public/private methodology is utilized to construct many roads on National Forests.

Maintenance Level 1 roads are managed for intermittent use and can be allowed to deteriorate and return to a more natural vegetative state. These roads can be put into service by being brought to an ML 2–5 standard during a timber sale or other intermittent project need, then later taken out of service and put back into long term “storage” and ML 1 status. The roads are kept in storage until a subsequent need arises. While in storage, they are an ML 1 category, which allows no motor vehicle access. Non-motorized access, such as horseback riding, bicycling and hiking, may occur on ML 1 roads while they are in storage, however, the Forest Service will generally not maintain these ML 1 roads for such uses.

Maintenance Level 2 roads are generally local and managed for relatively slow rates of speed with low speed design features (5-15 mph) and advised for travel by high-clearance vehicles only. Maintenance Level 2 roads are considered single-purpose roads. Traffic is normally light, usually consisting of administrative, permitted, dispersed recreation, or other specialized uses. These roads provide for the greatest extent of dispersed recreation access

on the forest and account for 2,568 miles, or 72 percent of the existing Lassen NFTS road network. Lassen NF completed a Travel Analysis on its ML 1-2 road system in April 2008.

Maintenance Level 3, 4, and 5 roads account for 710 miles of road on Lassen NF. These roads form the backbone arterial and collector system that enables relatively fast (25–55 mph) efficient transportation across the forest. The Forest completed a Roads Analysis on its ML 3–5 road system in July 2006 and it was accepted and signed by the Forest Supervisor in January 2007.

Table 12 National Forest System Road Maintenance Level (ML) Attributes on Lassen NF

Maintenance Level	Attributes
5	Subject to the requirements of the Highway Safety Act and Manual of Uniform Traffic Control Devices (MUTCD). Navigable/Passable by passenger car. Highest traffic volume and/or speeds. Typically connect to state and county roads. Bridges/Culverts provide drainage. Usually arterial and collector. May include some developed recreation roads. Usually paved or chip-sealed.
4	Subject to the requirements of the Highway Safety Act and Manual of Uniform Traffic Control Devices (MUTCD). Moderate traffic volume and speeds. Navigable/Passable by passenger car. Typically connect to county/state roads. Bridges/Culverts provide drainage. Usually collector or arterial. May include some developed recreation roads. Usually provide crushed-rock or volcanic cinder road surfacing.
3	Subject to the requirements of the Highway Safety Act and Manual of Uniform Traffic Control Devices (MUTCD). Moderate/low traffic volume. Navigable/Passable by passenger car. 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. May provide various road surfacing to include native soil, crushed rock, cinder.
2	Not subject to the requirements of the Highway Safety Act. Low traffic volume and moderate to low speeds. Navigable/Passable by high-clearance vehicles. Not maintained for passenger cars. Typically local roads. Typically connect to collectors and other local roads. Dips are the preferred drainage treatment, culverts common Surface smoothness is not a consideration.
1	Not subject to the requirements of the Highway Safety Act. Motor vehicle traffic is restricted, including administrative traffic. Physically blocked or entrance is disguised. Maintenance conducted to minimize resource impacts. Aside from a condition survey, no maintenance may be required if there is no likelihood of resource damage.

Source: USDA FS 2005b.

Annual and Deferred Maintenance Costs: Roads

Annual maintenance involves the regular, cyclical maintenance required to keep a road functioning in accordance with the assigned maintenance level. Annual maintenance needs for ML 2 roads average $2,094 per mile. Maintenance for these low standard roads typically involves addressing resource concerns, including drainage. User-comfort is not a consideration.

Table 13 Current Miles of National Forest System Roads

Maintenance Level	Miles
5	17
4	149
3	544
2	2,568
1	280

Source: Current INFRA database inventory. Note: Includes roads where right-of-way may cross non-NFS lands.

Annual maintenance needs for ML 3 roads average $12,806 per mile, and ML 4 roads average $15,915 per mile. Costs are higher because these roads tend to be wider, require a higher standard of maintenance (road number signing, sight-distance vegetation clearing, cleaning road drainage culverts, cleaning drainage catch basins, cleaning culvert outlets, road traffic signing, cleaning drainage ditches, surface blading and road shaping, aggregate replacement), and usually have smooth aggregate surfacing for passenger car vehicle use and comfort. Lassen NF completes an average of approximately 318 miles of ML 3+ road maintenance per year.

Deferred maintenance tasks are the cumulative total of all annual maintenance tasks that are not accomplished as needed or scheduled. Deferred maintenance costs for ML 3 and 4 roads currently average $45,738 to $82,957 per mile. If annual maintenance funds and accomplishments do not keep up with the required tasks, deferred maintenance backlogs continue to grow. Smaller tasks not accomplished over time may result in major reconstruction needs.

Annual and deferred maintenance costs reflect necessary expenditures to keep roads at the Road Management Objective (RMO) standard. Improvement costs are also necessary when Lassen NF needs to upgrade or enhance a road. These improvements include informational, regulatory or warning signs; aggregate surfacing or hardening of the road surface; adding turnouts; replacing old culverts with arch culverts to enhance fisheries; road widening; road realignments; and adding safety features such as guardrails, etc. Lassen NF also monitors road conditions and safety by conducting engineering analyses and road condition surveys.

Additional Maintenance of NFTS Roads/Access to – NFRTA (forest roads and trails act), Cooperative Road Rights of Way, Construction and Use Agreements, and In holdings.

The Forest Service implements the authority found in the NFRTA – National Forest Roads and Trails Act of October 13, 1964 as amended (16 USC 532-538, Pub. L. 88-657) and FSM 7705/7732 which provides that commercial users perform maintenance of roads and a variety of easements made necessary by their use.

Some NFS roads are cooperatively planned, designed and constructed for different modes of commercial and public travel. These planned modes of travel require an associated set of regional agreements with private landholders, implementation of an associated set of the CFR – Code of Federal Regulations, and an associated set of FSM - Forest Service Manuals and FSH - Forest Service Handbooks. These agreements are exempt from the MVUM – Motor Vehicle Use Map requirements.

A substantial amount of Lassen NFTS road maintenance (between 2001 – 2005 the Forest had prepared road maintenance sale packages on 575 miles of ML 3-5 roads) is accomplished annually in this manner.

Costs for Trail Maintenance

Fifty-seven miles of motorized NFS trails are included in the project area. Most of these trails are located on the Almanor RD. Motorized trails are typically managed in a “rougher is better” condition to provide users with a challenging 4x4 driving experience. Maintenance is therefore typically limited to addressing emerging or ongoing resource concerns. The only other basic maintenance on these trails is roadside brushing to accommodate planned vehicle traffic.

General costs for various types of motorized trail maintenance were derived from national USDA Forest Service Enterprise Team data for motorized trail maintenance, and the resulting costs per mile are listed below:

Light maintenance	$2,500/mile
Heavy maintenance	$6,000/mile
New construction	$6,000 – $25,000/mile

Maintenance of the motorized trail system is only one cost associated with the trails program. Other costs include planning, trail system design and construction, management, and volunteer program coordination, tracking, and reporting.

The annual forest budget includes an allocation specifically for the maintenance and operation of forest trails. Motorized NFS trails, however, are a very small component of the entire Lassen NF trail system. Table 14 shows the recent budget allocations received by the forest to accomplish work on all types of forest trails.

Table 14 Funding allocated to Lassen NF for trails construction and maintenance (CMTL) (all trails – motorized and non-motorized)

Fiscal Year	Amount Allocated
2007	$59,000
2008	$133,000
2009	$141,000

Source: Lassen National Forest Work Plan.

Unauthorized Routes

After the scoping period for this project, scoping comments went through a formal content analysis and the resulting report was utilized for a GIS-based roads analysis of the 768 miles of unauthorized routes for which the public provided specific comments. These routes were important components of the Forest ML 1-2 TAP and the associated data and recommendations can be found in the TAP document, which is included in the project analysis, file/planning record.

The rating data for Lassen NF unauthorized routes, was documented and includes interdisciplinary analyses and recommendations for specific route segments. Unauthorized routes considered for addition to the NFTS were examined on the ground and reviewed to ensure were needed, and are in good enough condition to be added to the NFTS as either an ML 2 road or a motorized NFTS trail. Table 13 shows the current miles of Lassen National Forest Transportation System roads by programmatic maintenance level. Although only ML 2 roads are available for OHV use, these currently represent 72% of the system's mileage.

Current projected deferred maintenance for roads on the Lassen National Forest for FY 2009 is $111,695,499. This figure can be used as an indicator of maintenance needs for the existing road system and how proposed changes would affect the deferred maintenance backlog.

Forestwide annual average maintenance costs per-mile by operational maintenance level (ML) were estimated as inTable 4. These costs estimates were applied across the NFTS to calculate the total maintenance expense associated with each alternative.

Table 15 Current Operational Maintenance Levels and Associated Annual Maintenance Costs/Mile

Operational Maintenance Level	Annual Maintenance Cost per Mile
1	$500
2	$2,094
3	$12,806
4	$15,915
5	$7,691
Motorized Trail	$2,600 - $6,000

Source: Current INFRA database inventory. Note: Includes roads where right-of-way may cross non-NFS lands.

Direct Costs

Each year, Lassen NF is responsible for maintaining its NFTS roads. Table 16 displays number of miles accomplished of ML 3+ for 2002–2006. Roads require various levels of maintenance and investment to remain functional. These roads have annual maintenance such as surface grading, ditch cleaning, culvert cleaning, dust abatement, gravel replacement, and roadside brushing/clearing. The NFTS roads also have deferred maintenance expenses, the amortized regular-maintenance which was not completed. If a road is scheduled for substantial road maintenance, or if it is delinquent, it is listed in the Forest Service infrastructure database known as INFRA, as a deferred maintenance item. Forest road maintenance tracking determines listing as planned or overdue.

Table 16 Road work accomplishments by year

Year	Road Maintenance ML 3+ (miles)
2002	483
2003	368
2004	325
2005	141
2006	275
5 Year Total	**1,592**
5 Year Average	**318**

Source: USDA FS PSW Region 2006d.

Lassen NF receives funding each year to cover costs of maintaining the NFTS, and for program support, such as transportation planning, transportation system design and construction, transportation management and operation, coordination with local counties, tracking, and reporting. Table 17 reflects the funding levels for the past five years in this funding category (CMRD). These allocations for 2008 are slightly higher than in 2007. Because the funding increase is offset by increased operating costs, the increase in 2008 is negligible. A flat to slightly decreasing funding trend is anticipated to continue at least through Fiscal Year 2012.

Table 17 CMRD funding – annual construction and maintenance of roads

Fiscal Year	Amount Allocated
2004	$938,000
2005	$1,255,000
2006	$870,100
2007	$889,800
2008	$1,089,000
5 Year Average	**$1,008,400**

Source: Lassen National Forest Financial Management Department.

Lassen NF has Road Use Agreements with each of the counties within its boundary. These agreements allow Lassen NF and counties to cooperatively share in maintenance and reconstruction of NFS roads and county roads. A limited amount of additional funding comes from commercial road use permits and deposit accounts from road users.

Other roads are maintained/funded under project work such as in hazardous forest fuels reduction treatments and timber sales. The type, location, and amount of project work varies from year to year. Certain roads are managed under the special use permit program, which can place maintenance responsibilities on the holder of the special use permit.

In addition to the above-mentioned long-term costs, there would also be an immediate implementation cost associated with the ML 3+ roads designated for motorized mixed use in this alternative. These motorized mixed use segments would cost approximately $3500-$5000 per segment for signage. Adding unauthorized routes to the system would also have a cost. Accounting for route identification signing, Forest transportation atlas updates, and obtaining necessary agreements for those routes within public road rights-of-way managed by other jurisdictions, an estimated implementation cost of approximately $3000 per mile would be associated with these additional routes. Once added to the system, these routes would also require maintenance and therefore contribute to the applicable annual and deferred maintenance expenses.

Environmental Consequences

Direct and Indirect Effects

Alternative 1– No action

Measurement Indicator 1 – Public Safety

The current Forest transportation system was designed to provide for administrative and public access to NFS lands. It was not specifically designed to provide non-highway-legal vehicle opportunities. If no action is taken, 2,568 miles of NFS roads remain available for non-highway-legal vehicles; however, the situation does not address improving safe access for these types of vehicles across the Forest. In addition, the unauthorized routes would not be managed or addressed, and any existing safety concerns with these routes and impacts to the adjacent managed system would continue to exist. Continued use of unmanaged routes would also likely have resource impacts requiring future rehabilitation efforts.

Measurement Indicator 2 – Transportation System Affordability

By not adding routes to the system, nor making any changes to the existing FTS, no additional costs would be incurred associated with implementation and increasing maintenance responsibilities. The costs associated with repairing resource damage associated with unmanaged use under Alternative 1 can be anticipated but not quantified.

No Forest-wide tool would exist to display where motor vehicles can be legally operated on NFS roads and NFS trails.

Alternative 2 – Proposed Action

Measurement Indicator 1 – Public Safety

Road Maintenance Expense: This alternative proposes the addition of unauthorized routes as either motorized trails or ML 2 roads. None of the routes added to the system would have safety concerns because the roughly graded condition of ML 2 roads and motorized trials accommodates OHV use in a safe manner. However, changes to improve and accommodate current uses and needs would improve safe public motorized opportunities on the Forest. In general, providing connector opportunities by adding unauthorized routes to the system would improve access and safety. Safety concerns along the designated system would be managed when appropriate, and use on those unauthorized routes not being managed by the Forest would be prohibited.

Motorized Mixed Use: Thirteen miles of motorized mixed use is being proposed under this alternative. Allowing motorized mixed use on higher standard passenger car roads (ML 3+) would increase the risk of crashes – both crash probability and crash severity. Of the 13 road segments proposed for mixed use, ten exhibit moderate crash probability and eleven exhibit a high probability of a severe crash if one were to happen. It will be important for the Responsible Official to weigh the increased risk with the associated benefit of improved non-highway-legal vehicle access when making changes to allow motorized mixed use on the Forest.

Changing Objective Maintenance Levels: There are no roads being proposed for objective maintenance level changes under this alternative.

Seasonal Closures: There are no roads being proposed for seasonal closures under this alternative.

Measurement Indicator 2 – Transportation System Affordability

Changes to the Forest transportation system would have an associated implementation cost as well as a long-term maintenance responsibility. Compared to baseline (Alternative 1), costs for maintenance of NFTS roads under Alternative 2 change as follows:

Annual maintenance needs:	- $148,000
Projected deferred maintenance (need) in 2013:	- $1,062,000

Annual maintenance not funded or accomplished with the annual Forest roads allocation becomes deferred maintenance; backlogs continue to grow each year and a projection for 2013 is included above. Adding unauthorized routes to the system would also have an implementation cost. Accounting for route identification signing, Forest transportation atlas updates, and obtaining necessary agreements for those routes within public road rights-of-way managed by other jurisdictions, an estimated implementation cost of approximately $3,000 per mile would be associated with these additional routes. For this alternative, that would result in an implementation cost of approximately $63,000 to cover these tasks. Once added to the system, these routes would also require maintenance and therefore contribute

to the applicable annual and deferred maintenance expenses. Additional expenses, although unquantifiable at this time, would arise from implementing resource mitigation measures prior to adding the unauthorized routes to the NFTS.

Motorized Mixed Use: In addition to the above-mentioned long-term costs, there would also be an implementation cost associated with the motorized mixed use designated on ML 3+ roads in this alternative. These motorized mixed use segments would cost approximately $3,500-$5,000 per segment for warning signing. With 13 proposed MMU segments, this would result in an approximate implementation cost of $65,000 for signing and labor.

Changing Objective Maintenance Levels: There are no roads being proposed for objective maintenance level changes under this alternative.

Seasonal Closures: There are no roads being proposed for seasonal closures under this alternative.

Alternative 3

Measurement Indicator 1 – Public Safety

Adding Unauthorized Routes to the FTS: No new routes would be added to the FTS under this alternative, therefore there are no safety concerns. Motorized travel would be prohibited on unauthorized routes and any existing safety concerns with these routes and impacts to the adjacent managed system would be minimized under this alternative.

Motorized Mixed Use: No motorized mixed is proposed under this alternative.

Changing Objective Maintenance Levels: There are no roads being proposed for objective maintenance level changes under this alternative.

Seasonal Closures: There are no roads being proposed for seasonal closures under this alternative.

Alternative 3 provides the safest riding conditions of all alternatives as cross-country travel is prohibited and no mixed use is proposed. Vehicles would be limited to those roads safely accommodating their particular class.

Measurement Indicator 2 – Transportation System Affordability

Road Maintenance Expense: By not adding routes to the system, nor making any changes to the existing FTS, no additional costs would be incurred associated with implementation and increasing maintenance responsibilities.

Minimal implementation costs would occur with the production of the MVUM and any annual changes occurring to that map.

Alternative 4

Measurement Indicator 1 – Public Safety

Adding Unauthorized Routes to the NFTS: This alternative proposes the addition of unauthorized routes as ML 2 roads. None of the routes added to the system would have safety concerns as the roughly graded condition of ML 2 roads and motorized trials accommodates OHV use in a safe manner. However, changes to improve and

accommodate current uses and needs would provide for safer public motorized opportunities on the Forest. In general, providing connector opportunities by adding unauthorized routes to the system would improve access and safety. Safety concerns along the designated system would be managed when appropriate, and use on those unauthorized routes not being managed by the Forest would be prohibited.

Motorized Mixed Use: No motorized mixed is proposed under this alternative.

Changing Objective Maintenance Levels: Under Alternative 4, 79 miles of ML 3 and ML 4 roads are proposed for changing to objective ML 2 roads. Changing objective maintenance levels would be a step towards allowing non-highway-legal vehicle of current operational maintenance level 3 roads. Through "weathering" over time and through specific downgrading activities analyzed and implemented during subsequent projects, these roads could be converted to high-clearance vehicle roads that would more safely allow shared use involving both highway-legal and non-highway-legal vehicles.

Seasonal Closures: Seasonal closures are proposed on a number of roads under this alternative. There are no safety concerns with seasonal closures. Since most closures are related to keeping motorized vehicles off roads during seasons when they may be slick or icy and therefore increasing the risk of vehicle accident, these would have the effect of providing added safety for the public.

Measurement Indicator 2 – Transportation System Affordability

Road Maintenance Expense: Changes to the Forest transportation system would have an associated implementation cost as well as a long-term maintenance responsibility. Compared to baseline (Alternative 1), costs for maintenance of NFTS roads under Alternative 4 change as follows:

Annual maintenance needs:	- $825,000
Projected deferred maintenance (need) in 2013:	- $5,904,000

Annual maintenance not funded nor accomplished with annual Forest roads allocation becomes deferred maintenance; backlogs continue to grow each year and a projection for 2013 is included above. Adding unauthorized routes to the system would also have an implementation cost. Accounting for route identification signing, Forest transportation atlas updates, and obtaining necessary agreements for those routes within public road rights-of-way managed by other jurisdictions, an estimated implementation cost of approximately $3,000 per mile would be associated with these additional routes. For this alternative, that would result in an implementation cost of approximately $30,000 to cover these tasks. Once added to the system, these routes would also require maintenance and therefore contribute to the applicable annual and deferred maintenance expenses. Additional expenses, although unquantifiable at this time, would arise from implementing resource mitigation measures prior to adding the unauthorized routes to the NFTS.

Motorized Mixed Use: No motorized mixed is proposed under this alternative.

Changing Objective Maintenance Levels: Seventy-nine miles of roads are being proposed for objective maintenance level changes from ML 3 to ML 2 under this alternative. This change will lower maintenance costs, resulting in a reduction of approximately $825,000 in annual maintenance needs over the No Action Alternative (see summary discussion above and Table 19).

Seasonal Closures: Seasonal closures are proposed under this alternative. It is assumed the MVUM will be sufficient to effectively close these roads to public motorized travel. Should other measures be required, Implementation costs could include potential signing and/or gating of road segments seasonally closed.

Minimal implementation costs would occur with the production of the MVUM and any annual changes occurring to that map.

Alternative 5

Measurement Indicator 1 – Public Safety

Adding Unauthorized Routes to the FTS: This alternative proposes the addition of unauthorized routes as either ML 2 roads or motorized trails. None of the routes added to the system would have safety concerns as the roughly graded condition of ML 2 roads and motorized trails accommodates OHV use in a safe manner. However, changes to improve and accommodate current uses and needs would provide for safer public motorized opportunities on the Forest. In general, providing connector opportunities by adding unauthorized routes to the system would improve access and safety. Safety concerns along the designated system would be managed when appropriate, and use on those unauthorized routes not being managed by the Forest would be prohibited.

Motorized Mixed Use: Fifty-one miles of motorized mixed use are being proposed under this alternative. Allowing motorized mixed use on higher standard passenger car roads (ML 3+) would increase the risk of crashes – both crash probability and crash severity (Appendix G, Table G-3). Of forty-seven road segments proposed for mixed use, twenty three exhibit a moderate probability (after mitigation) of a vehicle collision. All proposed mixed use road segments exhibit either moderate (9 segments) or high (38 segments) severity of a crash, should it occur. It will be important for the Responsible Official to weigh the increased risk with the associated benefit of improved non-highway-legal vehicle access when making changes to allow motorized mixed use on the Forest.

Changing Objective Maintenance Levels: Under Alternative 5, 79 miles of ML 3 and ML 4 roads are proposed for changing to objective ML 2 roads. Changing objective maintenance levels would be a step towards allowing non-highway-legal vehicle of current operational maintenance level 3 roads. Through “weathering” over time and through specific downgrading activities analyzed and implemented during subsequent projects, these roads could be converted to high-clearance vehicle roads that would more safely allow shared use involving both highway-legal and non-highway-legal vehicles.

Seasonal Closures: Seasonal closures are proposed on a number of roads under this alternative. There are no safety concerns with seasonal closures. Since most closures are related to keeping motorized vehicles off roads during seasons when they may be slick or icy and therefore increasing the risk of vehicle accident, these would have the effect of providing added safety for the public.

Measurement Indicator 2 – Transportation System Affordability

Road Maintenance Costs: Changes to the Forest transportation system would have an associated implementation cost as well as a long-term maintenance responsibility. Compared to baseline (Alternative 1), needs for maintenance of NFTS roads under Alternative 5 change as follows:

Annual maintenance costs: - $1,137,000

Projected deferred maintenance (need) in 2013:- $10,709,000

Annual maintenance not funded nor accomplished with annual Forest roads allocation becomes deferred maintenance; backlogs continue to grow each year and a projection for 2013 is included above. Adding unauthorized routes to the system would also have a implementation cost. Accounting for route identification signing, Forest transportation atlas updates, and obtaining necessary agreements for those routes within public road rights-of-way managed by other jurisdictions, an estimated implementation cost of approximately $3,000 per mile would be associated with these additional routes. For this alternative, that would result in an implementation cost of approximately $159,000 to cover these tasks. Once added to the system, these routes would also require maintenance and therefore contribute to the applicable annual and deferred maintenance expenses. Additional expenses, although unquantifiable at this time, would arise from implementing resource mitigation measures prior to adding the unauthorized routes to the NFTS.

Current and projected annual budgets do not cover current annual road maintenance costs and the backlog of deferred maintenance continues to increase. Although it does not solve this problem, Alternative 5 is the least costly proposal due to the proposed lowering of maintenance levels on 79 miles of ML 3 roads (changed to ML 2) and six miles of ML 2 (changed to motorized trails). The advantages are increased access miles for motorized recreation enthusiasts, a reduction of $1,497,104 in NFTS annual maintenance needs and a subsequent substantial annual reduction in deferred maintenance needs.

Alternative 5 is the most economical for the annual maintenance of the ML 3-5 road system, the cyclical maintenance of the ML 2 road system, the deferred maintenance of the ML1-5 system, and meets national engineering and ecosystem standards and guidelines.

Motorized Mixed Use: In addition to the above-mentioned long-term costs, there would also be an implementation cost associated with the motorized mixed use designated on ML 3+ roads in this alternative. These Motorized mixed use segments would cost approximately

$3,500-$5,000 per segment for warning signing. With 47 proposed MMU segments, this would result in an approximate implementation cost of $235,000 for signing and labor.

Changing Objective Maintenance Levels: Seventy-nine miles of roads are being proposed for objective maintenance level changes from ML 3 to ML 2 under this alternative. This change will require fewer maintenance costs resulting in a reduction of approximately $825,000 in annual maintenance needs over the No Action Alternative (see summary discussion above and Table 10).

Seasonal Closures: Seasonal closures are proposed under this alternative. It is assumed the MVUM will be sufficient to effectively close these roads to public motorized travel. Should other measures be required, Implementation costs could include potential signing and/or gating of road segments seasonally closed.

Minimal implementation costs would occur with the production of the MVUM and any annual changes occurring to that map.

Modified Alternative 5

Measurement Indicator 1 – Public Safety

Adding Unauthorized Routes to the FTS: Modified Alternative 5 was designed to enhance and improve motorized recreation across the Lassen NF, responding to the need for providing diverse riding opportunities without compromising safety. This alternative proposes the addition of unauthorized routes as either ML 2 roads or motorized trails. None of the routes added to the system would have safety concerns as the roughly graded condition of ML 2 roads and motorized trails accommodates OHV use in a safe manner. However, changes to improve and accommodate current uses and needs would provide for safer public motorized opportunities on the Forest. In general, providing connector opportunities by adding unauthorized routes to the system would improve access and safety. Safety concerns along the designated system would be managed when appropriate, and use on those unauthorized routes not being managed by the Forest would be prohibited.

Motorized Mixed Use: The mixed use safety analysis demonstrated that all of the NFTS road segments proposed for mixed use exhibit either moderate or high probability of a severe crash (Appendix G, Table G-3). The routes with moderate probability of high severity crash are analyzed in this alternative and the high probability routes are dropped.

As we looked for ways to create the riding loops people told us they wanted; we identified 9 and 3 tenths miles of lesser-used ML 3 road segments where mixed use could be designated and 79.6 miles where ML 3 objective maintenance levels could be reduced to ML 2, this is an increase of 0.6 miles over Alternative 5. It was discovered in the process of conducting the mixed use safety analysis on routes in Alternative 5 that one of the segments, 0.6 miles of 28N70, proposed in that alternative had already operationally changed from a ML 3 to a ML 2. Over time, all 79.6 miles of these ML2 roads will be made

available for non-street-legal vehicles and link currently disconnected ML 2 road segments to form continuous OHV circuits.

Changing Objective Maintenance Levels: Under Modified Alternative 5, 79.6 miles of ML 3 and ML 4 roads are proposed for changing to objective ML 2 roads. Changing objective maintenance levels would be a step towards allowing non-highway-legal vehicle of current operational maintenance level 3 roads. Through "weathering" over time and through specific downgrading activities analyzed and implemented during subsequent projects, these roads could be converted to high-clearance vehicle roads that would more safely allow shared use involving both highway-legal and non-highway-legal vehicles.

Seasonal Closures: Seasonal closures are proposed on a number of roads under this alternative. There are no safety concerns with seasonal closures. Since most closures are related to keeping motorized vehicles off roads during seasons when they may be slick or icy and therefore increasing the risk of vehicle accident, these would have the effect of providing added safety for the public.

Measurement Indicator 2 – Transportation System Affordability

Road Maintenance Costs: Changes to the Forest transportation system under Modified Alternative 5 would primarily be realized in decreased implementation costs, discussed below, as well as a long-term maintenance responsibility. Compared to baseline (Alternative 1), costs for actual maintenance of NFTS roads under Modified Alternative 5 do not change or change negligibly from Alternative 5, as follows:

Annual maintenance costs: - $1,137,000

Projected deferred maintenance (need) in 2013:- $10,709,000

Annual maintenance not funded nor accomplished with annual Forest roads allocation becomes deferred maintenance; backlogs continue to grow each year and a projection for 2013 is included above. Adding unauthorized routes to the system would also have a implementation cost. Accounting for route identification signing, Forest transportation atlas updates, and obtaining necessary agreements for those routes within public road rights-of-way managed by other jurisdictions, an estimated implementation cost of approximately $3,000 per mile would be associated with these additional routes. For this alternative, that would result in an implementation cost of approximately $167,100 to cover these tasks. Once added to the system, these routes would also require maintenance and therefore contribute to the applicable annual and deferred maintenance expenses. Additional expenses, although unquantifiable at this time, would arise from implementing resource mitigation measures prior to adding the unauthorized routes to the NFTS.

Current and projected annual budgets do not cover current annual road maintenance costs and the backlog of deferred maintenance continues to increase. Although it does not solve this problem, Alternative 5 Modified is the least costly proposal due to the proposed lowering of maintenance levels on 79 miles of ML 3 roads (changed to ML 2), 6 miles of ML

1 (changed to motorized trails), and proposing motorized-mixed-use on 9.3 miles of current ML 3-4 roads. The immediate, first-year advantages are increased access miles for motorized recreation enthusiasts, an immediate reduction of $1,497,104 in NFTS annual maintenance needs and a subsequent substantial annual reduction in deferred maintenance needs.

Alternative 5 and modified 5 are the most economical for the annual maintenance of the ML 3-5 road system, the cyclical maintenance of the ML 2 road system, the deferred maintenance of the ML1-5 system, and meeting national engineering and ecosystem standards and guidelines.

Motorized Mixed Use: In addition to the above-mentioned long-term costs, there would also be an implementation cost associated with the motorized mixed use designated on ML 3+ roads in this alternative. These Motorized mixed use segments would cost approximately $3,500-$5,000 per segment for warning signing. With 7 proposed MMU segments, this would result in an approximate implementation cost of $35,000 for signing and labor.

Changing Objective Maintenance Levels: Seventy-nine miles of roads are being proposed for objective maintenance level changes from ML 3 to ML 2 under this alternative. This change will require fewer maintenance costs resulting in a reduction of approximately $825,000 in annual maintenance needs over the No Action Alternative (see summary discussion above and Table 10).

Seasonal Closures: Seasonal closures are proposed under this alternative. It is assumed the MVUM will be sufficient to effectively close these roads to public motorized travel. Should other measures be required, Implementation costs could include potential signing and/or gating of road segments seasonally closed.

Minimal implementation costs would occur with the production of the MVUM and any annual changes occurring to that map.

Cumulative Effects

Alternative 1– No action

Measurement Indicator 1 – Public Safety

The No-action Alternative does not address improving safe and efficient access for non-highway-legal vehicles across the Forest. In addition, the unauthorized routes would not be managed or addressed, and any existing safety concerns with these routes and impacts to the adjacent managed system would continue to exist. Continued use of unmanaged routes would also likely have resource impacts requiring future rehabilitation efforts. Future public use would not be restricted to a designated and managed system, increasing the risk of users encountering unmitigated hazards.

Transportation System Affordability

By not adding routes to the system, no additional costs would be incurred associated with implementation and increasing maintenance responsibilities.

Action Alternatives – Alternatives 2, 3, 4, 5, Modified 5

Measurement Indicator 1 – Public Safety

In general, changes to improve and accommodate current uses and needs would improve safe public motorized opportunities on the Forest. Providing connector opportunities by adding unauthorized routes to the system would improve access and safety when designated. Safety concerns along the designated system would be managed when appropriate, and use on those unauthorized routes not being managed by the Forest would be prohibited.

Allowing motorized mixed use on higher standard passenger car roads (ML 3+) would increase the risk of crashes – both crash probability and crash severity. Under these conditions OHV users will share the routes with a variety of vehicles of different sizes: from other OHVs to commercial log trucks and chip vans. It will be important for the Responsible Official to weigh the increased risk with the associated benefit of improved non-highway-legal vehicle access when making changes to allow motorized mixed use on the Forest. In addition, other projects taking place on the Forest and adjacent lands often use these higher standard roads as primary access and major haul routes. This would translate to an increasing frequency of encounters with large, commercial vehicles as well as significant passenger and high-clearance vehicles accessing the forest for a variety of recreation purposes. There would be an increased exposure to high severity crashes associated with these uses.

Measurement Indicator 2 – Transportation System Affordability

Changes to the Forest transportation system would have an associated implementation cost as well as a long-term maintenance responsibility. Costs associated with changes to the Forest transportation system would be incurred associated with implementation and increasing maintenance responsibilities. Depending on the changes being made, there may either be an increase to long-term management costs (additions to the system, increased safety mitigations) or a savings (downgrading of roads).

Summary of Effects Analysis Across All Alternatives

Public Safety Summary

The goal of motorized travel management is to create a safe, affordable and sustainable National Forest Transportation System. The potential changes in public safety from each alternative are not definitive, but can be discussed in qualitative terms based on the results of engineering safety analysis conducted for each route where motorized mixed use is being considered under one or more alternatives. The information needed to provide this qualitative, comparative assessment is provided in Table 18. This table lists the number of miles for which changes to the operational road maintenance objectives are proposed under each alternative by category of change. In particular, and of greatest concerns are the

changes in authorized use patterns that will result from permitting mixed use on ML 3 roads and from changing the operational maintenance levels for some ML 3 roads to ML 2. In either case, an engineering safety analysis provides additional information from which the public safety implications of the proposed changes can be assessed.

Adding unauthorized routes to the FTS: Most of the routes added to the system would not have safety concerns due to low design speeds, rough surfaces and infrequent use. If safety concerns arise during project implementation, corrections can be made during trail maintenance work.

Motorized Mixed Use: The Travel Management Rule (TM), 36 CFR 212, 251, 261, and 295, supersedes past practices and enforcement of OHV use on the National Forests. In consideration of public safety and to best comply with State traffic laws, as required by 36 CFR 212.5a, the Pacific Southwest Region, R5,equates Forest Service roads maintained for passenger vehicle use (ML 3, 4, and 5) to roads defined as “highways” under the California Vehicle Code (CVC). In making this determination, the Forest Service has aligned OHV use on ML 3, 4 and 5 roads to CVC restrictions and requirements for OHV use on highways. This policy was further clarified by the Regional Forester by letter, dated January 13, 2009, entitled Motorized Mixed Use on National Forest Roads in the Pacific Southwest Region. Travel Management on the Lassen NF is consistent with this direction.

Table 18 Miles of roads/trails/unauthorized routes changing maintenance levels

Maintenance Level Change Recommendations	Alt. 1 (miles)	Alt. 2 (miles)	Alt. 3 (miles)	Alt. 4 (miles)	Alt. 5 (miles)	Alt. 5 and Mod 5 (miles)
ML 1 miles to be added as motorized NFS trails	0	0	0	0	6	6
Unauthorized routes to be added as ML 2 roads	0	16	0	10	10	10
Unauthorized routes to be added as motorized NFS trails	0	5	0	0	43	46
ML 2 miles to be changed to ML 1 miles	0	0	0	0	0	0
Motorized Mixed Use, ML 2 miles	2,568	2,584	2,568	2,657	2,657	2,657
ML 3-4 miles to be Changed to ML 2 miles	0	0	0	79	79	79
ML 3-4 miles to be Changed to motorized mixed-use	0	13	0	0	51	9

Source: Lassen National Forest, GIS data.

Motorized mixed use (MMU) on high clearance roads (ML 2): All of the high clearance roads currently open to the public on the Lassen National Forest were determined to have minimal safety concerns and will be designated as open to all vehicles.

Motorized mixed use (MMU) on passenger car roads (ML 3+): depending upon the alternative, 9 to 51 miles of passenger car roads have been proposed for mixed use. Appendix G, Table G-3 presents the results of the engineering analyses conducted to assess crash risk, including both crash probability and crash severity, for those segments of passenger car roads proposed for motorized mixed use in the various alternatives. The table displays the risk without mitigation and the risk after mitigation measures take place. Mitigation measures include warning signs to assist road users in identifying when entering a designated motorized mixed use section of operational maintenance level 3+ roads.

Crash probabilities represent the likelihood of a crash occurring. Crash severities document the potential damage that would occur in the event of a crash. Because non-highway-legal operators often are more exposed than operators protected in a cab with a seatbelt, crash severities are naturally higher for these vehicle types. Low severities indicate situations where little vehicle damage or bodily injury is expected. High severities represent expected major vehicle damage and serious bodily injury or death in the event of a crash.

Changing Objective Maintenance Levels: Under Alternative 4, 5, and Modified 5, 79 miles of ML3 and ML4 roads are proposed for changing to objective ML 2 roads. Changing

objective maintenance levels would be a step towards safely allowing non-highway-legal vehicle of current operational ML 3 roads. Through “weathering” over time and through specific downgrading activities analyzed and implemented during subsequent projects, these roads could be converted to high-clearance vehicle roads that would more safely allow shared use involving both highway-legal and non-highway-legal vehicles.

Seasonal Closures: There are no safety concerns with seasonal closures. Since most closures are related to keeping motorized vehicles off roads during seasons when they may be slick or icy and therefore increasing the risk of vehicle accident, these would have the effect of providing added safety for the public.

Affordability Summary

Table 19 identifies the relative affordability of FTS roads and trails under each alternative. Although Table 8 alternatives 4, 5, and modified 5 may appear to share identical mileages in several categories, the differences occur in implementation costs where 10 miles of current ML 1 roads are changed to motorized trails in alternatives 5, and modified 5, and where motorized mixed use is allowed on 51 miles of ML 3-4 roads in alternative 5 and motorized mixed use is allowed on 9.3 miles of ML 3-4 roads in modified 5. Additional minimal implementation cost will be incurred in modified 5 with the addition of 2.7 miles of current unauthorized routes as motorized trails. Alternatives 5 and modified 5 also differ from alternative 4 in that 6 miles of current ML 1 roads are changed to motorized trails.

The Forest may incur significant implementation costs to physically manage routes consistently with the Motor Vehicle Use Map, (such as installing road/route signage in accordance with the Manual on Uniform Traffic Control Devices as implemented by the Forest Service in EM 7100-15 December 2005 Sign and Poster Guidelines for the Forest Service and the Federal Highway Administration Manual on Uniform Traffic Control Devices-2003 Edition), physically altering road entrance treatments, and managing roadside vegetation.

In addition to the above-mentioned long-term costs associated with each alternative, Table 20 summarizes the estimated one-time implementation costs for each alternative. These estimates include the costs of additional signing, agreement facilitation, and atlas data management that are associated with the proposed changes to the transportation system.

Over time and as funding permits, RAP/TAP recommendations may provide the travel management program with a strategic transportation plan. With publication of the MVUM, the public will be able to clearly identify the modes of travel permitted on specific NFTS roads and NFTS trails.

Table 19 Measurement Indicator 2 - Affordability

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 5 Mod
NFTS Road Miles open to all motorized use	3,278 miles	3,294 miles	3,278 miles	3,288 miles	3,288 miles	3,288 miles
NFTS Road Miles open to Highway Legal Vehicles	710 miles	697 miles	710 miles	631 miles	631 miles	631 miles
NFTS Road Miles open to Non-Highway Legal Vehicles	2,568 miles	2,597 miles	2,568 miles	2,657 miles	2,657 miles	2,657 miles
Annual Maintenance Needs for Roads, current	$14,844,719	$14,723,424	$14,844,719	$14,159,366	$14,156,366	$14,156,366
Deferred Maintenance Needs for roads at 5 years	$181,329,917	$180,462,261	$181,329,917	$176,427,390	$176,405,930	$176,405,930

Table 20 Estimated Implementation Costs for Agreements, Signing & Data Management

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 5 Modified
Cost ($)	$0	$128,000	$0	$30,000	$394,000	$202,000

Through subsequent planning efforts, Lassen NF will continue to evaluate the NFTS in order to provide a safe, economically sustainable, and environmentally sound transportation system that provides multiple users with a quality experience.

Table 21. Summary Comparison of Alternatives by Environmental Effects for Facilities

Indicators – Facilities Resources	Rankings of Alternatives for Each Indicator1					
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. Mod 5
Public Safety	1	2	5	4	3	3
Transportation System Affordability	5	2	5	4	3	3
Average for Facilities Resources	3	2	5	4	3	3

[1] A score of 5 indicates the alternative is the best for facilities resources related to the indicator; A score of 1 indicates the alternative is the worst for facilitiesl resources related to the indicator

Compliance with the Forest Plan and Other Direction

All alternatives comply with the Lassen National Forest Land and Resource Management Plan and other regulatory directions.

3.3 Recreation Resource

Changes Between DEIS and FEIS

Throughout this section the number of acres, miles and tables were edited to more accurately reflect the project area, correct mileages and provide consistency throughout the document. The Affected Environment section was edited to better describe the Forest, settings, and opportunities (motorized and non-motorized). Loop opportunities of 20 miles or more were identified by alternative. Appendix C - On Going and Reasonably Foreseeable Future Actions was edited to add future planning efforts in the High Lakes OHV Area, the Front Country OHV Area, and the Potato Butte Area. The Cumulative Effects section was edited to include these three planning efforts as planned program of work that will enhance and manage OHV opportunities across the Forest. Between the release of the DEIS and the FEIS the Forest completed a safety analysis for routes proposed for motorized mix use. This analysis identified seven segments of current ML 3 roads, and a .57 mile segment of ML 2 road totaling approximately 9.3 miles that are available for motorized mixed use. This 9.3 miles is substantially less than originally proposed in the DEIS. Specific routes identified for motorized mixed use, as well as rationale are detailed in the Safety Analysis and in the Engineering section of this document. Four additional routes were added under Alternative 5, as modified. These routes would add approximately 2.7 miles of motorized trails to the NFTS, and would provide motorized access dispersed recreation sites and provide connectivity for loop riding opportunities.

Introduction

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 using motor vehicles to access trailheads, facilities, destinations, or geographic areas that are utilized for non-motorized recreational activities. This section of the Travel Management FEIS examines the extent to which the diversity of recreation opportunities are affected by the proposed action and alternatives and the extent to which alternatives are consistent with direction established in the Lassen National Forest Land and Resource Management Plan, as amended (LRMP), the Sierra Nevada Forest Plan Amendment (SNFPA), and the Travel Management (TM) Rule.

The LRMP recreation direction was established under the implementing regulations of the National Forest Management Act (NFMA). The NFMA requires the provision of a broad spectrum of Forest and rangeland-related outdoor recreation opportunities that respond to current and anticipated users' demands. The LRMP satisfies this requirement by using the Recreation Opportunity Spectrum (ROS) classification system as a mechanism for "zoning"

recreation opportunities in the Forest Plan. The Travel Management Rule requires that the agency examines the compatibility of motor vehicle use with existing conditions in populated areas, the conflict between motor vehicle use and existing or proposed recreation uses on NFS lands or neighboring Federal lands, and the provision of recreational opportunities and access needs.

Analysis Framework: Statute, Regulation, Forest Plan, 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 LRMP includes standards and guidelines for management of recreation including use of off-highway vehicles. Specifically for off-highway vehicle management, NFMA requires that this use be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of NFS lands. NFMA also requires that a broad spectrum of Forest and rangeland-related outdoor recreation opportunities be provided that respond to current and anticipated user demands.

Sierra Nevada Forest Plan Amendment (SNFPA)

The SNFPA established the direction to prohibit motor vehicle travel off of designated routes, trails, and limited off-highway vehicle (OHV) use areas. Unless otherwise restricted by current Forest Plans or other specific area standards and guidelines or Forest Orders, cross-country travel by over-snow vehicles would continue.

SNFPA ROD, Appendix A, Part D

Mitigate impacts where there is documented evidence of disturbance to the nest site from existing recreation, off-highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off-highway vehicle routes, and recreational and other developments for their potential to disturb nest sites and den sites.

Identify roads, trails, OHV trails, staging areas, developed recreation sites, dispersed campgrounds, special use permits, grazing permits, and day use sites during landscape analysis. At the project level, evaluate and consider actions to ensure consistency with standards and guidelines or desired conditions.

Supplemental SNFPA S&Gs for Travel Management/Long term strategy for Anadromous Fish-producing watersheds

Recreation: Adjust dispersed and developed recreation practices that retard or prevent attainment of Aquatic Conservation Strategy goals. Where adjustment

measures such as educational signing, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective in meeting Aquatic Conservation Strategy goals, eliminate the practice or occupancy.

Travel Management Rule, Subpart B (36 CFR 212.50-57)

The following criteria incorporate Executive Order 11644 and Executive Order 11989):

The Responsible Official shall consider effects on NFS natural and cultural resources, public safety, provision of recreational opportunities, access needs, conflicts among uses of NFS lands, the need for maintenance and administration of roads, trails, and areas that would arise if the uses under consideration are designated; and the availability of resources for that maintenance and administration. 36 CFR 212.55(a)

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).

In addition to the criteria in paragraph (a) of this section, in designating NFS roads, the responsible official shall consider: Speed, volume, composition, and distribution of traffic on roads; and compatibility of vehicle class with road geometry and road surfacing. 36 CFR 212.55(c).

Lassen National Forest Land and Resource Management Plan.

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 (USDA FS 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 site-specific project level planning beyond the

programmatic planning used to develop the LRMP. How ROS applies to the LRMP depends on how (or if) it was integrated into the management prescriptions and associated standards and guidelines in the LRMP. On Lassen National Forest, ROS is incorporated into forestwide management direction and management prescriptions, and it guides facility development via management area standards and guidelines. Lassen NF management direction, relating to motor vehicle recreation management, includes the following:

Provide for a wide range of outdoor recreation opportunities to meet public demand by furnishing different levels of access, service, facilities, and information (USDA FS PSW Region 1993: chapter 4: 4).

Provide diverse opportunities for off-highway vehicle recreation (USDA FS PSW Region 1993: chapter 4: 4)

Provide a stable and cost-efficient trail system through appropriate construction, reconstruction, and/or maintenance (USDA FS PSW Region 1993: chapter 4: 3).

Provide a stable and cost-efficient road system through appropriate construction, reconstruction, and/or maintenance (USDA FS PSW Region 1993: chapter 4: 3).

LRMP, CH.4

Facilities: Maintain all trails and related structures to: a) protect the recreation amenities of adjacent areas; b) provide reasonable access; c) be an efficient transportation system; and d) provide for various experience levels according to type and volume of use.

Facilities: Modify parts of the NFS Trails as needed to meet changing use demands.

Facilities: Look for opportunities to convert roads that are no longer needed to equestrian, mountain bike, and or pedestrian trails.

Recreation: Provide a wide range of outdoor recreation opportunities to meet public demand by furnishing different levels of access, service, facilities, and information.

Recreation: Manage recreation according to the ROS classes described in the ROS User's Guide, as specified in Appendix J, and the Management Prescriptions. Refer to the separate ROS map for the distribution of ROS classes throughout the Forest.

Recreation: Protect recreation amenities around areas of concentrated use.

Recreation: Provide diverse opportunities for off-highway vehicle (OHV) recreation

Recreation: Cooperate with the State, other agencies, and user groups to identify and develop segments of OHV trails that contribute to a statewide OHV trail system connecting use areas and allowing long-distance trail touring.

Recreation: Minimize user conflicts by specifying allowable winter use on certain roads and trails (e.g., cross-country ski trails, snowmobile-only trails or winter 4-wheel drive only).

Prescription A/Facilities: Seasonally close roads where necessary to protect wildlife during critical periods.

Prescription A/Recreation: Provide opportunities for viewing wildlife, hunting, gathering forest products, and vehicle camping.

Prescription F/Recreation: Confine off-highway vehicles, except over-the-snow vehicles, to designated roads, trails, and stream crossings in riparian areas.

Prescription M/Facilities: Prohibit road upgrading what would detract from motorized recreation opportunities.

Prescription M/Facilities: Close specific areas or travel routes seasonally or year-round as needed to facilitate management of adjacent areas, prevent damage to other resources, prevent use conflicts, and avoid unnecessary costs.

Prescription M/Soils: Rehabilitate areas of significant soil degradation caused by OHV's. Close trails and areas to motorized use if necessary to protect soils.

Prescription N/Facilities: Construct no new permanent roads.

Prescription N/Facilities: Prohibit motorized recreation.

Prescription S/Recreation: Prohibit motorized vehicles within Research Natural Areas.

Mgmt. Area 8/Recreation: Close any existing motorized access routes in Semi-Primitive Non-Motorized areas to motorized use.

Impacts Relevant to Recreation Include

The compatibility of proposed changes to the NFTS with LRMP recreation and OHV management prescriptions and ROS.

The impact of proposed changes to the NFTS on non-motorized (i.e., quiet) recreation (dust, noise, use conflicts).

The amount and diversity of motorized recreation opportunity by alternative.

The amount of motorized access to dispersed recreation by alternative.

The impact of proposed changes to the NFTS on neighboring private and Federal lands (dust, noise, use conflicts).

Effects Analysis Methodology

Assumptions Specific to Recreation Analysis

The prohibition of cross-country travel is not a change to ROS (semi-primitive motorized for example); it is simply a prohibition within that ROS 'zone' to travel off of designated routes.

The changes 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.

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.

Proposed additions to the NFTS will have a beneficial effect on motorized recreation opportunities by providing a variety of trail riding experience and increasing the amount of motorized recreation opportunities (loops, connectors).

Proposed changes and additions to the NFTS will have a beneficial effect on the amount of motorized access to dispersed recreation opportunities that are available.

The Forest's National Visitor Use Monitoring (NVUM) report accurately expressed the most popular motorized and non-motorized recreation activities for use in this analysis.

Overall changes in the NFTS that require non-significant plan amendment(s) will result in corresponding changes in the net Semi-Primitive Non-Motorized (SPNM) ROS class acres available on the Lassen National Forest.

The area of influence (dust, noise) of motorized use on populated areas or 'quiet recreation' opportunities is ½ miles from associated boundaries (e.g. wilderness, Research Natural Areas (RNAs), property line, urban limit line).

The majority of the motorized public use occurring on NFS land is occurring within the existing NFTS based on observation and NVUM data.

For each unauthorized route added to the NFTS as a road or trail for the purpose of accessing dispersed recreation, we assume 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.

Data Sources

Lassen National Forest Plan (as amended) for distribution of ROS classes.

Forest's NVUM report for most popular recreation activities and recreation market data.

Law Enforcement, Recreation, and other Resource staff observations.

GIS data

Recreation Indicator Measures

Indicator measures 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 Travel Management 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. Indicator measures also illustrate the amount of motorized access available on the Forest. 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 roads or trails, indicator measures were used. Mileage available for each class of vehicle is useful in analyzing the ability of Forest users to travel around the Forest, enjoy motorized recreation opportunities, and access non-motorized recreation opportunities. Such opportunities include accessing trailheads, hunting, and using dispersed recreation sites for activities such as fishing and camping. The Forest has determined that these activities 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 wheeled recreation will not be allowed to use designated roads, trails or areas and, conversely, the time of year that conflicts among motorized wheeled vehicles, snowmobiles, and non-motorized uses will be minimized. Also, the effect on non-motorized recreation activities that are accessed by native surface roads is considered. The number of acres located ½ mile away from roads, 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: Recreation Opportunity Spectrum Consistency with LRMP (as amended)

Description

This measurement indicator looks at the impact of proposed changes to the NFTS on ROS.

Methodology

Short-term timeframe: 1 year

Long-term timeframe: 20 years.

Spatial boundary: Project Area

The specific measure is the number of ROS acres in each class under each alternative and number of required non-significant ROS plan amendments (and or any associated changes to LRMP recreation and OHV management prescriptions) displayed by associated acreage changes in the LRMP by alternative.

ROS is a planning framework developed for classifying and managing outdoor recreation opportunities based on the following criteria: physical setting, social setting, and management setting (Clark and Stankey 1979). The LRMP identifies ROS settings, or zones, across the Forest which best provide opportunities for specific recreation experiences ranging from Primitive to Rural, shown in the ROS Map in LRMP (USDA FS PSW Region 1993, as amended). The ROS setting providing the best opportunities for OHV use is Roaded Natural, and Semi-Primitive Motorized.

Approximately 8.41 percent of the project area is located within Semi-Primitive Non-Motorized (**SPNM**) zones. Within SPNM settings, visitors can participate in non-motorized recreation activities and expect a moderate-to-high opportunity for isolation from the sights and sounds of man. These areas are characterized by an unmodified or natural-appearing environment. Typical recreation activities in SPNM settings include hiking, equestrian use, fishing, hunting, and backpacking. There are no proposed motor vehicle routes located within these ROS settings on Lassen NF. Non-motorized NFS trails within these settings are not included in the scope of this analysis.

Approximately 5.8 percent of the project area is located within Semi-Primitive Motorized (**SPM**) settings. In this setting, there are moderate opportunities for isolation from the sights and sounds of humans within a natural-appearing environment. There is a low probability of interactions with other people while participating in activities such as hiking, hunting, fishing, camping, day use and motorized travel on primitive roads for a variety of vehicles types. These vehicles range from stock four wheel drive vehicles with minor lifts, and dual sport motorcycles, to dirt bikes and rock crawlers that have been pieced together using parts from several vehicles with heavy duty roll bars. Typically the trails within the SPM setting are located in more remote areas, are narrow, rough and offer a range of opportunities and challenges to a wide range of vehicles and users.

Approximately 85 percent of the project area is located within Roaded Natural (**RN**) settings. Within the RN setting, the sights and sounds of humans are moderately frequent, and the Forest is mostly natural-appearing from roads and trails. Compatible recreation activities within an RN zone include hiking, fishing, picnicking, camping, bicycling, viewing scenery/wildlife, driving for pleasure and OHV touring. Typical vehicles in this setting are passenger cars, SUV’s, 4X4’s, motorcycles, and more recently side by side ATV’s. This setting offers the most diversity of road and trail opportunities as well as access to a wide range of recreation opportunities across the Forest.

The highly developed recreation facilities at Eagle Lake are examples of a Rural ROS setting. Within the Rural (R) setting, sights and sounds created by visitors are evident and the natural environment is culturally modified, yet attractive. Access and travel facilities are designed for individual, intensive motorized use. Typical recreation activities or facilities include camping, fishing, resorts, marinas, and information centers. The south end of Eagle Lake, a small area near Lake Almanor, and the Highway 36 corridor between Susanville and

Fredonyer Pass are the only areas on the Lassen NF located within the Rural ROS setting. Those settings account for less than one percent of the project area.

The number of ROS acres, in each class, under existing conditions and Alternative 1 are shown in Table 22. This analysis does not propose changes to adopted ROS classes on the Forest as shown in Table 23. Any proposed revisions to ROS settings will be fully analyzed during the next Forest Plan revision process.

Table 22 Total acres of each ROS type in the project area

ROS Type	Total Acres[a]	Percent of Project Area
R	8,923.91	0.83%
RN	909,245.09	84.97%
SPM	61,961.23	5.79%
SPNM	89,970.75	8.41%

[a]228.86 acres of the project area are unclassified in our ROS layer due to a lack of vertical integration. Those acres were broken out as follows: R=39.14, RN=162.40, SPNM=27.32. Source data, GIS analysis. R= Rural, RN= Roaded Natural, SPM=Semi-primitive Motorized and SPNM=Semi-Primitive Non-motorized.

Measurement Indicator 2: Non-motorized recreation opportunity

Description

This measurement indicator addresses “Quiet Recreation”.

Methodology

Short-term timeframe: 1 year

Long-term timeframe: 20 years.

Spatial boundary: Project Area

This method was determined through a literature review of sound studies and reports cited. The specific measure is the number of acres of NFS lands located one-half mile or farther from NFS roads, NFS trails, and unauthorized routes.

Indicator 2 analyzes the extent of non-motorized recreation activities displaced by proposed motor vehicle use. Opportunities for quiet, non-motorized recreation experience may vary among the alternatives, as areas of the Forest that permit a mix of motorized and non-motorized used may see increases in the proportion of motorized trail and road mileage. The ROS category Roaded Natural is used as an indicator of those mixed-use areas, as it best represents the areas on the Forest with a broad distribution of motorized and non-motorized recreation opportunities. As the acreage of ROS Semi-Primitive Non-Motorized lands on the Forest does not change across alternatives, changes in the Roaded Natural category are assumed to be the most significant factor in “quiet zone” availability. Those alternatives with the least proposed motorized mileage in Roaded Natural areas will have a lower impact on non-motorized recreation, and will be more likely to offer greater potential for a quiet recreation experience.

Visitors seeking a quiet non-motorized recreation experience within the project area are most successful when distancing themselves from NFS roads and trails, or unauthorized motor vehicle routes. Escaping noise and crowds is one of the main benefits sought by visitors to public lands (Kariel 1990). Noise from motor vehicles and other man-made sounds can be a source of dissatisfaction and conflict for visitors seeking quiet recreation experiences. Since distance is the best way to reduce noise levels, it was selected to evaluate potential noise impacts to quiet recreation users. The opportunity for residents, and visitors to experience quiet and a sense of solitude within a non-motorized use setting, varied by alternative as shown in Table 24.

Forest Service research indicates that noise from motorcycles is detected less than five percent of the time at a distance of one-half mile from the nearest motor vehicle route (Harrison 1975). For this analysis, a buffer of one-half mile or more from an open motor vehicle route is being used to define outer boundaries of “quiet” areas. This indicator is based on an assumption that areas located more than one-half mile from an open motor vehicle route provide the best opportunities for quiet recreation within the project area.

Comments regarding user conflict were raised during public scoping for the NOI. There were numerous comments stating that Lassen NF needed to develop a motor vehicle transportation system that minimized conflicts between motorized and non-motorized recreation users.

Recreation research has identified that conflict is almost always identified as “the impact of mechanized recreationists upon those who prefer non-mechanical activities” (Jackson and Wong 1982). In comparison to NOI comments received from quiet recreation proponents, there were no comments from motorized recreation users expressing feelings of conflict with non-motorized users.

Several comments in response to the NOI indicated that unmanaged OHV use was a disruption to quiet recreation activities such as dispersed recreation, hiking, equestrian use, viewing wildlife, and camping. Specific comments included complaints that excessive noise from OHV use diminishes the quality of experience for people participating in non-motorized recreation activities. Other comments indicated that visual and environmental impacts (e.g., streambank erosion, vegetation damage, dust) occurring from unmitigated OHV use was disturbing to non-motorized recreation users and leading to their displacement from certain areas. Site-specific comments mentioned Hat Creek (Twin Bridges area), Lost Creek, and Pacific Crest Trail as areas of concern.

Another common statement from proponents of non-motorized recreation was that Alternative 2 does not reflect actual recreation use on the Forest. Comments indicated Lassen NF should develop a transportation system focused on providing opportunities for more popular non-motorized recreation activities such as hiking, camping, fishing, hunting, and wildlife watching. Several comments indicated that Lassen NF should decommission existing roads to create more opportunities for non-motorized use, to better reflect current

recreation activity levels. Other people feel that there are too many roads on the landscape and Lassen NF should not be adding unauthorized roads to the NFTS that would further detract from opportunities to experience non-motorized recreation activities in a quiet environment.

The Travel Management Rule (36 CFR 212.55) identifies general and specific criteria for considering the effects of route designation. Effects that must be considered include conflicts among uses of NFS lands, and conflict between motor vehicle use and existing or proposed recreational use of NFS lands. Additionally, Section 212.21 provides direction that the Pacific Crest Trail (**PCT**) "shall be administered primarily as a footpath and horseback riding trail." The PCT is assessed in the Visual Resource section.

As proposed in the alternatives, motorized and non-motorized recreation would be affected by seasonal closures on selected NFS roads. Under these restrictions, public motor vehicle use would be limited to open routes during the dates proposed. This would impact not only the available area for motorized recreation opportunities, but also users wanting access to non-motorized recreation activities found within the closure areas.

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.

Methodology

Short-term timeframe: 1 year

Long-term timeframe: 20 years.

Spatial boundary: Project Area

The specific measures are:

Roads: Number of miles available by vehicle class and season of use.

Trails: Number of miles available by vehicle class and season of use.

Areas: Number acres in Open Areas by vehicle class and season of use.

Quality of Trail Experience: Number of miles by Trail class and degree of difficulty.

Indicator 3 analyzes the miles of roads and motorized trails available by alternative, as well as the total miles available by vehicle type by alternative. The potential recreation experience may differ among the alternatives, which contain routes ranging from high standard surfaced roads managed for public highway-legal motor vehicle use to roughly graded native surface roads and trails managed for high-clearance vehicles.

Many comments in response to the NOI indicated that Alternative 2 does not provide enough motor vehicle recreation opportunities on Lassen NF. Those comments can be generalized to have come from two groups: historic trails enthusiasts and motorized mixed-use access advocates.

Several comments expressed concern that Alternative 2 ignores or disrupts traditional recreation use along portions of historic emigrant trails on the Forest. Many recreation users enjoy visiting historic site markers and intact segments of the Nobles Trail and Lassen National Historic Trail. Alternative 2 would limit motorized access to historic site markers located on these trails. Trail users also expressed that restricting motor vehicle use on certain trail segments would encourage and accelerate growth of vegetation, thereby eliminating traces of historic routes and destroying part of our cultural heritage. Comments indicated those trails predate Lassen NF, have been maintained as travel routes since the 1800s, and should remain open to motor vehicles.

Proponents of motorized mixed use are concerned that Alternative 2 does not adequately address the need for non-highway-legal vehicles to access contiguous parts of the NFTS. Approximately 2,600 miles of OHV riding opportunities would exist under any of the action alternatives. However, without motorized mixed use or downgrading road maintenance levels on some ML 3-4 roads, enthusiasts would be constrained to a collection of ML 2 roads and trails that provide limited loop or circuit riding opportunities. For the most part, riders would only be able to unload their OHV's and ride back and forth on ML 2 roads or a few relatively short loops. After those opportunities were exhausted, riders would need to reload, move to another area, and repeat the process. Proponents have expressed concern that without some motorized mixed use, opportunities for enjoyable riding experiences on Lassen NF would be limited. To provide a high-quality OHV touring experience, appropriate riding opportunities need to be available for users. A survey of OHV enthusiasts in Colorado indicates that a typical OHV ride lasts 4.7 hours and covers a total length of 29 miles (Crimmins 1999). Results from a similar survey in Iowa indicate that 39 percent of users feel minimum trail length needed for an enjoyable OHV experience is between 10 and 20 miles. Over 36 percent of OHV enthusiasts stated they need more than 20 miles for the same experience (IDOT 2000).

Other access advocates provided reasons why they thought more unauthorized routes should be added to the existing NFTS. A number of users wanted the Forest Service to provide a diversity of roads and trails to meet growing demands for OHV recreation opportunities. Others indicated that not adding unauthorized routes to the NFTS would limit opportunities for the elderly, physically disabled, and young children to visit dispersed recreation and cultural sites located more than a short distance from NFS roads and trails.

Table 23 Miles of added routes by ROS type

ROS Code	Alt. 1 Unauthorized Routes (miles)	Alt 2 Unauthorized Routes (miles)	Alt 3 Unauthorized Routes (miles)	Alt 4 Unauthorized Routes (miles)	Alt 5 Unauthorized Routes (miles)	Alt 5 ML1 routes to Motorized Trails (miles)	Mod. Alt 5 Unauthorized Routes (miles	Modified Alt. 5 ML1 routes to Motorized Trails (miles)
R	19.38	0	0	0	0.39	0	0.39	0
RN	1031.95	20.49	0	9.98	52.82	6.23	55.43	6.23
SPN	25.57	0	0	0	0	0	0	0
SPNM	5.80	0	0	0	0	0	0	0

Table 24 Acreage outside ½ mile of Routes 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 (% total Forest acreage)

	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5		Modified 5	
	Acreage and % of Total Project Area Acreage		Acreage and % of Total Project Area Acreage		Acreage and % of Total Project Area Acreage		Acreage and % of Total Project Area Acreage		Acreage and % of Total Project Area Acreage		Acreage and % of Total Project Area Acreage	
Unauthorized Route Additions*	433,885	40%	1,052,401	98%	107,2488	100%	1,053,780	98%	998,382	93%	995,087	93%
Total Mileage in Alternative	155,949	14%	203,430	19%	203,928	19%	203,461	19%	201,138	19%	201,029	19%

*Includes ML1 routes being converted to motorized trails in Alternative 5 and Modified Alternative

Table 25 Road Mileage Open to the Public Forestwide by Alternative and Class of Vehicle

Route Classification	Use Category	Alt 1 (miles)	Alt 2 (miles)	Alt 3 (miles)	Alt 4 (miles)	Alt 5 (miles)	Mod Alt 5 (miles)
Unauthorized Routes	Mostly High Clearance Non-Highway Legal Vehicles	1,089	0	0	0	0	0
NFS Trails	Segments Allowing Motorized Travel	57	62	57	57	106	108
ML 1 Roads	Closed to Public Use	280	280	280	280	280	280
ML 2 Roads	Mixed Use High Clearance Vehicles	2,568	2,584	2,568	2,657	2,657	2,658
ML 3 Roads	Mixed Use	0	8	0	0	45	10
ML 3 Roads	Highway Legal Only	544	536	544	465	420	455
ML 3 and 4 Loop Opportunities	Mixed Use	227	265	227	332	603	413
ML 4 Roads	Mixed Use	0	5	0	0	6	0
ML 4 Roads	Highway Legal Only	149	144	149	149	143	149
ML 5 Roads	Highway Legal Only	17	17	17	17	17	17
Total Mileage Open to Non-Highway Legal Vehicles		**3,714**	**2,659**	**2,625**	**2,714**	**2,814**	**2,776**
Total Miles Available for All Motorized Vehicle Use		**4,424**	**3,356**	**3,335**	**3,345**	**3,394**	**3,397**
Total NFTS Miles		**3,598**	**3,614**	**3,598**	**3,608**	**3,651**	**3,400**
Total NFTS & UR Mileage (Including closed ML1 Roads)		**4,704**	**3,636**	**3,615**	**3,625**	**3,674**	**3,677**

Table 26 Trail Mileage Open to the Public Forestwide by Alternative and Season of Use

Reason for Restriction	Restricted Period	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5 and Mod Alt 5
Winter Recreation	December 26 to March 31	271	271	271	546	546
Wet Road Damage	December 1 to April 30	0	0	0	80	88
Hunting	November 1 to July 31	0	0	0	12	12
Totals		**271**	**271**	**271**	**638**	**646**

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.

Indicator 4 measures the impact of the changes on motorized recreation by looking at the number of dispersed sites accessed by motorized roads and trails in each alternative.

Dispersed recreation sites may be campsites or parking areas for many other activities (fishing, hunting, bird watching, etc.) which are both motorized and non0motorized. Some visitors prefer the characteristics of dispersed areas, which include the lack of development, fees, registration, and management controls. Greater solitude and privacy are often possible at these more remote sites. Some visitors may prefer the freedom to engage in legal activities that would not be allowed in developed campgrounds, such as OHV use, shooting firearms, or bringing along a noisy dog. Some dispersed sites accommodate groups, providing the opportunity to camp close to each other, and away from others compared to developed campgrounds which offer no flexibility on proximity. Often dispersed recreation sites have a long history of repeated use, are often special places that visitors return to over time, creating family memories and traditions. Elimination of motorized access to them can be a significant change, especially to the elderly, or persons with disabilities. Some traditional activities relying on proximity of the vehicle such as RV's, trailer, or camper use is displaced when vehicle access is prohibited. Also, dispersed day use is more prevalent than dispersed overnight use (Clark et al. 1984). A complete list of proposed unauthorized routes for addition to the NFTS that provide access to dispersed recreation sites with mileages by alternative is available in Appendix A-1, A.

Methodology

Short-term timeframe: 1 year

Long-term timeframe: 20 years.

Spatial boundary: Project Area

Roads: Number of miles available by vehicle class and season of use.

Quality of Road/Dispersed 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).

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).

See Table 25 and Table 26 under Measurement Indicator 3 above for mileages, vehicle class and season of use for motorized recreation opportunities.

Measurement Indicator 5: Impact of proposed changes to the NFTS on neighboring private and Federal lands (dust, noise, use conflicts)

Description

This measurement indicator looks at the impact of proposed changes to the NFTS on neighboring private and Federal lands (dust, noise, use conflicts) by alternative.

Those alternatives with fewer roads would not present as much of an impact in terms of noise, dust, and physical presence on places where people live. The most notable indicator of the use of newly designated routes by motorized vehicles would be the potential for an increase in background sound adjacent to the road or trail being used. The number of miles by alternative that would be added to the NFTS within ½ mile of neighboring private and Federal lands is shown in Table 27.

Methodology

The specific measure is the number of miles of new routes proposed within ½ miles of populated areas, neighboring Federal land boundaries, wilderness boundaries, and private land boundaries. This method of measure acts as surrogate indicating how much conflict off NFTS may occur by alternative (Table 27).

Table 27 Number of miles of routes proposed for addition to the NFTS under each alternative within ½ mile of neighboring private and Federal lands

	Alt 1 (miles)	Alt 2 (miles)	Alt 3 (miles)	Alt 4 (miles)	Alt 5 (miles)	Modified 5 (miles)
Unauthorized Route Additions	[a]499	12	0	6	25	26
ML 1 to Motorized Trails	0.00	0.00	0	0	3	3
Total Mileage in Alternative	[a]499	12	0	6	28	29

[a]Unauthorized routes under Alternative 1 are not added to the NFTS, but would be available for use.

Affected Environment and Environmental Consequences

Affected Environment

The Lassen National Forest (LNF) offers a variety of high quality recreation opportunities in a range of settings, year round. Three geomorphic provinces meet within the Forest and contribute to its great diversity-the Sierra Nevada Mountains, the Southern Cascade Mountains, and the Modoc Plateau. Elevations on the Forest range from 900 feet to 8,677 feet. Topography varies from deep river canyons, vast sage brush flats to sharp rocky peaks. The Forest completely surrounds the Lassen Volcanic National Park and the 10,457 foot Lassen Peak is a prominent feature viewed from many locations on the Forest. Proximity to the National Park and a variety of access point from the Forest increase Forest visitors' opportunity for quiet recreation.

Other federal lands adjacent to the Lassen National Forest include the Plumas National Forest (south), Shasta-Trinity National Forest (north), Bureau of Land Management (BLM) (north and east), and the Lassen Volcanic National Park (NPS) and Tehama Wildlife area (State of California) (west). The ROS classes for each of the bordering National Forests vary, but are compatible with the ROS classes on the Lassen National Forest. National Forest ROS classes may not be entirely compatible with NPS and BLM management, proposed changes would require coordination with them. Private lands surrounding the Lassen National Forest vary between rural/sparsely populated to residential subdivisions. In addition the Forest has significant acreage held by private timber companies like Sierra Pacific Industries, Collins Pine Company, Beaty & Associates, and Fruit Crowers. Many adjacent residents enjoy riding directly onto Forest land from their property and would prefer to continue, others strongly disagree. These issues have surfaced at several locations on the Forest and are difficult to resolve. The prohibition on cross country travel will eliminate many of these routes from future use.

The Forest provides a wide range of recreation facilities located in attractive settings, primarily located along lakes and rivers. Developed facilities include: 44 campgrounds, 10 day use/picnic areas, 5 boating sites, 283 recreation residences, 5 organization camps 7 outfitter/guide services and 1 marina. Approximately 30 recreation event special use authorizations are issued annually.

The Volcanic Legacy All American Road bisects the Forest via Highway 89, 36, 44, and 147. This Scenic Byway offers Forest visitor many opportunities for viewing scenery, and wildlife as well as discovery of historic points of interest. The recently designated Lassen Backcountry Discovery Trail provides a contrast in opportunity to view the Forest. The Discovery trail is located almost entirely on ML 3 routes beginning on the Modoc National Forest, continuing through the Lassen National Forest and onto the Plumas National Forest. This trail offers visitors a more challenging trek through the Forest and provides a venue for discovery of more remote recreation settings and challenges. Federal Highways is

beginning a multi-million dollar project to pave the Skyway approximately 5 miles from Inskip (just above the community of Paradise) to Butte Meadows. This improvement is expected to significantly increase access to and use of National Forest Lands, including the often over-crowded High Lakes OHV area.

Motorized Recreation Opportunities

The key goal of recreation management is to provide for a wide range of recreation opportunities. Where appropriate, the Forest goal is to provide OHV recreation opportunities in a variety of settings from semi-primitive motorized areas to fairly developed Roaded Natural areas. OHV trails should also offer a range of trail experiences in varying lengths and degrees of difficulty (easy to difficult), as well as a variety of recreation opportunities. These include access to dispersed recreation sites, picnicking, fishing, hunting, viewing wildlife, scenic vistas, trailheads and other activities in the backcountry of the Forest. Motorized trails primarily used by non highway legal vehicles should be designed for user enjoyment and challenge by providing views, loops and connections to explore a variety of trails and areas. These factors facilitate a quality recreation experience. A large system of motorized trails results in increased opportunity for solitude, and remoteness. A small system compresses the increasing use into a limited area, resulting in overcrowding, dust, noise and user conflict (between other motorized and non-motorized users) and can result in resource degradation which affects the recreational setting.

There are several areas on the Forest that have concentrated OHV use: High Lakes, Front Country, Philbrook, and Potato Buttes. The High Lakes and Front Country are currently designated as OHV areas in the LRMP and offer the greatest opportunity for challenge and experience to a wide variety users and vehicles; ATV's, rock crawlers, motorcycles, modified custom high clearance 4X4's, other OHV's. The High Lakes area has documented OHV use dating back to the early 1930's when the area was accessed primarily for mining, and cutting shakes for roofs. The High Lakes area is rugged and some consider this area the "official" break between the Sierra and Cascade mountain ranges. The season of use in the High Lakes varies each year depending on the amount of snow. Generally the area is accessible by mid June and use will continue through mid November. The Front Country OHV area is located on the northern boundary of the Ishi Wilderness, and some routes in this area are very rugged. The area is characterized as oak/pine woodland, with rocky terrain. This area does offer challenge to a variety of vehicle types and challenge. The Front Country area does offers some loop riding opportunities when routes in the Tehama Wildlife area are available. The bulk of the major use in this area occurs during late season hunting when hundred of people in a variety of vehicles come to the area and set up camps in historically used dispersed recreation sites along Ponderosa Way and other system roads. A typical camp will have RV's, campers, tent trailers and tents. Nearly all of the camps will have a have an ATV, jeeps, OHV, rock crawlers, etc for use in the OHV area.

The Forest does have an OHV (greensticker) grant to begin the process for development of an area management plan for the Front Country, and the High Lakes. To date, an inventory of all existing routes has been completed and development of a proposed action is planned in the near future. This project is currently listed on the Forest SOPA (Schedule of Proposed Actions) however; no timeframes have been established for completion. Both the High Lakes and the Front Country have Forest Orders restricting travel to posted open routes. Enforcement of these orders is not consistent. In recent years, both areas have seen the development of "play areas" that offer challenge for rock climbers, new routes or short cuts between trails. Use in the Philbrook area is concentrated mostly on historic road, user created routes or on Forest system roads (mostly ML 3) primarily used to access the High Lakes area from campgrounds, and cabins near Philbrook Lake. Soda Ridge is also a popular destination for OHV's from the Philbrook area. Potato Butte is an area located between Highway 89 and 44 near Old Station. This area is heavily used by the OHV community via a maze of user created routes that access dispersed recreation areas as well as OHV riding opportunities. This area has a combination of private lands and National Forest with resource impacts to both entities. The Forest does have a grant from the State (greensticker) to begin a planning effort to address issues in this area, a timeline for a final decision is unknown at this time. This project is currently listed on the Forest SOPA (Schedule of Proposed Actions).

There are several large (600+ member), well organized groups that are engaged in maintaining existing OHV opportunities and have identified many routes that provide loops and connecting motorized trails. These groups work cooperatively with the Forest under a Challenge Cost Share Agreements, Individual Volunteer Agreements and/or Sponsored Group Volunteer Agreements to complete trail maintenance project, trail patrols, and conduct restoration projects on areas impact by unauthorized OHV use. One of these groups, Friends of the High Lakes was Region 5's 2009 nominee for the National Sponsored Group Volunteer award for their commitment to the High Lakes and the OHV program on the Forest.

The Lassen National Forest has a well developed winter recreation program which emphasizes snowmobile use and includes 546 miles of snowmobile trails that connect to six well-placed developed staging areas.

Non-Motorized Opportunities

The Forest contains three designated Wildernesses (78,060 acres), three proposed wilderness areas, (61,686 acres); three recommended eligible; suitable rivers for federal Wild and Scenic River designation (84 miles), and six Research Natural Areas (RNA's). These areas are outside of the project area, for more information please refer to Chapter 1. Most of the managed non-motorized lands lie within the Primitive (P) and Semi-primitive non-motorized (SPNM) settings which are free of conflicts with motorized activities. Several

hundred miles of non-motorized trails exists outside of these areas in the Roaded Natural (RN) setting offering a range of non-motorized opportunities. These areas are covered in more detail in the Special Areas section of this document. These trails vary from heavily used, paved bicycle trails, and interpretive trails to more moderately used National Recreation Trails and the Pacific Crest Scenic Trail.

The Forest has over 430 miles of hiking trails. These trails range from little more than a fishing access path to nationally designated trails such as the Pacific Crest Trail. Forest hiking trails provide a wide range of opportunities for hikers, equestrians, and, where permitted, bicyclists.

The Forest has abundant opportunities for cross country skiing. There are several locations on the Forest that are closed by Forest Order to motorized vehicles to allow for solitude on designated cross country ski trails. These trails are designed to challenge a variety of skill levels and are marked from easy to most difficult. They are groomed periodically during the snow season.

Recreation Activity Participation

To determine the potential effects of management alternatives, it is important to understand the characteristics of people who visit and recreate on Lassen NF. Responding to the need for improved information about visitors to NFS lands, the Forest Service developed a nationwide, systematic monitoring process for estimating annual recreation use: the National Visitor Use Monitoring (NVUM) program.

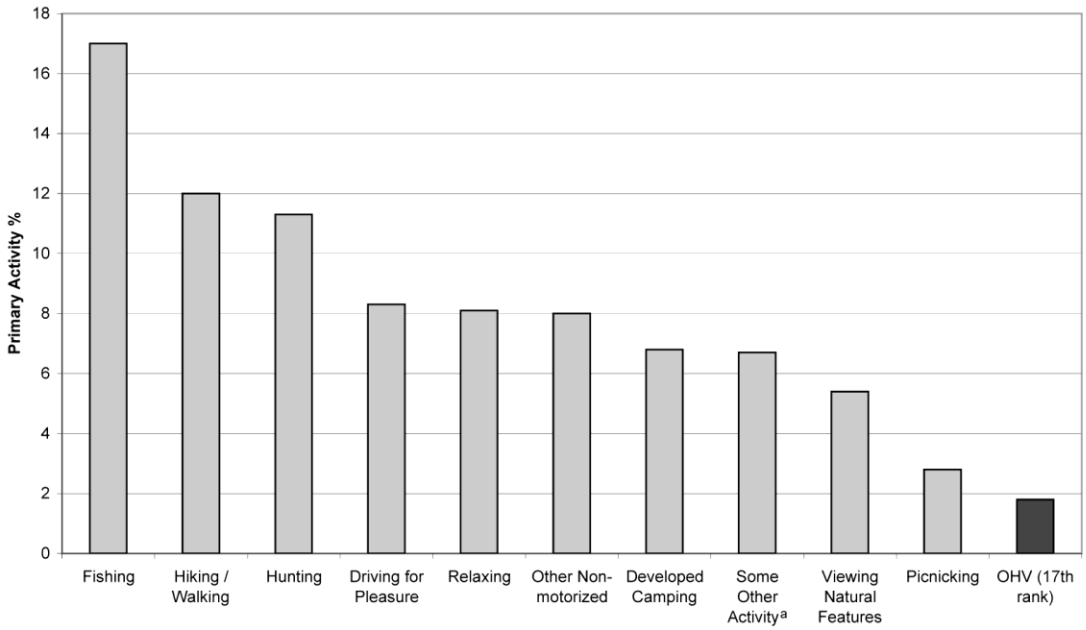
The NVUM program was designed to provide statistically reliable estimations of recreation visitation to National Forests and Grasslands. Through collection and dissemination of information about recreational users and their preferred activities, resource managers can make informed, strategic decisions about the types and amount of recreation opportunities provided on Lassen NF.

National Visitor Use Monitoring surveys were conducted on Lassen NF during calendar year 2000 and fiscal year 2005, the results of which were published in 2001 and 2006, respectively (USDA FS 2001a, 2006b). Surveys collected information about participation in recreation activities, visitor demographics, and spending patterns. Summaries from these surveys are useful to describe recreation use patterns on Lassen NF. As displayed, these data are only valid at the Forest level and cannot be disaggregated to specific sites or locations.

Results from both surveys indicate most Lassen NF visitors reside in towns and cities close to the Forest. National Visitor Use Monitoring identifies Susanville, California as the community representing the highest number of Lassen NF visitors (12.4 percent of total use). Most other visitors reside in small towns within or surrounding Lassen NF and large population centers in Sacramento Valley (such as Chico, Redding, and Red Bluff) and

northern Nevada (Reno and Carson City). Sacramento and the San Francisco Bay Area metropolis also represent substantial numbers of visitors to Lassen NF.

Recreation activity participation levels represent the average of the two NVUM surveys. The following three graphs show primary activity levels (Figure 1), secondary activity levels (Figure 2), and total activity levels (Figure 3) of visitors to the Lassen NF.



[a]Category not surveyed or reported in 2001 NVUM; Source: USDA FS 2001a, 2006b.

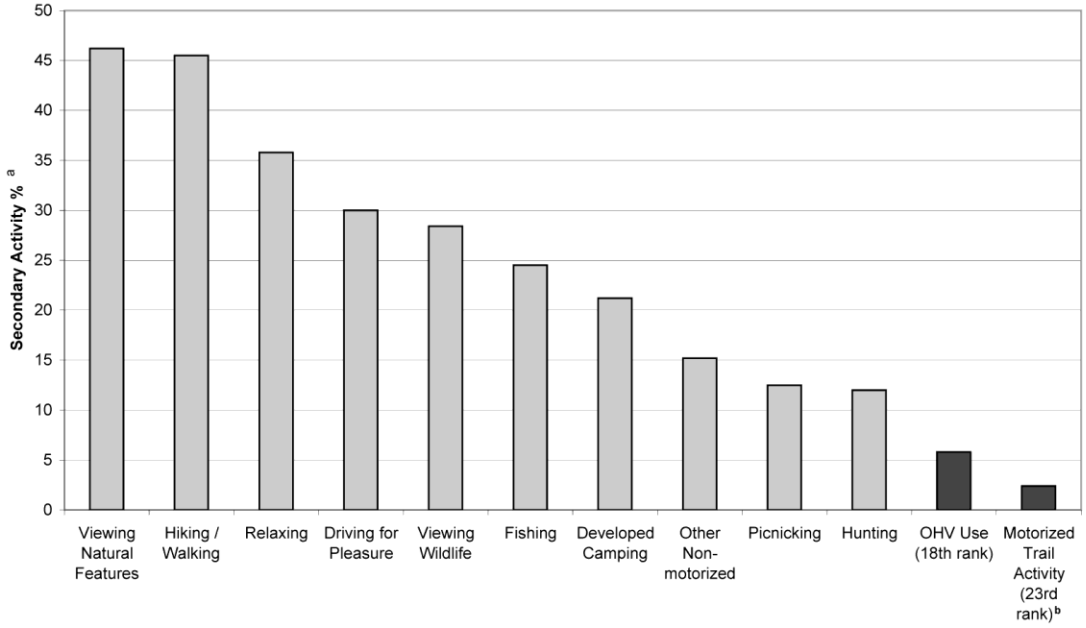
Figure 1 Primary activity participation on Lassen NF; ten most popular activities and OHV use

The NVUM classifies recreation activities as primary or secondary. For example, a user whose primary activity is fishing might also be participating in relaxation, viewing natural features, and viewing wildlife as secondary activities. Another example would be secondary recreation activities of a user whose primary activity is OHV use. That person might also be relaxing, viewing natural features, or perhaps driving for pleasure. There are innumerable combinations of secondary activities that recreation users may experience along with their primary activities.

Total recreation participation levels represent the sum of primary activities and secondary activities. This number provides best estimates for use levels of a given recreation activity on the Forest. NVUM identifies hiking/walking, viewing natural features, relaxing, fishing, driving for pleasure, and viewing wildlife as the most popular recreational activities on the Forest. OHV use and motorized trail activities rank 17th and 24th, respectively.

Although motorized trail use has the lowest participation visits in the above display of activity categories, virtually all of the other categories have a component of motorized use within them since nearly everyone travels to their destination via motorized transportation

due to the remoteness of the Forest and the dispersed nature of many of the recreation opportunities. Of the activities above, for both primary and secondary participation the majority activity occurs once individuals have reached a specific destination. In many cases this indirect motorized component is the travel time to the destination, which in some cases may be related to the activity. A person driving for pleasure would likely be viewing scenery or viewing wildlife along the route to their destination. This is particularly true because the Forest is spread over more than a million acres. Many of the recreation opportunities are accessed most easily through motorized travel via a variety of road conditions and with a variety of vehicle classes (SUV's, passenger cars, ATV's/motorcycles, and 4X4). If the motorized component of all activities were reflected in one of the "motorized" categories (driving for pleasure, viewing wildlife, OHV use) the motorized components would likely be much higher.

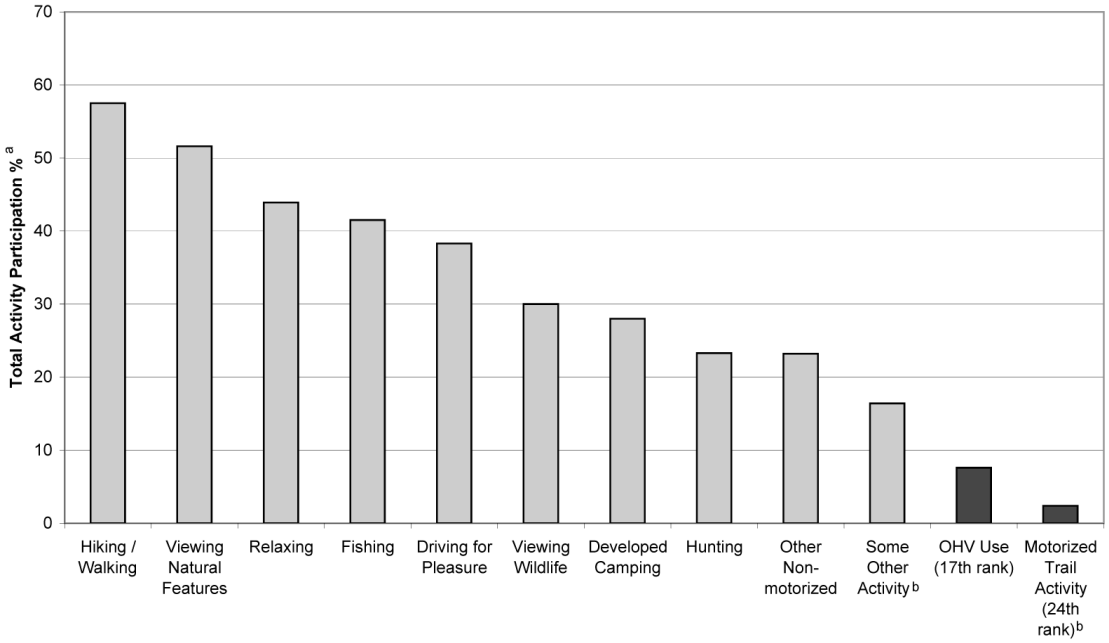


[a]Survey respondents could select multiple activities, so activity % totals more than 100%; bCategory not surveyed or reported in 2000 NVUM; Source: USDA FS 2001a, 2006b.

Figure 2 Secondary activity participation on Lassen NF; ten most popular activities and OHV use

In 2002, results of a cooperative research project between the Forest Service, Bureau of Land Management, and San Francisco State University were published (Tierney et al. 2002). The project goal was to complete a market analysis of outdoor recreation participation on public lands by residents of central and northern California (CNC), and northeastern California and northwest Nevada (NENW). Results include recreation activity participation levels for visitors to public lands in proximity to those areas. The residence

locations of survey respondents are very similar to those of participants in Lassen NF NVUM surveys.



[a]Note: Survey respondents could select multiple activities, so activity % totals more than 100%; [b]Categories not surveyed or reported in 2000 NVUM; Source: USDA FS 2001a, 2006b.

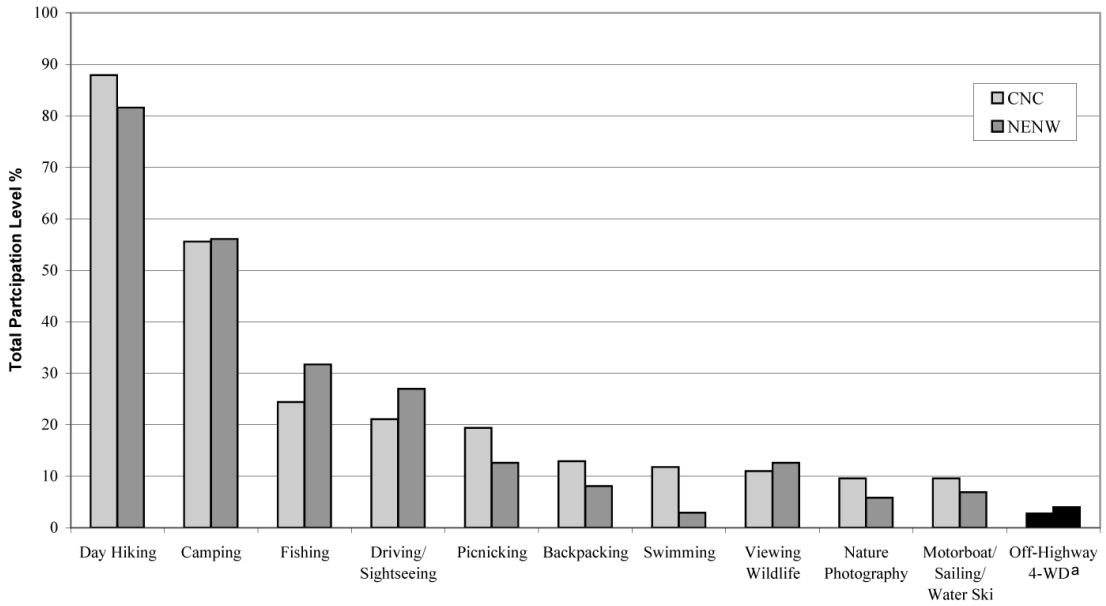
Figure 3 Total activity participation on Lassen NF; ten most popular activities and OHV use

Figure 4 represents a summary of recreation activity participation on federal lands during 2000-2001 by survey participants residing in CNC and NENW areas.

The results of the market analysis are similar to results from NVUM surveys conducted on Lassen NF. Hiking, camping, fishing, and driving for pleasure were identified as the most popular recreation activities on federal lands in CNC and NENW regions. The results from this effort have a positive correlation with NVUM summaries indicating OHV use does not have high participation rates on Lassen NF.

Recreation Use Levels

It is estimated that recreation use levels on Lassen NF accounted for approximately 656,000 National Forest visits in calendar year 2000 and approximately 607,000 national Forest visits in fiscal year 2005. Statistical methodology used for developing these estimates is fully described in NVUM survey summary documents, available in the Project Record. For purposes of this analysis, the two-year average of total recreation use on Lassen NF is estimated to be approximately 632,000 national Forest visits annually. The figures in Table 28 are estimates of annual National Forest visits for the most popular primary recreation activities and OHV use.



[a]Note: This category was the 18th (CNC) and 14th (NENW) ranked activity; Source: Tierney et al. 2002.

Figure 4 2000-2001 Recreation activity participation on Federal lands by residents of Central/Northern California (CNC) and Northeast California/Northwest Nevada (NENW)

Table 28 Lassen NF visitor estimates of primary activity

Activity Type	Primary Activity Participation %	Total Annual Visits
Fishing	17.0	107,440
Hiking/Walking	12.0	75,840
Hunting	11.3	71,416
Driving for Pleasure	8.3	52,456
Relaxing	8.1	51,192
Other Non-Motorized	8.0	50,560
Developed Camping	6.8	42,976
Some Other Activity	6.7	40,669
Viewing Natural Features	5.4	34,128
Picnicking	2.8	17,696
OHV Use	1.8	11,376

Source: USDA FS 2001a, 2006b.

Regional Recreation Participation and Trend Data

Long-term trends in outdoor recreation have been developed by social scientists based on comparisons of findings from the National Survey on Recreation and the Environment and other national recreation surveys dating back to 1960. In the study referenced for this analysis, researchers reported indexed projections for future recreation participation across four assessment regions in the United States (Bowker et al. 1999). Table 29 displays trends

for dispersed recreation activities in the Pacific assessment region. States included in the Pacific assessment region are California, Oregon, Washington, Alaska, and Hawaii.

Table 29 shows a baseline figure for the number of people participating in dispersed recreation activities, and the projected growth index for 2010, 2020, and 2030. Projection indices represent the percent increase in participants expected for each activity between 1995 and 2030 in the Pacific assessment region. Multiplying the projection index with the 1995 baseline provides the estimated increase in participation over this time period.

The data displayed in Table 29 represent a subset of recreational activities covered in the study and apply not only to NFS lands, but to the entire Pacific assessment region.

Table 29 Number of participants for selected dispersed recreation activities in the Pacific assessment region and projected index for participation in 2010, 2020, and 2030

Activity	1995 Estimated Participants	2010 Projection Index	2020 Projection Index	2030 Projection Index	2030 Estimated Participants
Viewing Wildlife	16,700,000	1.23	1.37	1.52	25,384,000
Hiking	10,900,000	1.23	1.34	1.53	16,677,000
Biking	9,800,000	1.19	1.29	1.41	13,818,000
Fishing	7,500,000	1.12	1.20	1.23	9,225,000
Primitive Camping	5,600,000	1.13	1.23	1.27	7,112,000
Off-Road Driving	4,700,000	1.10	1.20	1.20	5,640,000
Backpacking	3,800,000	1.12	1.23	1.24	4,712,000
Horseback Riding	2,400,000	1.18	1.29	1.46	3,504,000
Hunting	1,700,000	0.85	0.79	0.73	1,241,000

Source: Bowker et al. 1999.

Recreation data from the Pacific assessment region are most useful for displaying possible trends that could reasonably be expected for visitation to Lassen NF over the next 10 to 20 years. Projections indicate that viewing wildlife, biking, hiking, and fishing will be the most popular recreation activities over the next two decades.

Summary of Recreation Activity Participation

Based on the previously described recreation surveys, current use levels and trends in use patterns can be estimated for the Lassen NF. Information from NVUM and market analysis surveys indicates that most recreation use on Lassen NF is associated with activities which are predominantly non-motorized. Activities such as viewing wildlife, hiking/walking, fishing, hunting, biking, camping, and picnicking can be typified as non-motorized recreation activities. Research from the National Survey on Recreation and the Environment indicates that most people participating in outdoor recreation will continue to seek non-motorized

activities over the next few decades. Regional trends indicate the growth rates of wildlife viewing and hiking will rise approximately 30 percent between 2010 and 2030 (Table 29).

During the past few decades, there has been a dramatic growth in purchases and use of OHV's in the United States. Between 2001 and 2006, annual registration of non-highway-legal vehicles increased 112 percent in California (California Department of Parks and Recreation 2006). However, there are signs that the growth of OHV use may be stabilizing. In 2006, ATV sales were down more than eight percent from peak annual sales in 2004 (Powersports Business 2007). New unit sales were down an additional 10 percent in 2007 (Pascale 2008).

Comparing NVUM data from 2000 and 2005 surveys, it appears that OHV use has declined on Lassen NF. In 2000, 6.9 percent of respondents indicated that they participated in OHV recreation on the Forest; results from the 2005 survey indicate the same use had dropped to 4.6 percent. OHV use was identified as the primary recreation activity by 3.0 percent of users in 2000, compared to 0.6 percent in 2005.

Recreation trend research indicates that OHV use will increase, although growth rates are expected to be lower than for most non-motorized activities. Regional trends indicate the growth rate for off-road driving is expected to rise approximately 10 percent between 2010 and 2020. Between 2020 and 2030, growth of off-road driving as a recreation activity is expected to stabilize (Table 29).

Recreation Niche

The recreation niche is a characterization of the distinct role Lassen NF has in providing outdoor recreation opportunities to the public. The niche allows Forest Service to focus management efforts on providing recreation opportunities related to what is unique and valuable about the Lassen National Forest. The recreation niche statement of the Lassen NF for the next decade is:

> "Your Crossroads to Discovery–The Lassen National Forest is a crossroads of landscape and people. Here the granite of the Sierra Nevada, the lava of the Cascades and the Modoc Plateau, and the ranges of the Great Basin converge. The geologic crossroads has influenced the cultural crossroads throughout time. For generations, the Forest has and continues to provide quality of life and livelihood for local families and native people while enriching the experiences of a changing and diverse group of visitors. In this high country oasis, water is the key attraction. Large, high elevation lakes provide a social weekend get-away and clear streams offer premier fishing. The Volcanic Legacy All- American Road, Lassen Backcountry Discovery Trail and other major routes traverse the Forest offering outstanding viewing and learning opportunities and access to the Forest backcountry." (USDA FS 2007c)

Water-based recreation, hiking or walking, viewing scenery and wildlife, developed camping, and driving for pleasure, as well as geologic and cultural interpretation, provide the focus for

recreation on the Lassen NF (Table 30). Four broad niches describe this focus: lakes and special waterways, travelways, backcountry, and wildlands.

Table 30 Lassen NF Visitor Activity Participation and Primary Activity as Reported in NVUM Results (2006 year)

Activity	Percent Participating	Percent as Main Activity
Viewing Natural Features	53.9%	8.7%
Relaxing	32.7%	9.2%
Hiking / Walking	60.5%	17.4%
Downhill Skiing	2.8%	2.8%
Viewing Wildlife	44.7%	0.8%
Driving for Pleasure	40.6%	8.8%
Other Non-motorized	8.7%	2.0%
Fishing	16.0%	10.2%
Developed Camping	12.5%	3.1%
OHV Use	5.1%	0.7%
Primitive Camping	7.3%	1.4%
Nature Study	4.9%	0.2%
Hunting	24.5%	19.5%
Gathering Forest Products	14.5%	4.9%
Non-motorized Water	0.9%	0.1%
Motorized Water Activities	5.6%	0.9%
Picnicking	4.3%	0.3%
Cross-country Skiing	2.8%	2.8%
Bicycling	5.1%	3.5%
Visiting Historic Sites	6.2%	0.1%
Other Motorized Activities	0.0%	0.0%
Motorized Trail Activity	2.5%	0.0%
Backpacking	1.6%	1.4%
Resort Use	3.6%	0.1%

Based on the reported 1,399,400 visits to NFS lands on the Lassen NF during fiscal year 2005 (Table 30), this would mean that 568,157 visitors spent some time driving for pleasure, 71,369 used off highway vehicles during their visit, and the primary activity for 9,796 visitors was off-highway vehicle use. When primary motorized uses are combined (Table 31), 131,600 visitors reported driving for pleasure and other motorized activities as their main activity; versus 481,600 enjoying primarily non-motorized uses, including: backpacking, fishing, hiking/walking, horseback riding, bicycling and other non-motorized activities. Motorized access, however, is the primary form of access to non-motorized recreation activities on the Forest.

Table 31 Approximate LNF Visitors by Type of Main Activity

Type of Use	NVUM Categories	Percent as Main Activity	Approximate Number of Visitors FY2005
Camping	Developed Camping Primitive Camping	4.4%	61,600
Hunting	Hunting	19.4%	271,600
Motorized Uses	OHV use Driving for Pleasure Other Motorized Activity	9.4%	131,600
Non-motorized Uses	Backpacking Fishing Hiking/Walking Horseback Riding\ Bicycling Other Non-Motorized Activities	34.4%	481,600
Other Activities	Resort Use Picnicking Viewing Natural Features Visiting Historic Sites Nature Center Activities Nature Study Relaxing Gathering Forest Products Viewing Wildlife	24.4%	341,600
Water Sports	Motorized Water Activities Non-motorized Water	1.0%	14,000
Winter Sports	Downhill Skiing Cross-country Skiing Snowmobiling	7.0%	98,000

Environmental Consequences

Direct/Indirect Effects

Alternative 1 (No-action)

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

This No-action Alternative would propose no change to the NFTS and there would be no prohibition of cross-country travel. Cross-country travel would continue to be authorized on 1,072,488 acres, providing OHV users excellent opportunities for traveling across the Forest landscape in an unrestricted or unconfined manner, but this alternative would not prevent the Forest from establishing cross-country closures in areas for purposes of safety, resource protection, or other issues as determined by proper administrative action and appropriate public input.

Without a cross country prohibition, existing motorized use would expand, creating approximately 2.25 miles of new unauthorized routes each year. The lack of controls and enforcement capability would encourage activities that result in resource degradation and overuse. Over time, this will affect the quality of the experience for the more responsible riders. The Forest Service would be challenged to meet standards. It therefore is the least sustainable of all alternatives. With no deterrent to increasing use, demand would not be limited in any way by the supply of OHV opportunities.

Under Alternative 1, unmanaged motor vehicle use would continue. This would lead to further route proliferation caused by unmitigated, motorized cross-country travel. Quality of the natural environment at popular OHV areas such as Twin Bridges/Old Station would continue to decline, and impact Forest lands and adjacent private lands. As route proliferation and motor vehicle use increase, visitors seeking to participate in quiet recreation activities would find fewer areas on the Forest available for those opportunities. This alternative would not be responsive to the Travel Management Rule and would likely escalate perceived conflict between non-motorized and motorized recreationists.

Some of the existing unauthorized routes are within SPNM areas, which is not in line with the LRMP for this ROS type (Table 23).

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 authorizations as NFTS facilities.

This alternative has the most mileage available for motor vehicle use. Cross-country travel would continue to be allowed on 1,072,488 acres of NFS lands including use of 1,089 miles of unauthorized routes. Use over time, including associated noise and dust impacts, would remain at around the same levels.

This alternative had the most effect to neighboring private and federal lands (Table 27).

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

Unauthorized routes would not be maintained or added to the NFTS, although unmanaged use of those routes would continue. In many areas, visitors could have difficulty navigating a dense web of motor vehicle routes not identified on a map or signed on the ground.

Under this alternative, there would be no seasonal restrictions for additions to the NFTS, since there would be no additions.

Visitors to the Forest seeking a quiet, non-motorized recreation experience would continue to be adversely affected by noise, dust, and other factors caused by motor vehicles if they choose to recreate in developed sites or areas currently popular with OHV enthusiasts (Table 24).

Due to relatively low numbers of OHV users or other visitors, many large parcels within the project area would continue to provide users opportunities to participate in quiet recreation activities. However, those parcels would still be open for cross-country motor vehicle use, and recreationists engaged in non-motorized pursuits would be subject to possible conflicts from noise and/or encounters with motor vehicles. Within the affected area, unauthorized routes and restricted ML 1 roads would continue to be available for non-motorized activities such as hiking, hunting, and wildlife viewing. 155,949 acres would be available as quiet areas located more than one-half mile from designated routes (Table 24). Total mileage of NFS roads, NFS trails, and unauthorized routes available for all motorized

vehicle use is 4,424 (Table 25). Hunting and big game retrieval would continue as in the past with no restrictions on cross country vehicles travel to animals or favorite hunting spots.

Direct/indirect effects of changes to the existing NFTS including changing the vehicle class and season of use.

No changes would be made to the current NFTS under this alternative.

There would be no motorized route reductions near populated areas or campgrounds. No specific non-motorized developed or dispersed recreation activity would be displaced.

The quality and diversity of Forest motorized recreation experiences, including driving for pleasure and touring, adequate sport experiences, loop opportunities, mixed use roads to connect loops and create longer routes, diversity of trail difficulty and access to desirable features would not change from the condition.

Seasonal Restrictions would include 271 miles for winter recreation from Dec. 26 through March 31 of each year (Table 26). Within the affected area, unauthorized routes and restricted ML 1 roads would be available for non-motorized activities such as hiking, hunting, and wildlife viewing; 155,949 acres would be available as quiet areas located more than one-half mile from designated routes.

This alternative is providing 227 miles of loop opportunities; less than that provided under any of the other Alternatives. This figure is based on the fact that OHV's are not currently allowed to operate on ML 3 and 4 roads (Table 25). This alternative has loops of approximately 28 miles or more in the northern most part of the Hat Creek Ranger District, as well as 110 miles on the eastern edge and westernmost portions of that District. The Eagle Lake Ranger District has riding loops of about 50 miles or more along the easternmost and close to 40 miles in the central and westernmost portions of the District. This alternative has no loop opportunities identified on the Almanor Ranger District. Loop opportunities would provide for longer motor vehicle touring for a variety of vehicle types.

Alternative 2 (Proposed Action)

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

Indicators Measures: Non-Motorized Recreation Opportunity, Motorized Recreation Opportunity, Impact of Proposed Changes to the NFTS on Neighboring Private and Federal Lands.

Cross-country travel off designated NFS roads and trails would be prohibited on approximately 1,072,440 acres, except as allowed by permit or other authorization. Under this alternative, cross-country motor vehicle use would end. Damage caused by route proliferation and cross-country travel would slowly heal after motor vehicle travel restrictions were implemented. Aesthetics of the natural landscape would improve over time, increasing the appeal of the Forest for most visitors. Opportunities for a high-quality, non-motorized recreation experience would improve, because larger areas would be unaffected by ongoing motor vehicle travel.

The prohibition of wheeled motor vehicle use off of the NFTS would have a beneficial effect on non-motorized recreation activities throughout the Forest, it would curtail on-going (noise, dust, and physical presence) effects in the short and long term (Table 27).

Within the affected area, unauthorized routes and restricted ML 1 roads would be available for non-motorized activities such as hiking, hunting, and wildlife viewing. There would be 203,430 acres available for quiet recreation located more than one-half mile from designated routes (Table 24).

For motorized recreation, there would be a net loss in miles and acreage accessible for dispersed recreation and other activities. Hunting and big game retrieval would be impacted by restricting access to historical remote locations. Some historically used dispersed camp sites would no longer be accessible causing visitor dissatisfaction and displacement.

Impacts to neighboring private and Federal lands would benefit in the short and long term by the cross country prohibition resulting in less noise, dust, and physical presence (Table 27).

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

Indicators: ROS Consistency with LRMP, Non-Motorized Recreation Opportunity, Motorized Recreation Opportunity, Impact of Proposed Changes to the NFTS on Neighboring Private and Federal Lands.

A total of 21 miles of unauthorized routes would be added to the NFTS as ML 2 NFS roads (16 miles) or as motorized NFS trails (5 miles). These 21 miles would be designated for highway- and non-highway-legal motor vehicles. No other unauthorized routes would be added to the NFTS. The NFTS would include 3,356 miles of roads and motorized trails available for motorized vehicle use within the project area (Table 25). These routes would provide access to dispersed recreation sites and support very limited additions to existing loop/circuit opportunities for non-highway-legal vehicles (Table 33 and Table 36).

Adding roads or trails would allow the motoring public continued motorized access to more areas of the Forest, which will add to their outdoor experience. This alternative would add approximately 265 miles of loop opportunities (Table 33). All of these loops are located on the Hat Creek (155 miles) and Eagle Lake (110 miles) Districts.

All routes proposed for addition to the NFTS comply with the ROS class in the associated management area (Table 23).

This alternative adds 12 miles of routes near private and federal lands. However, a closer inspection of the analysis reveals that the majority of the routes are near Lassen National Park rather than private landowners, this may have the effect of disturbing non-motorized recreation users of the park through noise, dust, and physical presence (Table 27).

Direct/indirect effects of changes to the existing NFTS including changing the vehicle class and season of use

Indicators: Non-Motorized Recreation Opportunity, Motorized Recreation Opportunity, Impact of Proposed Changes to the NFTS on Neighboring Private and Federal

Lands.

Thirteen miles of roads would be designated for motorized mixed use by both highway- and non-highway-legal motor vehicles. Only those winter seasonal restrictions specified in existing, annually-recurring Forest Orders would be continued as reflected in the MVUM. Wheeled motorized travel would not change from the current restrictions on 271 miles of roads groomed for winter snow-mobile recreation (Table 26). These roads would be open to public motorized travel between April 1 and December 25. Additional mitigation measures would be needed as shown in Table 32.

Changing vehicle classes will allow more of the motoring public to experience the Forest environment. Different classes of vehicles will mean there may be more issues of sharing the road with others. Deleting roads or trails will negatively impact the motoring public by reducing miles of wheeled access, but could have a positive effect on non-motorized opportunities and for dispersed recreation and other resource concerns (Table 24, Table 27 and Table 36).

Table 32 Alternative 2: Recreation mitigation measures which would be required for each specific unauthorized route prior to designation to the Lassen NF National Forest Transportation System

Route ID	Quad	Administrative Measure
310716UC01 310716UC02	Bogard Buttes	Sign area to keep vehicles on established routes. Post leave no trace/light on the land use ethics. Sign unauthorized routes for vehicle restrictions.
UBB412	Pegleg Mtn.	Sign to keep vehicles on established route. Post leave no trace land use ethics. Sign unauthorized routes for vehicle restrictions.
UBB414	Pegleg Mtn.	Sign area to keep vehicles on established route. Post leave no trace land use ethics.
UBB416	Pegleg Mtn.	Sign to keep vehicles on established route. Post leave no trace land use ethics.
UBB707 UBB707A	Mineral	Define parking area for resource protection; sign area to keep vehicles on designated route. Post leave no trace/light on the land use ethics
ULA488	Pegleg Mtn.	Sign area to keep vehicles on established route. Post leave no trace land use ethics.
ULA488-1	Pegleg Mtn.	Sign area to keep vehicles on established route. Post leave no trace land use ethics.
ULA489A	Pegleg Mtn.	Sign area to keep vehicles on established route. Post leave no trace land use ethics.
ULA489B	Pegleg Mtn.	Sign area to keep vehicles on established route. Post leave no trace land use ethics.

Table 33 Summary of Loop Opportunities by Alternative

Alternative 1 - Loop	Miles
Northernmost in Hat Creek	28.3
Along eastern edge of central Hat Creek	80.4
Westernmost in Hat Creek	30.0
Easternmost in Eagle Lake	49.8
Central Eagle Lake	20.6
Westernmost in Eagle Lake	18.2
Total	**227.3**
Alternative 2 - Loop	**Miles**
Northernmost in Hat Creek	28.3
Along eastern edge of central Hat Creek	80.4
Westernmost in Hat Creek	47.2
Westernmost in Eagle Lake	37.1
Central Eagle Lake	22.6
Easternmost in Eagle Lake	49.4
Total	**265.0**
Alternative 4 - Loop	**Miles**
Northernmost in Hat Creek	61.2
Along eastern edge of central Hat Creek	91.3
Westernmost in Hat Creek	30.0
Northernmost in Eagle Lake	61.9
Easternmost in Eagle Lake	38.3
Central Eagle Lake	20.6
Westernmost in Eagle Lake	28.2
Total	**331.5**
Alternative 5 - Loop	**Miles**
Massive loop that crosses Eagle Lake and Hat Creek	474.8
Easternmost in Eagle Lake	48.7
Westernmost in Hat Creek	40.9
Turner Mountain Loop in Almanor	38.6
Total	**603.0**
Modified Alternative 5 - Loop	**Miles**
Northernmost in Hat Creek	61.3
Along eastern edge of central Hat Creek	103.3
Westernmost in Hat Creek	32.3
Northernmost in Eagle Lake	61.9
Easternmost in Eagle Lake	38.0
Central Eagle Lake	21.2
Westernmost in Eagle Lake	26.2
Lassen Trail/Pegleg/Swain Mtn area	21.8
Turner Mountain Loop in Almanor	38.6
Total	**404.6**

Not adding most unauthorized routes to the system would eliminate opportunities for motor vehicle users to continue cross-country travel on them. However, most of these routes are the result of timber sales and other vegetation management activities. The majority of these roads do not access recreation destinations or provide for development of loop or circuit opportunities. Several unauthorized routes are redundant and serve the same destination as parallel system roads. Most unauthorized routes not added are short, dead-end spurs that end at timber harvest landings.

Visitors participating in non-motorized recreation activities would benefit from this alternative. Prohibition of cross-country travel on 1,072,440 acres of NFS lands and not adding unauthorized routes to the NFTS would create larger areas where non-motorized recreation activities would not be subject to direct interaction or conflict with motor vehicles. Approximately 203,430 acres would be available as quiet recreation areas (Table 24).

This alternative has 265 miles of loop opportunities, 38 miles more than Alternative 1 and Alternative 3 but less than Alternative 4 and 5 (Table 25). This alternative is very similar to the No-action alternative in that it has loops of 20-miles or more in generally the same locations, the northern most part of the Hat Creek Ranger District, as well as the eastern edge and westernmost portions of that District. The Eagle Lake Ranger District has riding loops of 20-miles or more along the easternmost, central and westernmost portions of the District (Table 33). Routes proposed for addition to the NFTS comply with the ROS class in the associated management area (Table 23).

Alternative 3

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

Indicators: Non-Motorized Recreation Opportunity, Motorized Recreation Opportunity, Impact of Proposed Changes to the NFTS on Neighboring Private and Federal Lands.

Under this alternative, cross-country motor vehicle use would end. Damage caused by route proliferation and cross-country travel would slowly heal after motor vehicle travel restrictions were implemented. Aesthetics of the natural landscape would improve over time, increasing the appeal of the Forest for most visitors. Opportunities for a high-quality, non-motorized recreation experience would improve, because larger areas would be unaffected by ongoing motor vehicle travel.

The prohibition of cross-country wheeled motor vehicle use would have a beneficial effect on non-motorized recreation activities throughout the Forest, in populated areas, and neighboring federal lands. In the short and long terms; it would curtail on-going effects (noise, dust, and physical presence). For motorized recreation, there would be a net loss in acreage (inclusive of the unauthorized mileages).

An estimated 203,928 acres would be available as quiet areas located more than one-half mile from designated routes. Public motor vehicle travel off designated NFTS roads and

trails on approximately 1,072,488 acres would be prohibited, except as allowed by permit or other authorization. No unauthorized routes would be added to the NFTS as NFS roads or NFS trails. Mileage proposed would be limited to the existing NFTS classifications. No changes to vehicle class restrictions will occur. No additional motorized mixed use would be proposed.

Approximately 3,335 miles of NFTS roads and trails would be available for motor vehicle use under this alternative (Table 25).

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

Indicators: ROS Consistency with LRMP, Non-Motorized Recreation Opportunity, Motorized Recreation Opportunity, Impact of Proposed Changes to the NFTS on Neighboring Private and Federal Lands.

No unauthorized routes would be added to the NFTS as NFS roads or NFS trails under this alternative. Mileage proposed under this alternative would be limited to the existing NFTS classifications. Loop opportunities of 20 miles or longer would be available, but limited in number (Table 24 and Table 33). These loops would increase duration of motor vehicle touring for a wide range of vehicle types.

Visitors who wish to use existing dispersed campsites would be adversely affected by this alternative. Almost all dispersed campsites on the Lassen NF are accessed by short unauthorized road spurs. Without designation, it would be illegal to drive a vehicle on routes leading to existing dispersed sites. Under this alternative, campers would be forced to park no more than one vehicle length from a designated route and walk to dispersed recreation.

Additions to the NFTS comply with the ROS class in the associated management area (Table 23).

This alternative is the best in terms of the impacts to neighboring private and federal lands since it makes no additions to the NFTS (Table 27).

This alternative adds no mileage near private and federal lands. There should be no effect from additional noise, dust, and physical presence to non-motorized recreation users (Table 27).

Direct/indirect effects of changes to the existing NFTS including changing the vehicle class and season of use

Indicators: Non-Motorized Recreation Opportunity, Motorized Recreation Opportunity, Impact of Proposed Changes to the NFTS on Neighboring Private and Federal Lands.

Not adding unauthorized routes to the NFTS would have a negative effect on access and motorized recreation opportunities by reducing opportunities relative to existing conditions. At the same time, not adding these routes would benefit non-motorized recreation due to a decrease in noise, dust, physical presence, possible use conflicts and displacement.

Season of use restrictions may have a negative effect to short and long term motorized opportunities and a beneficial effect to non-motorized opportunities by increasing the acres available for those activities during the closure (Table 24).

There are no changes in class that restrict or expand motor vehicle use on the NFTS under this alternative.

Most unauthorized routes not being added to the NFTS are the result of timber sales and other vegetation management activities. The majority of these routes do not access recreation destinations or provide for development of loop or circuit opportunities. Several unauthorized routes are redundant and serve the same destination as parallel system roads; most such routes are short, dead-end spurs that end at timber harvest landings.
Only those winter seasonal restrictions specified in existing, annually-recurring Forest Orders would be continued. Wheeled motorized travel would not change from the current restrictions on 271 miles of roads groomed for winter snow-mobile recreation (Table 26). These roads would be open to public motorized travel between April 1 and December 25.

This alternative has 227 miles of loop opportunities, tied with Alternative 1 as having the lowest number (Table 25 and Table 33). This figure is based on the fact that OHVs are not currently allowed to operate on ML 3 and 4 roads (Table 25 and Map 15 – Alternative 1 and 3 Current System with Circuits/Loops). Hunting and big game retrieval would impacted by the lack of historical access to many remote locations. Some historically used dispersed camp sites would no longer be accessible causing visitor dissatisfaction and displacement.

Alternative 4

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

Indicators: Non-Motorized Recreation Opportunity, Motorized Recreation Opportunity, Impact of Proposed Changes to the NFTS on Neighboring Private and Federal Lands.

Public motor vehicle travel off designated NFTS roads and trails on approximately 1,072,476 acres would be prohibited, except as allowed by written permit or other authorization. Under this alternative, cross-country motor vehicle use would end. Damage caused by route proliferation and cross-country travel would slowly heal after motor vehicle travel restrictions were implemented. Aesthetics of the natural landscape would improve over time, increasing the appeal of the Forest for most visitors. Opportunities for a high-quality, non-motorized recreation experience would improve, because larger areas would be unaffected by ongoing motor vehicle travel.

Within the affected area, unauthorized routes and restricted ML 1 roads would be available for non-motorized activities such as hiking, hunting, and wildlife viewing. 203,461 acres would be available as quiet areas located more than one-half mile from designated routes (Table 24). Approximately 3,345 miles or NFTS roads and trails would be available

for motorized vehicle use under this alternative (Table 25). Routes proposed for addition to the NFTS comply with the ROS class in the associated management area.

Visitors who wish to use existing dispersed campsites would be adversely affected by this alternative. Almost all dispersed campsites on the Lassen NF are accessed by short unauthorized road spurs. Without designation, it would be illegal to drive a vehicle on routes leading to existing dispersed sites. Under this alternative, campers would be forced to park no more than one vehicle length from a designated route and walk to their dispersed camps. Additional mitigation measures would be needed as shown in Table 34.

Direct/Indirect Effects of adding facilities (presently unauthorized roads and trails) to the NFTS, including identifying seasons of use and vehicle class

Indicators: ROS Consistency with LRMP, Non-Motorized Recreation Opportunity, Motorized Recreation Opportunity, Impact of Proposed Changes to the NFTS on Neighboring Private and Federal Lands.

Visitors participating in non-motorized recreation activities would benefit from this alternative. Prohibition of cross-country travel on NFS lands and not adding many unauthorized routes would create larger areas where non-motorized recreation activities would not be subject to direct interaction or conflict with motor vehicles.

A total of 10 miles of unauthorized routes would be added to the NFTS as ML 2 roads. These 10 miles would be designated for highway- and non-highway-legal motor vehicles. No other unauthorized routes would be added to the NFTS. Approximately 3,345 miles of NFTS roads and trails would be available for motor vehicle use under this alternative. This alternative would add approximately 331 miles of loop opportunities on the Hat Creek (182 miles) and Eagle Lake (149 miles) Districts (Table 33).

Visitors who wish to use existing dispersed campsites would be negatively affected by this alternative (Table 36). Almost all dispersed campsites on the Lassen NF are accessed by short unauthorized road spurs. Without designation, it would be illegal to drive a vehicle on routes leading to existing dispersed sites. Under this alternative, campers would be forced to park no more than one vehicle length from a designated route and walk to their dispersed camps.

Visitors participating in non-motorized recreation activities would benefit from this alternative. Prohibition of cross-country travel on NFS lands and not adding many unauthorized routes would create larger areas where non-motorized recreation activities would not be subject to direct interaction or conflict with motor vehicles.

This alternative adds 6 miles of routes near private and federal lands. However, a closer inspection of the analysis reveals that the only route (UNW100) goes near Bureau of Land Management Land rather than private landowners, this may have the effect of disturbing non-motorized recreation users through noise, dust, and physical presence (Table 27).

Direct/indirect effects of changes to the existing NFTS including changing the vehicle class and season of use

Indicators: Non-Motorized Recreation Opportunity, Motorized Recreation Opportunity, Impact of Proposed Changes to the NFTS on Neighboring Private and Federal Lands.

Not adding most unauthorized routes to the NFTS would have an adverse effect on access and motorized recreation opportunities by reducing opportunities relative to existing conditions. At the same time, non-motorized recreation visitors would benefit due to a decrease in noise, dust, physical presence, possible use conflicts, and displacement (Table 27).

Objective maintenance levels are being changed in order to provide for mixed use opportunities on approximately 79 miles of roads in this alternative. This will improve the riding experience for non-highway legal vehicles by making the conditions rougher as the roads will not be maintained as frequently. For Forest users that do not drive four-wheel drives or OHVs the roads will deteriorate and make them less accessible to these Forest users.

Season of use restrictions may have a negative effect short and long term to motorized opportunities and a beneficial effect to non-motorized opportunities by increasing the acreage available for those activities during the closure. Seasonal closures would have a greater impact on motor vehicle recreation under this alternative compared to Alternatives 1-3 (Table 26). The proposed closure would extend annually from December 1 to April 30 and would be open to motor vehicle use from May 1 to November 30. This proposal would prevent use of those roads by motor vehicle users for a five-month period, reducing motor vehicle access to areas of the Forest affected by the closure. These seasonal restrictions would be put into place in order to limit damage to roads from potentially severe rutting due to motor vehicle operation during periods when road beds are water-saturated and easily impacted.

The winter closures for groomed trails would be extended to include all snowmobile and cross-country ski trails identified in the Lassen NF Winter Recreation Guide (Project Record). In addition, the winter closure would also extend to NFS roads that are only accessible by traversing the trails identified in the Guide. This seasonal closure would close an additional 275 miles of NFS roads compared to Alternatives 1-3 (Table 26). Use of motor vehicles would remain seasonally restricted on NFS roads groomed for snowmobile and cross-country ski use during winter months. These 271 miles of NFS roads would remain open to motor vehicle use from April 1 through December 25. In addition to groomed trails, 275 miles of other routes identified on the Lassen NF Winter Recreation Guide would become seasonally restricted during the winter months.

Twelve miles of roads on the Eagle Lake RD are being proposed for annual closure from November 1 to July 31 to provide non-motorized recreational activities near Susanville. These roads, however, are popular with hunters during deer hunting season. The roads

would be open annually to motor vehicle travel from August 1 through October 31 to facilitate access for scouting and deer hunting.

Most unauthorized routes that are not being added to the NFTS are the result of timber sales and other vegetation management activities. The majority of these routes do not access recreation destinations or provide for development of loop or circuit opportunities. Several unauthorized routes are redundant and serve the same destination as parallel system roads. Most such routes are short, dead-end spurs that end at timber harvest landings.

Approximately 203,461acres would be available as quiet recreation areas.

This alternative has 332 miles of loop opportunities, 105 miles more than the No-action alternative and Alternative 3, but less than the Preferred Alternative (Table 25 and Map 17 – Alternative 4 Circuits/Loops). This alternative is very similar to the No-action alternative in that it has loops of 20-miles or more in generally the same locations, the northern most part of the Hat Creek Ranger District, as well as the eastern edge and westernmost portions of that District (Table 33). The Eagle Lake Ranger District has riding loops of 20-miles or more along the easternmost, central and westernmost portions of the District. The exception is an additional portion of the northernmost part of Eagle Lake Ranger District also has a loop opportunity. Hunting and big game retrieval would be enhanced in this alternative by increasing the number of miles of unauthorized routes added to the NFTS as well as an increase in the route available for loop opportunities. Seasonal closures will restrict access at different time and locations; however these routes would likely be available during traditional hunting seasons. Some historically used access to dispersed camp sites would no longer be accessible causing visitor dissatisfaction and displacement.

Routes proposed for addition to the NFTS comply with the ROS class in the associated management area (Table 23).

Alternative 5 and Modified Alternative 5

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

Indicators: Non-Motorized Recreation Opportunity, Motorized Recreation Opportunity, Impact of Proposed Changes to the NFTS on Neighboring Private and Federal Lands.

Public motor vehicle travel off designated NFTS roads and trails on approximately 1,072,357 acres would be prohibited, except as allowed by permit or other written authorization. Under this alternative, cross-country motor vehicle use would end. Damage caused by route proliferation and cross-country travel would slowly heal after motor vehicle travel restrictions were implemented. Aesthetics of the natural landscape would improve over time, increasing the appeal of the Forest for most visitors. Opportunities for a high-quality, non-motorized recreation experience would improve, because larger areas would be unaffected by ongoing motor vehicle travel.

Table 34 Alternative 4: Recreation mitigation measures which would be required for each specific unauthorized route prior to designation to the Lassen NF National Forest Transportation System

Route ID	Quad	Mitigation Measure
260225UC21	Devil's Parade Ground	Maintain only established access into Gaither Camp. Define travel way by rocking access, or other means to delineate route, maintain closures of all other routes into this site. Post leave no trace message. Sign adjacent unauthorized routes for vehicle restrictions.
270326UC14	Onion Butte	Maintain only established route into Upper Deer Creek dispersed site. Sign area to keep vehicles on established route. Sign unauthorized routes for vehicle restrictions. Post leave no trace land use ethics.
340327UC03	Burney Mtn. East	Sign area to keep vehicles on established route. Post leave no trace land use ethics.
ULA488	Pegleg Mtn.	Sign to keep vehicles on established route. Post leave no trace/light on the land use ethics.
ULA488-1	Pegleg Mtn.	Sign to keep vehicles on established route. Post leave no trace/light on the land use ethics.

The prohibition of cross-country travel would eliminate opportunities for motor vehicle enthusiasts to experience an unrestricted or unconfined experience. The challenge and sense of freedom provided by cross-country motor vehicle travel would end on the Lassen NF.

Most of the routes not being added to the NFTS are a result of timber sales and other vegetation management activities. The majority of these routes do not access recreation destinations or provide for development of loop or circuit opportunities. Several unauthorized routes are redundant and serve the same destination as parallel system roads. Most such routes are short, dead-end spurs that end at timber harvest landings.

Within the affected area, unauthorized routes and restricted ML 1 roads would be available for non-motorized activities such as hiking, hunting, and wildlife viewing. In Alternative 5, 201,138 acres would be available as quiet areas located more than one-half mile from designated routes (Table 24). Similarly, in Modified Alternative 5 approximately 201,029 miles would be available for quiet recreation. Approximately 3,394 miles of NFS roads and trails would be available for motorized vehicle use under Alternative 5 (Table 25). Routes proposed for addition to the NFTS comply with the ROS class in the associated management area.

Modified Alternative 5 would add four new routes as motorized trails for approximately 2.7 miles (**Error! Reference source not found.**). These routes would increase access for loop riding opportunities, increase touring distance and provide access to dispersed recreation, and hiking opportunities.

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

Indicators: ROS Consistency with LRMP, Non-Motorized Recreation Opportunity, Motorized Recreation Opportunity, Impact of Proposed Changes to the NFTS on

Neighboring Private and Federal Lands.

This alternative would change the NFTS as described in Chapter 2. It has the highest motorized road and trail mileage of the four action alternatives, and proposes the greatest addition to the non highway-legal vehicle system and the most highway legal mileage (Table 25). However, by not adding most unauthorized routes to the NTFS, opportunities for motor vehicle users to explore them would be reduced. Nevertheless, most unauthorized routes are the result of timber sales and other vegetation management activities. The majority of these routes do not access recreation destinations or provide for development of loop or circuit opportunities. Most such routes are short, dead-end spurs that end at timber harvest landings.

Approximately 53 miles of unauthorized routes and 6 miles of ML 1 roads are being proposed for designation as NFS roads or trails. These would provide access to dispersed recreation sites and circuit opportunities for non-highway-legal vehicles (Table 33 and Table 36). Unauthorized routes proposed for designation as NFS trails under Alternative 5 and Modified Alternative 5 include several located on or adjacent to the Nobles and Lassen Emigrant Trails. Compared to Alternative 1, recreation and interpretive opportunities related to Emigrant Trails would improve.

Modified Alternative 5, adds four unauthorized routes as motorized trails for a total of 2.7 miles (**Error! Reference source not found.**). These routes would provide access to dispersed recreation sites and create access to loops, increase touring distance and provide more diversity to both motorized and non-motorized recreation opportunities in the General Forest area (Table 33). Route ULA415 (access to Star Lake) would have a seasonal closure as it is within a designated snowmobile area. This trail would be closed from December 26 through April 30 annually. Additionally this trail provides access to some hiking opportunities that would enhance the non-motorized recreation experience.

The quality of motorized access to dispersed recreation opportunities would be greater than under the other action alternatives, because a larger number of unauthorized routes become authorized (Table 36). Visitors who wish to use existing dispersed campsites would have more opportunities under this alternative than the others. Almost all dispersed campsites on the Lassen NF are accessed by short unauthorized road spurs. Under this alternative, campers would not need to walk to disperse camp sites accessed by the unauthorized routes that this alternative adds to the system.

Proposed route additions under these alternatives would not be located in semi-primitive motorized, roaded natural or rural ROS classes, which is consistent with direction in the LRMP (Table 23). Routes proposed for addition to the NFTS comply with the ROS class in the associated management area.

These alternatives add the most mileage 28 and 29 miles, respectively near private and federal lands. However, a closer inspection of the analysis reveals that the routes are primarily near other federal land such as BLM (UNE476, UNH515) and Plumas National

Forest (ULA059 and ULA061). One route goes near Lassen National Park as well, UNW100. None of the routes go near private land. These routes may have the effect of disturbing non-motorized recreation users through noise, dust, and physical presence (Table 27).

Hunting and big game retrieval would be enhanced in these alternatives by increasing the number of miles of unauthorized routes added to the NFTS. Seasonal closures to the proposed additions to the NFTS will restrict access at different time and locations; however these routes would likely be available during traditional hunting seasons barring unseasonable weather conditions which would require closure for mitigation of wet weather issues. Some historically used access to dispersed camp sites would no longer be accessible causing visitor dissatisfaction and displacement.

Objective maintenance levels are being changed in order to provide for mixed use opportunities on approximately 79 miles of roads in these two alternatives. This will improve the riding experience for non-highway legal vehicles by making the conditions rougher as the roads will not be maintained as frequently. For Forest users that do not drive four-wheel drives or OHVs the roads will deteriorate and make them less accessible to these Forest users.

Alternative 5 would change the designation on 51 miles to allow for mixed use of non-highway legal and highway legal vehicles. Instead, Modified Alternative 5 would change the designation on 9.3 miles. Contiguous circuits would be created for non-highway-legal vehicle users in both alternatives (Table 33). Motor-touring opportunities for users of non-highway-legal vehicles would be significantly enhanced in comparison to the other action alternatives.

Although Modified Alternative 5 drops many of the routes for safety reasons, it maintains up to 404 miles of loop opportunities, second best of the action alternatives (Table 33). Most of the changes associated with this alternative to the NFTS are in key locations such as Turner Mtn, Blue Lake, Clover/Swain Mtn. Tie, West Prospect Lookout and Emigrant Road. The crash probability is low to moderate in all of the changes (See transportation section). The crash severity is moderate. These changes will provide for safer riding experiences.

Table 35 Routes added under Modified Alternative 5

Route Number	Miles	USGS Quad Name	Opportunity Type	Vehicle Class
ULA415	1.44	Red Cinder	Access to dispersed recreation site	Trail open to High clearance vehicles
ULA479	0.23	Swain Mountain	Access/loop opportunity	Trail open to High clearance vehicles
UNE436	0.47	Straylor Lake	Access/loop opportunity	Trail open to High clearance vehicles
UNH515	0.54	Timbered Crater	Access/loop opportunity	Trail open to High clearance vehicles

Direct/indirect effects of changes to the existing NFTS including changing the vehicle class and season of use

Indicators: Non-Motorized Recreation Opportunity, Motorized Recreation Opportunity, Impact of Proposed Changes to the NFTS on Neighboring Private and Federal Lands.

Not adding most unauthorized routes to the NFTS would have a negative effect on access and motorized recreation opportunities by reducing opportunities relative to existing conditions. At the same time, not adding these routes to the NFTS would benefit non-motorized recreation due to a decrease in noise, dust, physical presence, possible use conflicts, and displacement. Changes to the NFTS that provide more mixed use would benefit motorized recreation by increasing the diversity of motorized opportunities. Season of use restrictions may have a negative effect, short and long term, to motorized opportunities and a beneficial effect to non-motorized opportunities by increasing the acreage available for those activities during the closure. Additional mitigation measures would be needed as shown in Appendix E.

Under these alternatives, 88 miles of NFS roads are proposed for wet weather closure on the Almanor RD. The proposed closure would extend annually from December 1 to April 30. This proposal would prevent use of those roads by motor vehicle users for a five-month period, reducing motor vehicle access to areas of the Forest affected by the closure.

In addition to the 271 miles of seasonal restrictions as specified in the existing Forest Orders, an additional 275 miles would be seasonally restricted, totaling 546 miles. Seasonal closures would have a greater impact on motor vehicle recreation under this alternative compared to Alternatives 1-3. The winter closures for groomed trails would be extended to include all snowmobile and cross-country ski trails identified in the Lassen NF Winter Recreation Guide (Project Record). In addition, the winter closure would also extend to NFS roads that are only accessible by traversing the trails identified in the Guide.

Wet weather closures would affect use of motor vehicles on 88 miles of NFS roads, to limit damage to roads from severe rutting due to motor vehicle operation during periods when road beds are water-saturated and easily impacted.

Twelve miles of roads on the Eagle Lake RD are being proposed for annual closure from November 1 to July 31 to provide non-motorized recreational activities near Susanville. These roads, however, are popular with hunters during deer hunting season. The roads

would be open annually to motor vehicle travel from August 1 through October 31 to facilitate access for scouting and deer hunting.

This alternative has 603 miles of loop opportunities, the most of any of the action alternatives (Table 25 and Map 18 and Map 34). In Alternative 5 there is a very long 475 mile loop that crosses Eagle Lake and Hat Creek, additional loops in the easternmost portion of Eagle Lake and westernmost portion of the Hat Creek District (Table 33). The Turner Mountain Loop on the Almanor Ranger District offers approximately 39 miles for loop riding.

This alternative adds the most mileage to areas within ½ mile of private and federal lands (Table 27), Alternative 5 adds 28 miles and Modified 5 adds 29 miles.

General Cumulative Effects of the Alternatives

The existing footprint of the NFTS and unauthorized routes as identified in Alternative 1 is a result of many generations of human activity on the landscape. Activities ranging from early travels by Native Americans and emigrants, to management activities including timber harvest, mining, and grazing have shaped the existing road and trail system on Lassen NF. The net effect of these and other activities is a managed and unmanaged transportation system that includes over 4,400 miles of NFS roads, NFS trails, and unauthorized routes open to motor vehicle use.

The direct and indirect effects disclosed above contribute to cumulative effects along with certain past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis). Some future new trail construction is likely to occur, primarily to complete loop opportunities, develop sections of trail and create parallel OHV trails to eliminate motorized mixed use conflicts. An analysis of unauthorized routes providing motorized access to dispersed recreation sites is likely to provide for additions to the NFTS not analyzed in this document. Currently, there are three planning efforts in the planned program of work that will enhance and manage OHV opportunities across the Forest. These include planning efforts within the next five years for the Potato Buttes riding area, the Front Country OHV Management Plan, and the High Lakes OHV Management Plan. Timber harvest and fuel projects may make changes to the NFTS system on a case by case basis that may create new recreation opportunities not previously identified. The long-term expectation is a dynamic transportation system that will change annually as different needs, and issues are identified.

Under each alternative, a variety of factors could influence combined effects of reasonably foreseeable activities related to motorized recreation opportunities and experiences on Lassen NF. Project activities such as timber harvest, fire suppression, invasive species treatments, or fuel reduction projects may temporarily affect motorized recreation while projects are ongoing. Noise and traffic related to project activities could

affect the quality of the motor vehicle recreation experience. National Forest System roads and NFS trails may be temporarily closed to ensure public safety or resource protection.

Adding facilities (designated roads or trails) can have a beneficial effect on motorized opportunities if the additions contribute to the variety of riding experience (easy-to-difficult riding experience, access to loops, increase distance), contribute to the connectivity of the motor-touring opportunities, or of if they provide access to a diversity of dispersed recreation activities (which can benefit both motorized and non-motorized recreation opportunities by providing access to trailheads, dispersed campsites, etc). Table 36 lists the known access to dispersed recreation activities provided under the proposed routes for designation to the NFTS. They may also have a negative effect in both short and long term context for non-motorized opportunities due to an increase in noise, dust, physical presence, possible use conflicts, and displacement.

Table 36 Access to dispersed recreation sites by alternative

Route Number	Alt 2	Alt 4	Alt 5	Modifed Alt	Length (miles)
250510UC01			X	X	0.13
260225UC21		X	X	X	0.25
260608UC01			X	X	0.15
270326UC14		X	X	X	0.25
290522UC01			X	X	0.04
290522UC02			X	X	0.01
290522UC03			X	X	0.05
290606UC01			X	X	0.21
290606UC04			X	X	0.06
320924UC02			X	X	0.08
330329UC02			X	X	0.06
UBB031			X	X	0.16
UBB412	X				0.04
UBB414	X		X	X	0.45
UBB416	X		X	X	0.12
UBB707	X				0.08
UBB707A	X				0.05
UBB744			X	X	0.38
UBB746			X	X	0.15
UBB746A			X	X	0.04
UBB746B			X	X	0.03
UBB794			X	X	0.11
UBB796			X	X	0.05
UBB797	X		X	X	0.03
UBB798	X		X	X	0.11
UBB799	X		X	X	0.02
UBB800	X		X	X	0.21
UBB806	X		X	X	0.06
UBB860	X		X	X	0.05
UBB861	X				0.08
UBB865			X	X	0.03
UBB867			X	X	0.08
UBB872A			X	X	0.18
UBB872B			X	X	0.08
UBB872C			X	X	0.02
UBB873A			X	X	0.09
UBB873B			X	X	0.06
UBB874			X	X	0.03
UBB876			X	X	0.26
UBB877			X	X	0.17

Route Number	Alt 2	Alt 4	Alt 5	Modifed Alt	Length (miles)
UBB878			X	X	0.05
UBB886			X	X	0.02
UBB888	X		X	X	0.02
UBB889		X	X	X	0.08
UCC089			X	X	0.08
UCC368			X	X	0.08
ULA059			X	X	0.07
ULA061			X	X	0.11
ULA079		X	X	X	0.04
ULA098			X	X	0.10
ULA136	X		X	X	0.07
ULA156	X		X	X	0.12
ULA158	X		X	X	0.08
ULA174			X	X	0.05
ULA231			X	X	0.59
ULA252	X		X	X	0.08
ULA254	X		X	X	0.09
ULA364			X	X	0.07
ULA485			X	X	0.13
ULA536			X	X	0.18
UNC105			X	X	0.06
UNC106			X	X	0.14
UNE047			X	X	0.16
UNE087	X				0.12
UNE360		X	X	X	0.16
UNE562			X	X	0.08
UNE590			X	X	0.04
UNW100	X		X	X	0.40
UNW113	X				0.23
UNW318	X		X	X	0.15
ULA415				X	1.44
Total Miles	**2.66**	**.78**	**7.56**	**9.0**	

Summary of Effects Analysis across All Alternatives

Table 37 and Table 38 provide a summary of the effects analysis for each alternative as it relates to non-motorized recreational activities (Table 37) and motorized recreational activities (Table 38). An indicator core of 5 indicates the most beneficial for recreation resources and an indicator score of 1 indicates the least beneficial to recreation resources.

Table 37 Non-motorized Recreation Summary

Indicators – Recreation Resources	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Non-motorized recreation opportunity	1	3	5	4	2
Impact of proposed changes to the NFTS on neighboring private and Federal lands (dust, noise, use conflicts)	1	3	5	4	2
Average ranking for non-motorized Values	1	3	5	4	2

Table 38 Motorized Recreation and Access Summary

Indicator	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Motorized recreation opportunity	5	2	1	3	4
Type of motorized access to dispersed recreation	5	2	1	3	4
Average ranking for motorized values	5	2	1	3	4

Cross-country travel currently includes 1,072,488 acres, including 1089 miles of unauthorized routes; Currently there are 271 miles of winter recreation closures

Compliance with the Forest Plan and Other Regulatory Direction

All of the action alternatives are in compliance with the ROS classes found in the LRMP. They also prohibit cross-country travel as provided for in the Travel Management Rule.

3.4 Visual Resources

Changes Between DEIS and FEIS

Throughout this section the number of acres, miles and tables were edited to more accurately reflect the project area and provide consistency throughout the document. Discussion of Modified Alternative 5 was added.

Introduction

This section of the Motorized Travel Management environmental analysis examines the extent to which alternatives respond to visual resources management direction established in the Lassen 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 Lassen National Forest's Land and Resource Management Plan (Forest Plan), 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 National Forest System land areas. The VQOs establish minimum acceptable thresholds for landscape alterations from an otherwise natural-appearing forest landscape. For example, areas with a Retention Visual Quality Objectives (VQOs) 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.

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

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.

Sierra Nevada Forest Plan Amendment (SNFPA): No specific direction related to visual resources in the Final Supplemental ROD.

Lassen National Forest LRMP: The LRMP contains forest wide management direction in the form of Visual Quality Objectives and specific management area direction for visual resources.

The Pristine/Preservation VQO comprises 34,706 acres of the project area. In this VQO, very few management activities are allowed. Non-motorized NFS trails, trail bridges, and other trail related improvements are designed and located to be visually unobtrusive.

The Retention VQO comprises 174,988 acres of the project area. Within this VQO, management activities should result in a natural-appearing landscape. Project activities may occur, but are not visually evident to the casual observer. Activities would repeat form, line, color, and texture found frequently in the characteristic landscape. Changes in the qualities of size, amount, intensity, direction, and pattern should not be evident. Any actions necessary to meet Retention should be accomplished either during project implementation or immediately after.

The Partial Retention VQO comprises 238,565 acres of the project area. Management activities within this VQO should remain visually subordinate to the characteristic landscape. Project activities may repeat form, line, color, or texture common to the characteristic landscape, and may also introduce form, line, color, or texture found infrequently or not at all in the characteristic landscape. Reduction in form, line, color, and texture necessary to meet Partial Retention should be accomplished as soon as possible or within the first year after project completion.

The Modification VQO comprises 565,949 acres of the project are. Within this VQO, management activities may dominate the original landscape; however, those activities should borrow from naturally established form, line, color, or texture so completely that the visual characteristics of the treated area appear natural. Reduction in form, line, color, and texture necessary to meet Modification should be accomplished in the first year after project completion.

The Maximum Modification VQO comprises 53,559 acres of the project area. Management activities within this VQO may dominate the characteristic landscape; however, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character type.

More detailed guidance for meeting VQOs is found in the following visual resource management handbooks:

USDA Handbook 434, National Forest Landscape Management – Volume 1 (USDA FS 1974a)

USDA Handbook 462, National Forest Landscape Management – Volume 2 (USDA FS 1974b)

The following sections are discussed in chapter 4 of the LRMP (USDA FS PSW Region 1993):

Visual Resources: Throughout the forest, maintain visual quality commensurate with the other resource needs. Adopt and apply scenic Visual Quality Objectives for all areas of the forest.

Prescription A, Recreation: Provide opportunities for viewing wildlife, hunting, gathering forest products, and vehicle camping.

Management Area 10, Visual Resources: Meet a Visual Quality Objective of Partial Retention in the foreground of the Pacific Crest National Scenic Trail.

Management Area 28, Visuals: Meet Visual Quality Objectives along the Pacific Crest Trail as shown on the adopted VQO map.

Local Specialists: Various resource personnel on the Lassen National Forest, including Landscape Architect, Recreation, Resources, and GIS layers.

Effect Analysis Methodology

This section describes the methodology used for addressing the direct and indirect effects of each of the three actions and the cumulative effects of implementing each alternative as a whole. It addresses the spatial boundary of the effects analysis, timeframes (short and long term), visual resource indicators to be measured, including justification as to why they were chosen, impacts relevant to visual resources, visual resource-specific assumptions and sources of data used to support the analysis.

This analysis was completed using the framework outlined in USDA Forest Service Handbook: The Visual Management System (USDA FS 1974b). Non-characteristic line quality created by trail routes is the greatest impact to the visual resources from the proposed alternatives. Roads and trails can create changes to a naturally appearing landscape by introducing noticeable deviations to the characteristic form, line, color or texture of a landscape. The location and design of these routes can significantly reduce their visual impact.

The proposed alternatives have the potential to affect the visual resource. VQO compliance was based on map review and on-the-ground knowledge of topography and vegetation of the area.

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. The VQOS are defined as follows:

(P) Preservation VQO - Allows only for ecological changes. Management activities, except for very low visual impact recreation facilities, are prohibited. This objective applies to Congressionally-designated wilderness areas.

(R) Retention VQO - Provides for management activities which are not visually evident. Activities may only repeat form, line, color and texture which are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, pattern, etc. should not be evident.

(PR) Partial Retention VQO - Provides for management activities that remain visually subordinate to the characteristic landscape. Activities may repeat form, line, color and texture common to the characteristic landscape but changes in their qualities of size, amount, intensity, direction, pattern, etc. remain visually subordinate to the characteristic landscape. Activities may also introduce form, line, color or texture which are found infrequently or not at all in the characteristic landscape, but still remain subordinate to the visual strength of the characteristic landscape.

(M) Modification VQO - Management activities may visually dominate the characteristic landscape. Activities of vegetative and land form alterations must borrow from naturally established form, line, color and texture so completely and at such scale that its visual characteristics are compatible with the natural surroundings.

Of the four VQOs mentioned above, only Retention and Partial Retention VQOs will be addressed in this visual resources analysis because landscapes assigned these two VQOs retain a natural or near natural appearance.

General Guidelines for Effects Analysis for Visual Resources

Visual Resource Indicators

Spatial: The “viewshed” is the unit of spatial analysis when considering effects on visual resources.

Effects Timeframes:

Short-term effects occur within one year.

Long-term effects occur up to 20 years.

Cumulative effects should be analyzed at a 20-year interval.

Measurement Indicators and Rationale: The Measurement Indicators are intended to address how each action individually (direct /indirect effects) and each alternative as the sum total of its proposed actions (cumulative effects) respond to the LRMP and the Travel Management Rule: whether the motorized recreation opportunity affects the natural appearance of the forest landscapes. For each alternative it will be determined to what extent the proposed NFTS falls within landscapes assigned the Retention and Partial

Retention VQOs (number of miles traversing landscapes that are to remain natural to near-natural appearing in character).

Measurement Indicator 1: Compliance with the Retention and Partial Retention Visual Quality Objectives (VQOs)

Viewing natural features and driving for pleasure are two of the most popular recreation activities on Lassen NF. Many visitors enjoy driving the state highways, county roads, NFS roads, NFS trails and unauthorized routes on Lassen NF. The scenic quality of Lassen NF landscapes is an important component of the motor-touring experience. For this analysis, indicator number one was selected because landscapes assigned to the Retention and Partial Retention VQOs tend to be the most attractive or highly valued to Lassen NF visitors. The mileage of routes added comprising NFS roads, NFS trails and unauthorized routes within Retention and Partial Retention landscapes are listed in Table 39 below:

Table 39 Miles of routes in Retention and Partial Retention Visual Quality Objectives

Alternative	Miles of routes in VQOs	
Routes	**Retention**	**Partial Retention**
NFTS		
Roads	322.44	802.28
Trails	42.27	3.39
Alternative 1		
Unauthorized Routes	203.46	267.31
Alternative 2		
Proposed Additions to the NFTS	4.01	8.33
Alternative 4		
Proposed Additions to the NFTS	2.23	3.83
Alternative 5		
Proposed Additions to the NFTS	10.60	15.20
ML1 Routes to Motorized Trails	0.55	3.06
Modified Alternative 5		
Proposed Additions to the NFTS	10.60	15.27
ML1 Routes to Motorized Trails	0.55	3.06

Measurement Indicator 2: Key Viewsheds.

For each alternative determine the number of key viewsheds that are or have the potential to be affected by motor vehicle travel (the extent to which the proposed NFTS additions within sparsely canopy covered landscapes assigned the Retention and Partial Retention VQOs are visible from key viewsheds). The designated recreational travel routes and destination recreational areas identified in the LRMP and in the LRMP-FEIS are defined as key viewsheds for the purpose of this analysis.

Three state highway corridors (State Highways 36, 44, and 89) within Lassen NF are components of the Volcanic Legacy Scenic Byway which extends from Lake Almanor to Crater Lake National Park, Oregon (Table 40). The mission of the National Scenic Byways

Program is to create a unique travel experience and enhanced local quality of life through efforts to preserve, protect, interpret, and promote the intrinsic qualities of designated byways. As components of the National Scenic Byways Program, these sections of State Highways 36, 44, and 89 have been collectively designated as an All-American Road. These highways have been so designated because they provide visitors with a unique driving experience and are considered destinations unto themselves. All-American Roads provide such an exceptional traveling experience that motorists go to these highways as a primary reason for their trip. An assumption can be made that many travelers on All-American Roads are “driving for pleasure” and “viewing natural features.”

Table 40 Miles of routes in Scenic Byway Viewsheds by Retention and Partial Retention Visual Quality Objectives

Alternative	Miles of routes	
Routes	**Retention**	**Partial Retention**
NFTS		
Roads	116.17	147.11
Trails	0.00	0.00
Alternative 1		
Unauthorized Routes	96.06	73.88
Alternative 2		
Proposed Additions to the NFTS	1.92	0.55
Alternative 4		
Proposed Additions to the NFTS	0.96	0.83
Alternative 5		
Proposed Additions to the NFTS	4.30	2.77
ML1 Routes to Motorized Trails	0.00	1.73
Modified Alternative 5		
Proposed Additions to the NFTS	4.30	2.77
ML1 Routes to Motorized Trails	0.00	1.73

Several other highway and road corridors have also been identified as important viewsheds for motor-touring experiences on Lassen NF. These routes include sections of State Highways 32 and 172 passing through Lassen NF; Lassen County Roads A-1 and A-21; and the following roads which are identified as Forest Highways: NFS roads 32N02 and 31N17; portions of Plumas County Roads 311 and 312 with Tehama County Road 769; another portion of Plumas County Road 312; and portions of Plumas County Road 308 with Butte County Road 91422. Indicator number two was selected to identify potential visual impacts in proximity to highways and roads listed above.

Table 41 Miles of routes within 1/2 mile of motor vehicle viewsheds

Alternative Routes	Miles of Routes
Current Public System	
Roads	331
Trails	0
Alternative 1	
Unauthorized Roads	200
Alternative 2	
Proposed Additions to the NFTS	3
Alternative 4	
Proposed Additions to the NFTS	2
Alternative 5	
Proposed Additions to the NFTS	9
Modified Alternative 5	
Proposed Additions to the NFTS	9

Measurement Indicator 3: Miles of NFS roads, NFS trails and unauthorized routes within one-half mile of the Pacific Crest Trail

The Pacific Crest Trail was designated in 1968 as one of the first National Scenic Trails. The PCT (extending from Mexico to Canada) was established “to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas which such trails may pass.” Along with the Appalachian Trail, the PCT is acknowledged as one of the premier non-motorized trails in the nation. Due to its status as a National Scenic Trail, the PCT is identified as having the most important viewshed for non-motorized recreation on the forest. Indicator number three was selected to identify potential visual impacts in close proximity to the PCT as shown in Table 42.

Impacts Relevant to Visual Resources Include

Non-characteristic line quality created by trail segments is the greatest impact to the visual resources – the location and design of these segments can significantly reduce their visual impact.

Uncharacteristic changes in the natural landscape as measured in form, line, color and texture.

The proliferation of unauthorized routes and areas, particularly in sparsely canopy covered landscapes, can adversely affect the SNF visual resources.

Table 42 Miles of routes within 1/2 mile of the Pacific Crest Trail

Alternative Routes	Miles of Routes
National Forest Transportation System	
Roads	157
Trails	5
Alternative 1	
Unauthorized Roads	56
Alternative 2	
Proposed Additions to the NFTS	3
Alternative 4	
Proposed Additions to the NFTS	1
Alternative 5	
Proposed Additions to the NFTS	4
Alternative 5	
Proposed Additions to the NFTS	4

Table 43 Miles of routes in the PCT Viewshed by Retention and Partial Retention Visual Quality Objectives

Alternative	Miles of routes in VQOs	
Routes	**Retention**	**Partial Retention**
Current Public System		
Roads	38.82	54.61
Trails	3.26	1.86
Alternative 1		
Unauthorized Routes	28.03	15.00
Alternative 2		
Proposed Additions to the NFTS	0.64	2.75
Alternative 4		
Proposed Additions to the NFTS	0.62	0.00
Alternative 5		
Proposed Additions to the NFTS	1.02	3.01
ML1 Routes to Motorized Trails	0.00	0.00
Modified Alternative 5		
Proposed Additions to the NFTS	1.02	3.01
ML1 Routes to Motorized Trails	0.00	0.00

Assumptions Specific to Visual Resources Analysis

Based upon the review of forest plans, the basic Measurement Indicator for the visual resources should be Compliance with the Retention and Partial Retention VQOs. The Retention and Partial Retention VQOs were selected because management activities should remain natural appearing (Retention) or visually subordinate (Partial

Retention). The Preservation VQO is not assessed since this VQO is assigned only to Wilderness..

The Modification VQO and Maximum Modification VQO are not addressed since these VQOs allow for areas to have alterations, such as roads and trails that may visually dominate the characteristic landscape and not appear natural.

NFTS additions that contribute to the continuity of motor touring will have a beneficial effect on visual resources, since it is assumed that dead-end route situations will be reduced.

The prohibition of cross-country motor vehicle travel and not adding unauthorized routes to the NFTS should have a beneficial effect on the LNF visual resources. This assumes that nature will take its course, revegetating disturbances.

Data Sources

LRMP for distribution of VQOs and identification of scenic viewsheds

LNF National Visitor Use Monitoring (NVUM) reports (USDA FS 2001a, 2006b) to determine the popularity of viewing scenery or driving for pleasure.

LNF Geographic Information System (GIS) corporate database using ESRI ArcMap Version 9.2 GIS software for effect analysis of the proposed NFTS additions in relation to VQOs, vegetation type and key viewsheds.

Visual Resources Methodology by Action

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

The prohibition of cross-country motor vehicle travel would have a beneficial effect on the forest's visual resources because it would remove the chance of continued proliferation of unauthorized routes and unauthorized areas.

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 proposed NFTS additions (roads, motorized trails and use areas) and their potentially associated landscape alterations as measured in form, line, color and texture may be visible from key viewsheds affecting visual resources in landscapes with Retention and Partial Retention VQOs.. These effects can be both short and long term.

Short-term timeframe: 1 year

Long-term timeframe: 20 years

Spatial boundary: The "key viewshed" within the project area is the unit of spatial analysis when considering effects associated with changes in the NFTS or season of use.

Indicator 1: The extent to which the proposed NFTS additions (roads, motorized trails, use areas) fall within sparsely canopy covered landscapes assigned the Retention and Partial Retention VQOs (number of miles or acres in landscapes that are to remain natural to near-natural appearing in character).

Methodology: GIS analysis of proposed NFTS additions in relation to Retention and Partial Retention VQOs and vegetation type (overlay the proposed NFTS additions with the forest's VQOs of Retention and Partial Retention and the forest vegetation layer).

Rationale: Compliance with the Retention and Partial Retention Visual Quality Objectives (VQOs).

Indicator 2: Number of key viewsheds that are or have the potential to be affected by motor vehicle travel (the extent to which the proposed NFTS additions within sparsely canopy covered landscapes assigned the Retention and Partial Retention VQOs are visible from key viewsheds).

Methodology: Identify key forest viewsheds mentioned in the LRMP (designated recreational travel routes and destination recreational areas) and complete a viewshed analysis to portray which proposed NFTS additions are visible from each of the viewsheds and which additions cannot be viewed. Each viewshed takes into account a viewpoint, topography, direction of sight and distance of sight. Along with the viewshed analysis, vegetation type is analyzed and site visits are conducted to 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 Visual Quality Objectives (VQOs).

Changes to the existing NFTS including deletions of facilities and changing the vehicle class and season of use

Changes to the vehicle class and season of use would have no effect on visual resources. However, not adding many unauthorized routes would have a beneficial effect on visual resources, particularly if those routes are within Retention and Partial Retention VQOs.

Cumulative Effects

The cumulative effects include the other past, present and reasonably foreseeable actions on the LNF that might contribute to the visual resources effects on key viewsheds. The threshold for cumulative effects is exceeded when alterations visually dominate the landscape (e.g. uncharacteristic linear qualities in forest landscapes).

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 "key viewshed" in the project area is the unit of spatial analysis for determining cumulative effects.

Indicator 2: Number of key viewsheds that are or have the potential to be affected by motor vehicle travel. It is the extent to which the proposed NFTS additions within sparsely canopy covered landscapes assigned the Retention and Partial Retention VQOs are visible from key viewsheds. Miles of routes within one-half mile of a motor vehicle veiwshed are shown in Table 41.

Methodology: Identify key forest viewsheds mentioned in the LRMP (designated recreational travel routes and destination recreational areas) and complete a viewshed analysis to portray which proposed NFTS additions are visible from each of the viewsheds and which additions cannot be viewed. Each viewshed takes into account a viewpoint, topography, direction of sight and distance of sight. Along with the viewshed analysis, vegetation type is analyzed and site visits are conducted to identify whether any of these key viewsheds are or have the potential to be affected by motor vehicle travel and in the context of other past, present and reasonably foreseeable actions affecting visual resources.

Rationale: Compliance with the Retention and Partial Retention Visual Quality Objectives (VQOs).

Affected Environment and Environmental Consequences

Affected Environment

The affected area for visual resources is all areas within the boundary of the project area.

The LNF National Visitor Use Monitoring (NVUM) report in 2005 determined that 5.4 percent of those who visited the forest participated in viewing natural features such as scenery, flowers, etc. and 8.3 percent participated in driving for pleasure on roads (USDA FS 2006b).

Visual impacts from motorized off-highway vehicle use include unimproved roads and trails, which often create linear alterations on the landscape that have the potential to be viewed by Forest visitors looking from other locations or by Forest visitors traveling on the route itself. Roads and trails, when viewed from another location, have the potential to create negative visual impacts by introducing non-characteristic linear features on a non-linear landscape with color contrasts from exposed soils on the routes and high use areas. Due to topographic and vegetative screening, seen during field review, these deviations are not noticeable in key viewsheds from the travel routes identified in this analysis. In most cases, the visual impact is a short duration view of a low impact unimproved road or trail intersecting the road or highway. These low impact intersections are generally not evident to the casual Forest visitor, or, if they are evident, they remain subordinate to the characteristic landscape. The deviations from the characteristic landscape caused by motorized off-highway vehicle use are most noticeable to the person riding on the road or trail. No unauthorized inventoried routes are identified in key viewsheds and the routes will meet the allocated VQO when viewed from the unauthorized route itself.

Key Viewsheds

The California State Scenic Highways Master Plan recognizes Highway 89 and 299 as potential State Scenic Highways. Tehama County General Plan recognizes that Highway 32 along Deer Creek has count y level scenic significance. Highway 44 with its old growth pine has been identified as a potential scenic byway.

Visual Quality Objectives (VQOs)

Table 44 summarizes the acres assigned each Visual Quality Objective. Over 400,000 acres of the LNF landscapes are assigned Retention and Partial Retention VQOs

Table 44 Total Acres of Each Visual Quality Objective in the Project Area

VQO Class	Total Acres
Modification	565,949
Maximum Modification	53,559
Pristine	34,706
Partial Retention	238,565
Retention	174,988

78 acres are not accounted for due to a lack of vertical integration in the GIS data

Visual Resources: Environmental Consequences

Direct/Indirect Effects

Alternative 1

Under the No Action Alternative, the existing condition as described in the affected environment section would continue. It provides a baseline for comparing other alternatives while no changes would be made to the NFTS. Motor vehicle travel by the public would not be limited to designated routes.

Prohibition of cross country wheeled motorized vehicle travel

Under Alternative 1, cross country motorized vehicle travel would not be prohibited.

The existing condition would continue. In areas of Lassen NF that have undergone extensive timber management activities in past decades, the visual landscape has been altered by a dense network of NFS roads, trails and unauthorized routes. Many of these routes are well-used and easily distinguishable to a casual observer. Other routes are less apparent after taking on a more natural appearance from vegetative regrowth and lack of use.

The overall visual effect of NFS roads, NFS trails and unauthorized routes is negative due to ground and vegetative disturbance resulting from motor vehicle use. Linear alterations caused by road spurs include numerous intersections interrupting the natural flow of landforms and vegetative patterns along main thoroughfares in heavily managed areas. Large timber landings are located along, and at the termini of, many spur routes in managed areas. These landings are usually in sharp contrast to the surrounding forest and have a negative impact on visual quality.

Unmitigated cross-country motor vehicle use could lead to route proliferation and more visual impacts to the forest landscape. Since all routes would be open to motor vehicle use, this alternative provides the highest likelihood that visitors would view negative visual impacts associated with vegetation management activities.

Lassen NF, as viewed from State and forest highways, ranges from wide open vistas to dense stands of timber with limited viewing areas. Since implementation of the LRMP, visual integrity of the landscape has been managed to protect road corridors within Retention and Partial Retention VQOs. Most road building and vegetation management activities on Lassen NF occur outside of All-American Roads and other State or forest highway corridors. Under this alternative, 531 miles of NFS roads, motorized trails and unauthorized routes are located within one-half mile of state and forest highways on the Lassen NF.

Approximately 143 miles of the PCT are located on Lassen NF. Much of the trail corridor is located in isolated areas and remains unaffected by existing routes. However, portions of the trail corridor are impacted by a dense network of motor vehicle routes. This is especially evident in the Old Station/Twin Bridges area where concentrated OHV use and dispersed camping occurs. There are currently 218 of NFTS roads, NFS trails and unauthorized routes located within one-half mile of the PCT.

Additions and Changes to facilities (presently unauthorized roads and trails) to the NFTS

No additions or changes to the existing NFTS would be made under Alternative 1 so there would be no direct or indirect effects to scenery from these actions. This action would cause no change in effects for visual resources as it is assumed that existing NFTS roads, with road template, are already in place. Changing the road use, season of use, or vehicle class allowed to access the route would have no effect on scenery.

Alternative 2

Cross-country travel off designated NFS roads and trails would be prohibited on approximately 1,072,440 acres, except as allowed by permit or other authorization. The prohibition of wheeled motor vehicle use off of the NFTS would have a beneficial effect on non-motorized recreation activities throughout the forest, it would curtail on-going (i.e., noise, dust, and physical presence) effects in the short and long term. Within the affected area, unauthorized routes and restricted ML 1 roads would be available for non-motorized activities such as hiking, hunting, and wildlife viewing. 203,430 acres would be available as quiet areas located more than one-half mile from designated routes.

Prohibition of cross country wheeled motorized vehicle travel.

The prohibition of cross country motorized vehicles would not be noticeable in the short-term as the natural rehabilitation of unauthorized routes would take longer than one year. The visual impact from unauthorized routes may be noticeable until these areas naturally rehabilitate. Most unauthorized routes and their associated visual impacts are not noticeable in key viewsheds due to topographic and vegetative screening. If unauthorized motorized

routes intersect the road or highway, a short duration view of a low impact, unimproved road or trail may be noticeable until the route naturally rehabilitates. In the long term, unauthorized motorized vehicle routes and impact areas would naturally rehabilitate.

The effects of this action on visual resources would result in a more natural-appearing landscape. Compared to the No Action Alternative (Alternative 1), the landscape would, overall, have higher scenic integrity than currently exists with less evidence of human activity over time.

Additions and Changes to facilities (presently unauthorized roads and trails) to the NFTS

Cross country travel will be prohibited. Addition of 5 miles to NFS trails, 16 miles to ML2 roads, closure of 8 miles of ML3 roads, addition of 38 miles of ML 3 and 4 loop opportunities, addition of 5 miles of ML4 roads/ mixed use, closure of 5 miles of ML 4 roads/highway legal only, and no change to ML1 or ML5 roads.

Where proposed route additions intersect the road or highway in key viewsheds, views of a low impact, unimproved road or trail may occur for short durations, but these intersections generally would not be noticeable to the casual Forest visitor. The visual effects from these proposed route additions meet the retention and partial retention VQOs.

This action would cause no change in effects for visual resources as it is assumed that existing NFTS roads, with road template, are already in place. Changing the road use, season of use, or vehicle class allowed to access the route would have no effect on scenery.

Alternative 3

Alternative 3 prohibits cross country motorized travel and proposes no additions to the existing system of roads and trails.

Prohibition of cross country wheeled motorized vehicle travel

The prohibition of cross country motorized vehicles would not be noticeable in the short-term as the natural rehabilitation of unauthorized routes would take longer than one year. The visual impact from unauthorized routes may be noticeable until these areas naturally rehabilitate. Most unauthorized routes and their associated visual impacts are not noticeable in key viewsheds due to topographic and vegetative screening. If unauthorized motorized routes intersect the road or highway, a short duration view of a low impact, unimproved road or trail may be noticeable until the route naturally rehabilitates. In the long term, unauthorized motorized vehicle routes and impacted areas would naturally rehabilitate. Alternative 3, when compared to the other alternatives, would have the least impact to visual resources as most unauthorized motorized routes would naturally rehabilitate over time, resulting in a more natural-appearing landscape.

Additions and Changes to facilities to the NFTS

Alternative 3 proposes no additions or changes to the existing NFTS. In the long term the landscape viewed from existing system roads and trails would be more natural-appearing. This action would cause no change in effects for visual resources as it is assumed that existing NFTS roads, with road template, are already in place. Changing the road use, season of use, or vehicle class allowed to access the route would have no effect on scenery.

Alternative 4

Prohibition of cross country wheeled motorized vehicle travel

The effects on visual resources from the prohibition of cross country motorized vehicles under Alternative 4 would be the same as those described for Alternative 2. See the direct and indirect effects of the prohibition of cross country motorized vehicle travel section under Alternative 2. The effects of this action on visual resources would result in a more natural-appearing landscape. Compared to the No Action Alternative (Alternative 1), the landscape would, overall, have higher scenic integrity than currently exists with less evidence of human activity over time.

Additions and Changes to facilities (presently unauthorized roads and trails) to the NFTS

No change to NFS trails and ML 1 roads, addition of 89 miles of ML2 roads, no change to ML3 roads/mixed use, closure of 79 miles of Ml3 roads/highway legal only, addition of 105 miles of ML3 and 4 loop opportunities, no change to ML 4 roads, and no change to Ml5 roads. The visual effects from these proposed unauthorized route additions would achieve the retention and partial retention VQOs. Where proposed route additions would intersect a road or highway, views of a low impact, unimproved road or trail may occur for short durations, but these intersections generally would not be noticeable to the casual Forest visitor.

Alternative 5 and Modified 5

Prohibition of cross country wheeled motorized vehicle travel

The effects on visual resources from the prohibition of cross country motorized vehicles under Alternative 5 and Modified 5 would be the same as those described for Alternative 2. See the direct and indirect effects of the prohibition of cross country motorized vehicle travel section under Alternative 2. The effects of this action on visual resources would result in a more natural-appearing landscape.

Additions and Changes to facilities (presently unauthorized roads and trails) to the NFTS

A total of 56 miles of unauthorized routes, comprised of 207 route segments would be added to the NFTS as ML 2 roads (10.3 miles) or as motorized NFTS trails (45.7 miles). Adding these routes can have a beneficial effect on motorized opportunities as they contribute to the variety of riding experience (access to loops, increase distance) contribute

to the connectivity of the motor-touring opportunities, or they provide access to a diversity of dispersed recreation activities (which can benefit both motorized and non-motorized recreation opportunities by providing access to trailheads, dispersed campsites, etc). The addition of unauthorized roads and trails under Alternative 5 and Modified 5 would have similar impacts to the visual resource as those described under Alternative 2 but the negative impact to the visual resource would be slightly greater. See the direct and indirect effects of adding facilities to the NFTS section under Alternative 2. The visual effects from these proposed route additions would achieve the retention and partial retention VQOs.

Cumulative Effects

Alternative 1

A small to moderate increase in OHV use can be expected on Lassen NF over the next 20 years. Use of popular dispersed camping and OHV areas such as Old Station/Twin Bridges would continue to grow. Route proliferation and associated resource impacts would increase in areas with unmitigated OHV use. The use of existing NFTS roads, trails and unauthorized routes would continue. Linear alterations to the landscape (e.g., road prisms, intersections, and landings) would remain static or increase with route proliferation. Negative impacts to visual resources on the forest landscape would increase in direct correlation to damage of the physical environment.

Under Alternative 1, approximately 1,641 miles of NFS roads, NFS trails and unauthorized routes open for motorized use are located within Retention and Partial Retention settings. With continued motor vehicle use, the non-characteristic line quality of NFS roads, trails and unauthorized routes would remain

The cumulative effects analysis for scenery considers the impact of the alternatives when combined with past, present, and reasonably foreseeable future actions and events.

Since cross country motorized travel would continue under Alternative 1, the unpredictable proliferation of user-created routes would continue. The present and reasonably foreseeable future activities would continue to form the landscape aesthetics and recreation opportunities. Recreation activities and developments and travel management activities, including the NFTS, most often form the viewing platform and opportunities for viewing scenery. Any new road construction, reconstruction, decommissioning and/or adding roads to the Forest transportation system are expected to meet the VQOs assigned to the management area in which they occur. Abandoning, closing or decommissioning roads generally results in a more naturally appearing landscape. Although the majority of the Forest would continue to have a natural appearance, it is anticipated that the No Action Alternative along with the past, present, and reasonably foreseeable future actions would result in an increase in Forest lands which appear altered.

Alternatives 2, 3, 4, 5 and Modified 5

The cumulative effects of Alternative 3 would be slightly less impacting to visual quality compared to the cumulative effects described for Alternative 2 due to the lack of additions to the NFTS.

The cumulative effects of Alternative 4, 5, and Modified 5 would be the same as the cumulative effects described for Alternative 2.

Under these four alternatives, over 1,000 miles of unauthorized routes would not be added to the NFTS and would no longer be available for motor vehicle use within the project area. Over time, road prisms of nondesignated unauthorized routes would naturally revegetate. This would obscure constructed appearances on those routes and reduce contrast with the surrounding landscape. A more natural-appearing landscape would be the result of excluding motor vehicle activity on unauthorized routes. The prohibition of cross-country travel would eliminate proliferation of new routes and associated resource impacts that negatively affect visual quality.

Improved visual quality would be most evident in areas of high route density. Along NFS roads and NFS trails, intersections with nondesignated unauthorized routes would eventually naturalize and go unnoticed by motorists. Overall, the landscapes of these areas would become more intact, creating a mostly uniform forested landscape.

From a visual quality standpoint, impacts from those activities would be seen by less people and the overall landscape available for viewing by motorized users would appear to be more intact.

Over 520 miles of routes will be added to the Retention and Partial Retention VQO settings under the action alternatives. As road prisms revegetate over time, linear alterations would become less noticeable, resulting in improved visual resources.

Visual quality along State and forest highway corridors would improve under the action alternatives. National Forest System roads and unauthorized routes located within one-half mile of important viewsheds would be reduced by the action alternatives.

Visual resources within the Pacific Crest Trail corridor would improve. National Forest System roads and unauthorized routes located within one-half mile of the PCT would be reduced in the action alternatives.

The majority of the Forest would continue to have a natural appearance. Areas visually impacted by unauthorized motorized routes would continue to rehabilitate over time resulting in a more natural-appearing landscape. It is anticipated that implementation of this alternative along with the past, present, and reasonably foreseeable future actions would result in no cumulative effects to visual resources. With cross country motorized travel prohibited, the unpredictable proliferation and concentration of unauthorized routes would end. The landscapes viewed in the key viewsheds identified for this analysis would have more natural-appearing characteristics. Overall, the landscape would have higher scenic integrity than currently exists with less evidence of human activity over time.

Summary of Effects Analysis Across All Alternatives

As shown in Table 45, under Alternatives 2, 3, 4, 5, and Modified 5 proposed limitations on motor vehicle travel would improve visual resources of Lassen NF as compared to Alternative 1. Road prisms would revegetate and obscure linear alterations caused by road building. The cumulative effect of not adding many unauthorized routes to the NFTS, prohibition of cross-country travel, and elimination of linear alterations would be a more intact natural landscape where past alterations are largely unnoticeable.

Table 45 Summary of Effects Analysis across All Alternatives

Indicators – Visual Resources	Rankings of Alternatives for Each Indicator[a]					
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Mod.Alt. 5
Disturbance/Integrity: Compliance with the Retention and Partial Retention VQOs.	1	4	5	4	4	4
Key Viewsheds Affected by Proposed NFTS	1	4	5	4	4	4
Pacific Crest Trail Affected by Proposed NFTS	1	4	5	4	4	4
Average for Visual Resources	1	4	5	4	4	4

[a] A score of 1 indicates the alternative is the worst for visual resources related to the indicator and a score of 5 indicates the alternative is the best for visual reasources.

Compliance with the Forest Plan and Other Direction

All alternatives, except for Alternative 1, comply with the LRMP as amended, as well as with the National Forest Management Act (NFMA), and the Travel Management Rule. The proposed NFTS additions in each alternative have no direct, indirect, on visual resources and are in compliance with the Visual Quality Objectives of Retention and Partial Retention. All alternatives, except for Alternative 1, have no cumulative effects on key viewsheds or PCT as defined in the LRMP.

3.5 Cultural Resources

Changes Between the DEIS and the FEIS

Additional information was gathered on potential existing effects to cultural resources intersected by or adjacent to unauthorized routes being proposed for addition to the FTS. This information led to modification of the number of sites being potentially impacted by OHV routes. Fewer sites exhibited clear indications of being effected by motorized vehicles OHVs and those that did tended to show minor or ambiguous effects in need of further monitoring. All other discussions and conclusions remained the same.

Introduction

The Congress in 1966 declared it to be our national policy that the Federal government "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" (National Historic Preservation Act (**NHPA**) (16 U.S.C. 470-1(3)). This need was made more explicit when the National Historic Preservation Act was amended in 1980 and Section 110 was added to expand and underscore Federal agency responsibility for identifying and protecting historic properties and avoiding unnecessary damage to them. Many historic properties are fragile and once damaged or destroyed they can not be repaired or replaced.

Section 106 of the NHPA compels Federal agencies to take into account the effect of its undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (36 CFR 60) (Historic Properties). The Travel Management rule 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 System (NFS) lands (36 CFR 212.55(a), 212.55(b)(1)).

Analysis Framework: Statute, Regulation, Forest Plan, 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 by several laws. However, the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.) (NHPA), provides comprehensive direction to Federal agencies about their historic preservation responsibilities. Executive Order 11593, entitled Protection and Enhancement of the Cultural Environment, also includes direction about the identification and consideration of historic properties in Federal land management decisions.

The National Historic Preservation Act of 1966 extends the policy 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. NHPA Section 106 directs all Federal agencies to take into account effects of their undertakings (actions, financial support, and authorizations) on properties included in or eligible for the National Register. The Advisory Council on Historic Preservation's (ACHP) regulations (36 CFR 800) implements NHPA Section 106. NHPA Section 110 sets inventory, nomination, protection, and preservation responsibilities for federally-owned historic properties.

The Forest Service's 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 (2005c). 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.

Section 106 of the NHPA and the ACHPs implementing regulations, Protection of Historic Properties (36 CFR Part 800), require that Federal agencies take into account the effect of their undertakings on historic properties, and that agencies provide the ACHP with an opportunity to comment on those undertakings. Programmatic agreements (36 CFR 800.14(b)) provide alternative procedures for complying with 36 CFR 800. The Pacific Southwest Region has such an agreement: Programmatic Agreement among the U.S.D.A. Forest Service, Pacific Southwest Region, U.S.D.A. 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 (USDA FS 2006c) (Motorized Recreation PA). 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.

Executive Order 11593: Protection and Enhancement of the Cultural Environment, 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.

Effects Analysis Methodology

Assumptions specific to cultural resources analysis

Assumptions listed in the Introduction to Chapter 3 of this document are made with regard to analyzing the potential effects to cultural resources from implementation of the project. In addition, the following assumptions are made specifically for cultural resources:

Unauthorized, user-created routes and areas have already affected historic properties within route/area prisms exhibiting moderate to high levels of usage (as defined in the Motorized Recreation PA).

All sites identified within route corridors are considered “historic properties” as defined under 36 CFR 800 unless determined otherwise through formal evaluation.

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.

Under the action alternatives, motorized use will drop substantially or cease altogether through time in areas outside of the designated system.

Direct effects to at-risk historic properties are limited to the route corridor for all Action Alternatives. Direct effects include erosion, down cutting, and rutting within site boundaries.

Data Sources

Past archaeological support of forest projects has resulted in a total of 906,260 acres surveyed for cultural resources on the Lassen National Forest. For this project, all moderate and high-use unauthorized routes were surveyed, in accordance with provisions of the Motorized Recreation PA. At present, a total of 3,269 cultural resource sites have been located within the Lassen National Forest. Data are derived from Department of Interior and SHPO Annual Reports completed by the Lassen through 2007. In addition, site record information, forest INFRA database information, spatial data from GIS layers, and field investigations further comprise the information used in the following analysis. Survey was conducted on all moderate and high-use unauthorized routes proposed for addition to the FTS designation under this Environmental Impact Statement (**EIS**). The Motorized Recreation PA allows for deferred survey of proposed routes when they receive light motorized vehicle OHV use. Under Action Alternatives 2, 4 and 5 a maximum of 45 routes (totaling a maximum of 4.5 miles) proposed for designation received no cultural survey, but fall within expected light OHV use areas as determined by overall forest OHV use trends (see Chapter 3: Recreation). All other routes fall within surveyed acreage as indicated by forest GIS data.

Tribal consultation occurred concurrently with other public involvement activities. The project was discussed at multiple meetings with the Pit River Tribe, Greenville Rancheria, and the Susanville Indian Rancheria.

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 Action

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

The prohibition of motor vehicle use off designated NFTS would have a beneficial effect on cultural resources throughout the forest in the short and long terms. It would curtail on-going effects and reduce the risk and 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 motor vehicle use was not prohibited. Under this prohibition, most if not all future permitted or other authorized motor vehicle travel off designated NFTS routes will be subject to NHPA Section 106 compliance and potential effects to cultural and historic properties can be identified at that time.

Short-term timeframe: 1 year

Long-term timeframe: 20 years

Spatial boundary: Forest administrative boundary (outside of designated wilderness). The geographic scope of the cumulative effects analysis is the forest boundary. It was selected because impacts to cultural resources accumulate at the specific location of the cultural resources, irrespective of actions in surrounding areas. Due to this fixed nature of cultural resource sites, the geographical scope is limited to the forest's administrative boundary (outside of designated wilderness).

Indicator(s): (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 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 PA

Direct/Indirect effects of adding unauthorized routes and trails to the NFTS

The addition of routes to the existing NFTS may provide for continued impacts to cultural resources that occur within proximity to the routes. Sites within these corridors can generally be expected to see decreasing integrity and continued loss of historic property value as wheeled motorized vehicle use continues along these routes. Indirect effects would also rise as the addition of routes to the NFTS increases access to historic properties that may then be subject to looting and vandalism. In all cases, the potential loss of historic property values is expected to increase proportionally with the number of routes added.

Analysis consists of identifying the total number of sites within non NFS route corridors based on GIS data for the forest. Under this definition, the route "corridor" is defined as the route itself plus a "buffer" area of 30 meters on both sides and running parallel to the route. However, many sites that fall within the corridors are not on or adjacent to the route and may not be directly impacted by motorized use. Sites within the buffer zone or adjacent to the route may not experience direct effects from motorized activity along the route. Site effects will depend on the absolute proximity to the site (sites located directly adjacent to the route are more likely to be affected than those located further away), characteristics of motorized use on the route as well as soil and landform characteristics. Sites considered "At Risk" are generally those that are bisected by routes, tend to be smaller in size (thus having a greater proportion of their surface areas affected by motorized use), and/or may have routes impacting major features of the site surface. In many cases, however, GIS, site and field data indicate the site is not being directly impacted by the route, the route exhibits very light motorized use, or in the case of linear site features such as railroad grades and ditches, the route crosses the site at a single point. Sites with these characteristics are not considered to be at-risk.

Short-term timeframe: 1 year

Long-term timeframe: 20 years

Spatial boundary: Forest administrative boundary (outside of designated wilderness). The geographic scope of the cumulative effects analysis is the forest boundary. It was selected because impacts to cultural resources accumulate at the specific location of the cultural resources, irrespective of actions in surrounding areas. Due to this fixed nature of cultural resource sites, the geographical scope is limited to the forest's 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: 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, indirect, or cumulative effects.

Rationale: Motorized Recreation PA**.**

Changes to the existing NFTS

None of these actions are considered an undertaking subject to NHPA Section 106 compliance (USDA FS 2005c). Motor vehicles can already use NFTS roads. Allowing or prohibiting non-highway vehicle use will have no direct, indirect, or cumulative effect on cultural 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: Forest administrative boundary (outside of designated wilderness). The geographic scope of the cumulative effects analysis is the forest boundary. It was selected because impacts to cultural resources accumulate at the specific location of the cultural resources, irrespective of actions in surrounding areas. Due to this fixed nature of cultural resource sites, the geographical scope is limited to the forest's 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: The cumulative effects of each alternative (all actions) will describe the additive impact of the alternatives to the existing forest situation.

Rationale: Motorized Recreation PA.

Affected Environment and Environmental Consequences

Affected Environment

The record of a human presence within the area covered by the EIS (Environmental Impact Statement) is both long and complex. Humans have occupied the northern Sierra/southern Cascade area for over 10,000 years. During this time, populations of humans moved about the landscape, created settlements, extracted resources, developed new technologies, and both shaped, and were shaped by, the environments of this region. The diverse physiography of this area where the Sierra Nevada, Cascades, Modoc Plateau, Great Basin and the California central valley meet contributed to the cultural complexity of human populations. Many distinct cultural groups have come to this region since the end of the Pleistocene (some 10,000 years ago) and their relationships with each other and the environment has evolved through time. The cultural landscape these people created in the region is as varied and complex as the natural landscape they encountered.

However, the vast majority of the human experience in the area covered by the EIS is not documented in text, chronicles, or captured on film. In most cases, only the physical remains of human occupation and activity are left behind in the form of objects, structures, and sites. In some cases, locations important to these past human groups are marked only by the

memory of their descendents. Collectively, these places, artifacts, structures, items, and other documentation of the human record on the landscape are called “Cultural Resources,” a term that recently replaced “Heritage Resources”. These resources are scattered throughout the area covered by the EIS. Yet, this “scatter” is extensive. The cultural and natural environments of the forest have co-evolved over a period in excess of 8-10,000 years, and this interaction is documented in numerous archaeological sites left behind on the landscape. The nature of these remains varies, ranging from isolated arrowheads and can dumps to large, complex prehistoric village sites and historic towns. These remains represent both the significant time depth of human activity and occupation on the forest, as well as the many cultural groups that have played a role in the evolution of forest ecosystems.

Over the past 10,000 years, the types of cultural resources left behind by the human occupants of the National Forest System have been complex and varied. Typically, those locations that retain the physical evidence of human activity and habitation are the most widely recognized. Numerous archaeological sites are recorded that contain artifacts, features, and/or structures documenting the wide range of human imprints on forest environments. However, other sites exist that figure prominently in the human record of this region, but frequently are not demarcated by physical remains. The nature of these cultural resources and the general periods of human occupation they represent may be broadly categorized into the following types: Prehistoric Resources, Historic Resources, and Traditional Cultural Properties:

Prehistoric Resources

Prior to European-American and to a lesser extent, Spanish entrance into the region the area was inhabited by aboriginal Native American populations. Current evidence suggests the first of these populations entered the northern Sierra/southern Cascade region some time prior to 8,000 years ago (Johnston and Budy 1982, Markley and Henton 1985). The economy of these prehistoric inhabitants was based on hunting and gathering, a lifestyle requiring frequent movements as resources became available in different locations on the landscape. As these populations occupied the landscape and used a variety of natural resources, they left evidence of their presence in the form of archaeological sites, objects and features. These can be quite varied and include village sites, trails, rock alignments, bedrock mortar and other milling stations, quarrying locations, hunting blinds, “chipping” debris, burial sites, rock art (including both pecked “petroglyphs” and painted “pictographs”) and isolated features and objects (such as arrowheads or other projectile points).

The prehistoric sites, features and objects left by prehistoric Native American populations represent thousands of years of occupation and settlement, human population movement, cultural development and processes, and human-induced changes to the ecosystem (Johnston and Budy 1982). This archaeological record suggests that over this period

multiple cultural groups moved into this area, in some cases displacing those groups already in residence. At the time of historic contact (approximately mid 1800s) a minimum of seven distinct cultural groups already occupied the area covered by the EIS. These include the Achomawi, Atsuge, Apwaruge, Maidu, Paiute, Washo, and Yahi/Yana.

Historic Resources

By the mid 1800s, large numbers of Euro-Americans were emigrating into the region. Initial forays into the region were largely limited to trapping parties from the Hudson Bay Company, but discovery of gold in the Sacramento Valley in 1848 precipitated an enormous influx of Euro-American settlers and miners into the area. Establishment of emigrant trails, passes, and other routes (e.g. Lassen and Nobles emigrant trail, Beckwourth trail and pass, Humboldt road, etc.) provided access to areas encompassed by the EIS. Miners, loggers, ranchers and homesteaders moved into the area and during the late 1800s large-scale commodity production (cattle, timber, and minerals) was established. These commercial enterprises had a significant impact on both the environment and on the Native American populations present. Increasing conflicts between emigrant settlers and native populations led to the eventual removal of most Native Americans from their homelands and the extermination of the Yahi and Yana. More recent developments include establishment of the forest reserves and national forests and formation of the Civilian Conservation Corps (CCC).

This historic period (approximately mid-1800s to present) represents a significant shift in land use practices and the cultural landscape of the area. Cultural resources from this period reflect the development of mining, ranching and timber industries, the social history of Euro-American and other ethnic groups that came to this region, and the conflicts between these groups and Native American populations. These historic cultural resources include historic buildings and homesteads, mining shafts, mining ditches, railroad grades, emigrant trails, graves, flumes, fire lookouts and a variety of additional sites, features and objects.

Traditional Cultural Properties

Although cultural resources with physical features and remains are the best known, additional locations exist that are equally valued but may lack obvious remains or residues indicative of human activity. These include locations and areas historically valuable for spiritual or other traditional purposes such as the collection of native plants, animals and raw materials. Such “traditional cultural properties” are frequently (but not exclusively) associated with Native American traditional practices. More generally, these places are historically rooted and figure importantly in the lives of communities (King 1998). One difficulty with traditional cultural properties is that they are difficult to identify with standard methods of cultural resource inventory. Close consultation with groups who might have concerns with traditional cultural properties is necessary. Consideration of the effect to this type of cultural resource is warranted by the important value placed upon them by their users and is mandated by Federal preservation laws and regulations.

The affected cultural resource environment for the area covered by the EIS is complex. Cultural resources within the EIS area represent some 9000 years of prehistory and history, documenting a wide array of economic, social and ideological activities, and are crosscut by a diversity of ethnic groups. At the time of Euro-American immigration, many Native American groups were present on the landscape. These groups included the Washoe, Paiute, Maidu, Yahi/Yana, Achomawi, Atsuge, and Atsugewi. Many of their descendents maintain traditional use of forest locales, including sacred areas, places of origin and cultural importance (i.e. burial sites), and sites where traditional gathering or ceremonies occur. Descendents of Euro-American pioneers and settlers also identify with many historic locations.

Lassen NF Cultural Resource Inventory

The types and locations of projects for which cultural inventories have been undertaken generally bias the existing inventory of cultural resources. Within the area covered by the EIS, over 3000 cultural resources have been identified to date. Although this represents a significant portion of the cultural resource inventory, much of the area covered by the EIS remains to be adequately inventoried for cultural resources, and the estimated cultural sites remaining to be discovered is estimated to exceed 5,000. Moreover, less than 15% of the identified cultural resources are currently evaluated for their eligibility for inclusion on the National Register. Of those evaluated, approximately one hundred are determined eligible.

Current knowledge of the types and numbers of cultural properties within the project area is found in several documents prepared by both Forest Service personnel and external individuals and agencies. These include: Johnston and Budy (1982), Neuenschwander (1994), and Kowta (1988) as well as data from annual reports submitted to SHPO under the Pacific Southwest Region Programmatic Agreement and the Lassen National Forest INFRA database for cultural resources. In addition to general overviews of the prehistory, history, and ethnography of the project area, these sources identify and discuss major issues regarding interpretation of archaeological data.

Environmental Consequences

Alternative 1 – No-action

Direct/Indirect Effects

The No-action Alternative has the greatest potential to directly negatively affect historic properties due to the large number of historic properties located across the forest and potentially impacted by unrestricted wheeled motorized vehicle traffic. Approximately 11% (totaling almost 400) of all sites currently recorded on the forest occur within existing unauthorized route corridors and with no implementation of a cross-country prohibition, additional routes would be expected to proliferate. In addition, data suggest an average of three sites per 100 acres could be directly impacted if a prohibition on cross-country travel

were not in place. The current condition of no prohibitions on cross-country travel has the potential to directly affect additional historic properties as new routes are created and used across the landscape.

The No-action Alternative also has the greatest potential to indirectly affect cultural properties by assisting access to sites through motorized travel. Increased access correlates with increasing incidence of vandalism and looting. While the Motorized Recreation PA contains direction for monitoring, deferred survey, specialized protection measures, and evaluation and mitigation measures, the amount of cultural work necessary to support this alternative would be difficult and cost-prohibitive.

Under the No-action Alternative prohibition on cross-country travel will not be implemented. In effect, new routes could be added to the landscape in almost any location and the potential number of new routes that might be added is large. The large number of cultural resources currently within unauthorized route corridors suggests that additional routes allowed under this alternative have the potential to impact a larger number of historic properties. Identified effects of minor and major severity would continue and their severity could increase under this alternative. It should be noted that many routes not considered for addition to the FTS with this decision exhibited effects to heritage sites along those routes.

Under the No-action Alternative, no changes in vehicle class or seasonal restrictions would be made to the NFTS. Allowing or prohibiting non-highway vehicle use will have no direct, indirect, or cumulative effect on cultural resources.

Cumulative Effects

The cumulative effects of this action would result in continued creation of unauthorized routes, opening new areas that may subject cultural resources to potential impacts, including direct impacts from wheeled motorized vehicles and indirect impacts by facilitating access potentially resulting in looting and vandalism. Under this alternative, a greater proportion of the LNF's cultural resources would be at risk of adverse effects to integrity and values than in the action alternatives.

Alternative 2

Direct/Indirect Effects

Under the Proposed Action alternatives protection of cultural resources would be enhanced with the prohibition of cross-country travel. An average of 3 sites per 100 acres would be protected if motorized wheeled vehicle travel were prohibited off designated system roads. Indirect effects to cultural resources, principally through public access that may contribute to looting and vandalism, would be greatly reduced with a prohibition on cross-country travel. Continued effects to approximately 400 sites currently within unauthorized route corridors (see Alternative 1) would cease under this alternative. Mitigation measures identified for those sites within unauthorized routes added under this alternative would prevent further or

increased ongoing effects. This alternative does not differ from the other action alternatives in its beneficial effect to cultural resources under a prohibition on cross-country travel.

The addition of 21 miles of unauthorized routes under the Proposed Action alternative has the potential to directly or indirectly affect three cultural sites. All of these sites either intersect or fall immediately adjacent to the proposed route additions. Direct effects to these sites are largely limited to those intersected by the route itself; the nature of these effects is limited to visible tracks across the sites that do not diminish their integrity (minor severity). Sites for which the evidence of effects from motorized vehicle travel are unclear are identified as “ambiguous”. None of the sites exhibit direct or indirect effects of moderate or major severity. Table 46 identifies the type, nature and severity of effects on cultural resources under Alternative 2.

Table 46 Alternative 2 – Effects to Cultural Resources

Route ID	Site Number	Type of Effect	Nature of Potential Effect	Severity of Effect	Protection/ Mitigation
UBB414	58-480	none	none	none	none required
UBB416	58-480	none	none	none	none required
UBC021	51-545	direct	tracks	minor	none required
ULA136	51-799	none	none	none	none required
ULA254	51-348	direct	tracks	minor	none required
ULA488	58-527	none	none	n/a	none required
ULA488-1	58-527	none	none	n/a	none required
UNH001	53-584	direct	tracks	ambiguous	monitor
UNH001	53-766	none	none	none	none required
UNH529	53-487	none	none	none	none required
UNO216	53-867	none	none	none	none required
UNO216	53-867	none	none	none	none required
UNO229	53-40	none	none	minor	monitor
UNO229	53-924	none	none	none	none required
UNO230	53-40	none	none	none	none required

Under the Proposed Action alternative changes in vehicle class or seasonal restrictions are not considered an undertaking subject to NHPA Section 106 compliance (USDA FS 2005c). Motor vehicles can already use NFTS roads. Allowing or prohibiting non-highway vehicle use will have no direct, indirect, or cumulative effect on cultural resources.

Under Alternative 2, 15 route segments totaling 2.08 miles have not been surveyed for the presence of cultural resources. However, all occur in areas of light OHV use and survey is deferred per the stipulations in the Motorized Recreation PA.

Cumulative Effects

This action would reduce potential impacts to cultural resources by prohibiting cross-country travel. Overall, this alternative should reduce negative effects to cultural resources across

the forest as compared with Alternatives 4 and 5 as fewer numbers of routes are added to the system, although it does not compare as favorably with Alternative 3, which prohibits cross-country travel and adds no new routes. This alternative, when added to the reasonably foreseeable future actions, is not expected to cumulatively lead to increased impacts to cultural resources.

Alternative 3

Direct/Indirect Effects

Under the Alternative 3 protection of cultural resources would be enhanced with the prohibition of cross-country travel. An average of 3 sites per 100 acres would be protected on average if motorized vehicle travel were prohibited off designated system roads. Indirect effects to cultural resources, principally through public access that may contribute to looting and vandalism, would be greatly reduced with a prohibition on cross-country travel. This alternative does not differ from the other action alternatives in its beneficial effect to cultural resources under a prohibition on cross-country travel. Continued effects to approximately 400 sites currently within unauthorized route corridors (see Alternative 1) would cease under this alternative. As no new routes are added under this alternative, there are no direct or indirect effects anticipated to cultural resources.

Under this alternative no changes in vehicle class or seasonal restrictions would be made to the NFTS. Motor vehicles can already use NFTS roads. Allowing or prohibiting non-highway vehicle use will have no direct, indirect, or cumulative effect on cultural resources.

Cumulative Effects

This action would reduce potential impacts to cultural resources by prohibiting cross-country travel. Overall, this alternative offers the greatest protection for cultural resources and should reduce negative effects across the forest as compared with Alternatives 3, 4 and 5 as fewer numbers of roads are added to the system. This alternative, when added to the reasonably foreseeable future actions, is not expected to cumulatively lead to increased impacts to cultural resources.

Alternative 4

Direct/Indirect Effects

Under Alternative 4 protection of cultural resources would be enhanced with the prohibition of cross-country travel. An average of 3 sites per 100 acres would be protected if motorized wheeled vehicle travel were prohibited off designated system routes. Indirect effects to cultural resources, principally through public access that may contribute to looting and vandalism, would be greatly reduced with a cross-country travel prohibition. Continued effects to approximately 400 sites currently within unauthorized route corridors (see Alternative 1) would cease under this alternative. Mitigation measures identified for those sites within unauthorized routes added under this alternative would prevent further or

increased ongoing effects. This alternative does not differ from the other action alternatives in its beneficial effect to cultural resources under a prohibition on cross-country travel.

The addition of 10 miles of unauthorized routes under this alternative has the potential to directly or indirectly affect six cultural sites. Four of these sites exhibit minor effects resulting from single tracks observed across these areas. An additional site exhibits some direct impacts from tracks, but has been determined ineligible for inclusion on the NRHP. Finally one site exhibits no direct effects from motorized vehicle traffic but shows signs of looting as an indirect effect from motorized access to the site. There is moderate severity from this effect. Sites with looting are currently being monitored by Law Enforcement to identify and prosecute individuals adversely affecting sites in this manner. Table 47 identifies the type, nature and severity of effects on cultural resources under Alternative 3.

Under Alternative 4, 14 route segments totaling 1.35 miles have not been surveyed for the presence of cultural resources. However, all occur in areas of light OHV use and survey is deferred per the stipulations in the Motorized Recreation PA.

Table 47 Alternative 4 – Effects to Cultural Resources

Route ID	Site Number	Type of Effect	Nature of Potential Effect	Severity of Effect	Protection /Mitigation
260225UC21	51-123	indirect	looting	moderate	monitor
270326UC14	51-660	direct	none – ineligible site	none	none required
340327UC03	53-527	direct	tracks	minor	monitor
340327UC03	53-530	none	none	none	none required
UBB618	51-796	none	none	none	none required
ULA230	51-636	direct	tracks	minor	monitor
ULA488	58-527	none	none	none	none required
ULA488-1	58-527	none	none	none	none required
UNC513	53-533	direct	tracks	minor	monitor
UNE028	58-936	direct	tracks	minor	monitor
UNE360	58-939	none	none	none	none required
UNE499	58-12	none	none	none	none required
UNE499	58-269	none	none	none	none required
UNE564	58-00	none	none	none	none required
UNE564	58-843	none	none	none	none requried

Under this alternative changes in vehicle class or seasonal restrictions are not considered an undertaking subject to NHPA Section 106 compliance (USDA FS 2005c). Motor vehicles can already use NFTS roads. Allowing or prohibiting non-highway vehicle use will have no direct, indirect, or cumulative effect on cultural resources.

Cumulative Effects

This action would reduce potential impacts to cultural resources by prohibiting cross-country travel. Overall, this alternative would protect cultural resources and should reduce negative

effects across the forest as compared with Alternatives 5 as fewer numbers of routes are added to the system. This alternative provides slightly less benefit to cultural resources than Alternative 2 and much less than Alternative 3. This alternative, when added to the reasonably foreseeable future actions, is not expected to cumulatively lead to increased impacts to cultural resources.

Alternative 5

Direct/Indirect Effects

Under Alternative 5 protection of cultural resources would be enhanced with the prohibition of cross-country travel. An average of 3 sites per 100 acres would be protected if motorized wheeled vehicle travel were prohibited off designated system roads. Indirect effects to cultural resources, principally through public access that may contribute to looting and vandalism, would be greatly reduced with a cross-country travel prohibition. In the context of such a prohibition, this alternative does not differ from the other action alternatives in its beneficial effect to cultural resources.

The addition of 53 miles of unauthorized routes under Alternative 5 has the potential to directly or indirectly affect 56 cultural sites. Twenty of these sites exhibit direct or indirect effects attributable to motorized vehicles. Two sites, although exhibiting some direct impacts in the form of motorized vehicle tracks, have been determined ineligible for inclusion on the NRHP. Two additional sites show no direct impacts from vehicle use but looting, possibly facilitated by motor vehicle access, has had a moderate effect on site integrity. The remaining sixteen sites exhibiting direct effects from motorized vehicles show only minor potential effects. Table 48 identifies the type, nature and severity of effects on cultural resources under Alternative 4.

Under Alternative 5, 45 route segments totaling 4.51 miles have not been surveyed for the presence of cultural resources. However, all occur in areas of light OHV use and survey is deferred per the stipulations in the Motorized Recreation PA.

Under this alternative changes in vehicle class or seasonal restrictions are not considered an undertaking subject to NHPA Section 106 compliance (USDA FS 2005c). Motor vehicles can already use NFTS roads. Allowing or prohibiting non-highway vehicle use will have no direct, indirect, or cumulative effect on cultural resources.

Cumulative Effects

This action would reduce potential impacts to cultural resources by prohibiting cross-country travel. Overall, this alternative offers the least protection to cultural resources as compared with Alternatives 2, 3 and 4, although it provides greater protection than under the No-action Alternative. This alternative, when added to the reasonably foreseeable future actions, is not expected to cumulatively lead to increased impacts to cultural resources.

Table 48 Alternative 5– Effects to Cultural Resources

Route ID	Site Number	Type of Effect	Nature of Potential Effect	Severity of Effect	Protection /Mitigation
ULA095	51-1004	none	none	none	none required
ULA095	51-421	none	none	none	none required
UBB744	51-1010	direct	tracks	minor	monitor
UBB744	51-1009	direct	tracks	minor	monitor
ULA219	51-1038	none	none	none	none required
260225UC21	51-123	indirect	looting	moderate	monitor
280608UC01	51-200	direct	tracks	minor	monitor
280608UC02	51-200	direct	tracks	minor	monitor
ULA254	51-348	direct	tracks	minor	monitor
ULA219	51-432	direct	tracks	minor	monitor
ULA219	51-1004	none	none	none	none required
ULA219	51-1038	none	none	none	none required
ULA219	51-422	none	none	none	none required
ULA231	51-629	none	none	none	none required
ULA231	51-494	none	none	none	none required
UBC021	51-545	direct	tracks	minor	monitor
ULA230	51-636	direct	tracks	minor	monitor
270326UC14	51-660	direct	none-ineligible site	none	none required
260608UC01	51-7	none	none	none	none required
260608UC01	51-432	direct	none-ineligible site	none	none required
260608UC01	51-4	indirect	looting	moderate	monitor
260608UC04	51-7	none	none	none	none required
UBB618	51-796	none	none	none	none required
ULA136	51-799	none	none	none	none required
ULA084	51-813	none	none	none	none required
ULA084	51-1004	none	none	none	none required
ULA061	51-837	none	none	none	none required
ULA059	51-873	none	none	none	none required
ULA098	51-940	direct	tracks	minor	monitor
UCC368	53-1181	none	none	none	none required
UNO229	53-40	none	none	none	none required
UNO229	53-924	none	none	none	none required
UNO230	53-40	none	none	none	none required
UNH001	53-484	none	none	none	none required
UNH001	53-766	none	none	none	none required
UNH529	53-487	none	none	none	none required
340327UC03	53-527	direct	tracks	minor	monitor
340327UC03	53-530	none	none	none	none required
UNC513	53-533	direct	tracks	minor	monitor

UNO216	53-867	none	none	none	none required
UNO216	53-867	none	none	none	none required
UNE564	58-00	none	none	none	none required
UNE564	58-843	none	none	none	none required
ULA461	58-108	none	none	none	none required
UNE499	58-12	none	none	none	none required
UNE499	58-269	none	none	none	none required
UNE643	58-24	none	none	none	none required
UBB414	58-480	none	none	none	none required
UBB416	58-480	none	none	none	none required
UNE708	58-486	none	none	none	none required
UNE708	58-807	none	none	none	none required
ULA496	58-503	none	none	none	none required
ULA496	58-504	none	none	none	none required
UBB872A	58-512	direct	tracks	minor	monitor
UBB872B	58-512	direct	tracks	minor	monitor
ULA488	58-527	none	none	none	none required
ULA488-1	58-527	none	none	none	none required
ULA533	58-563	none	none	none	none required
UNE787	58-721	direct	tracks	none	monitor
UNE787	58-724	direct	tracks	none	monitor
UBB873A	58-92	none	none	none	none required
UBB872B	58-92	none	none	none	none required
UNE814	58-92	none	none	none	none required
UNE028	58-936	direct	tracks	minor	monitor
UNE360	58-939	none	none	none	none required

Modified Alternative 5

Direct/Indirect Effects

Alternative 5 as modified, adds 2.7 miles of unauthorized routes to the NFTS. All of these proposed routes have been surveyed for cultural resources and no sites are identified within the additional route corridors. The Direct/Indirect effects to cultural resources under Modified Alternative 5 are identical to those discussed under Alternative 5.

Cumulative Effects

Cumulative effects to cultural resources under Modified Alternative 5 are identical to those discussed under Alternative 5.

Summary of Effects Analysis across All Alternatives

Table 49 below summarizes the effects analysis by ranking each alternative based on cultural resource indicators for each cultural resource indicator. Alternative 3 provides the least risk of adverse effects as the prohibition on cross-country travel is implemented and no

new routes are added to the system. Alternative 1 has the most risk for adverse effects as cross-country travel continues, potentially subjecting large numbers of sites to greater risks. Of the action alternatives, Alternative 5 and Modified Alternative 5 have the greatest potential to adversely affect a larger number of cultural resources as more sites come within the area of potential effect. Alternatives 2 and 4 are similar in their potential to affect cultural sites. In all cases, however, direct effects to cultural sites are considered minor. However, one site under Alternative 4 and two sites under Alternative 5 (and Modified Alternative 5) exhibit moderate indirect effects from looting, possibly facilitated by motorized vehicle access. Continued monitoring in conjunction with Law Enforcement will reduce or eliminate these effects.

Table 49 Comparison of Effects to Cultural Resources

Indicators – Cultural Resources		Rankings of Alternatives for each Indicator[a]				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Mod Alt. 5
Degree to which the integrity of historic property values are diminished	1	4	5	4	3	3
Number of historic properties within unauthorized routes at risk from ongoing use	1	4	5	3	2	2
Average number of historic properties per acre protected from creation of new routes	1	4	5	4	3	3
Average for Cultural Resources	**1**	**4**	**5**	**4**	**3**	**3**

[a]A score of 5 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.

Compliance with the Forest Plan and Other Direction

All proposed alternatives would be in compliance with LRMP standards and guidelines for inventory, evaluation, protection and management of cultural resources. All alternatives would be in compliance with historic preservation law, policy and regulation.

3.6 Social and Economic Resources

Changes Between DEIS and FEIS

This section was edited to update data and data sources and to include Modified Alternative 5.

Introduction

The Lassen National Forest (LNF) is located in Northern California. The majority of the forest lies within a dominantly rural part of the state, and serves a variety of functions for residents. The primary role of the forest for local residents is as a recreation destination. Furthermore, forest amenities attract visitors from all over the Western United States. There are a variety of natural amenities, including lakes and rivers, which provide abundant recreational opportunities. A complex system of public roads, highways and interstates provide easy access to many LNF inlets.

Activities supported by the forest affect social and economic conditions in a variety of ways. Local residents associate forest recreation and natural amenities with their quality of life, and subsistence uses such as firewood are valued by local households. Therefore, the management of resources on the LNF affects the lifestyles, attitudes, beliefs and values of many individuals. In addition to the social implications, spending by non-resident visitors generates economic activity in nearby communities. Ultimately, expenditures related to the use of the forest can impact the overall level of jobs and income.

The LNF receives visitors from throughout the Western United States; however the vast majority of visits are from residents of northern California. Redding is the largest community within close proximity to the forest, and is home to a large population of outdoor enthusiasts. The LNF provides a variety of recreational opportunities such as hiking, horseback riding, camping, fishing, sightseeing, skiing, snowshoeing, and wilderness experiences (USDA FS PSW Region 2009).

Both motorized and non-motorized activities are popular on the LNF. The objective of this project is to develop of a sound travel management plan protecting a variety of amenity values for the well being of participants of all activities. Although recreational activities are available on lands under a variety of ownerships in the region, the LNF is a primary location for motorized travel. Motorized use provides a means of getting to other locations, as well as serving as a recreational activity by itself. Both motorized and non-motorized activities attract visitors to the forest; and those visitors have implications for economic and social conditions.

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

Multiple statues, 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. In addition, the following guidance also applies:

Executive Order 12898, issued in 1994 orders federal agencies to identify and address any adverse human health and environmental effects of agency programs that disproportionately impact minority and low-income populations (Office of the President 1994). The Order also directs agencies to consider patterns of subsistence hunting and fishing when an agency action may affect fish or wildlife.

The Civil Rights Act of 1964 provides for nondiscrimination in voting, public accommodations, public facilities, public education, federally assisted programs, and equal employment opportunity. Title VI of the Act, Nondiscrimination in Federally Assisted Programs, as amended (42 U.S. C. 2000d through 2000d-6) prohibits discrimination based on race, color, or national origin.

Impacts Relevant to the Socioeconomic Environment

Impacts to the socioeconomic environment include changes in employment and income, altered recreational habits by local residents, and variations in the distribution of social welfare experienced by user groups. Jobs and personal income are the primary variables used to determine economic effects. Social effects are less quantifiable by nature and are determined through a qualitative assessment of potential changes to the existing conditions as result of actions specific to the various alternatives.

Effects Analysis Methodology

Assumptions Specific to the Socioeconomic Analysis

Prohibition of cross-country motor vehicle travel will result in less motorized recreation and travel.

Non-motorized activities are enhanced by improvements in ecological conditions.

Study Area

The LNF study area is defined as five Northern California counties: Butte, Lassen, Plumas, Shasta, and Tehama.

Data Sources

1. US Census Bureau

2. Bureau of Labor Statistics
3. Minnesota IMPLAN Group
4. Headwaters Economics: Economic Profile System (EPS)
5. National Visitor Use Monitoring (NVUM)

Affected Environment and Environmental Consequences

Affected Environment

Population and Demographics

The reason for defining the relationship between the Travel Management Plan and the economic and social environments is two fold. First, individuals with different backgrounds are likely to be affected by LNF management differently. Secondly, social and economic well being may affect tastes, preferences, and demand for recreational opportunities. An important goal of this analysis is to inform decision makers of the social and economic conditions evident in the study area. A large portion of forest visits are from local residents. Therefore social and economic conditions may affect the rate and types of activities residents participate in, which in turn can affect individual livelihoods. Recreational, subsistence and cultural activities serve a primary function in defining the social and economic dynamic of the five counties. Forest visitors generate important economic stimulus for many businesses, which then impacts employment and income levels.

This section highlights demographic trends in each of the five counties in the study area. Current population levels influence the use of natural resources. Forecasts of future population levels indicate the potential for increased demand for recreational opportunities and resultant pressure on resources. Age distributions provide insight into the proportion of individuals in the working age group versus retirees and minors; groups who typically use the forest differently and utilize local services in different ways. Similarly, the racial composition of the population may affect cultural and heritage uses. Employment and income statistics describe economic conditions as well as aid in the identification of important sectors of the economy and the different ways travel management policies could affect them. For example, the impact of restrictions for motorized travel would affect businesses in the oil and gas industry differently than manufacturing firms. Additionally, household income could affect participation rates in natural resource recreation; the greater the income of local residents, the greater their ability to participate in various recreational activities.

Population is an important consideration in managing forest resources. In particular, population structure (size, composition, density, etc.) and population dynamics (how the structure changes over time) are “essential to describing the effects and consequences of forest management and planning on a social environment” (Seesholtz et al. 2006). This section highlights population trends in the study area. Population increases may lead to conflicts over forest uses, travel management, recreation activities and values; these are

conflicts that Forest Service managers may have to contend with and attempt to balance when making travel management decisions.

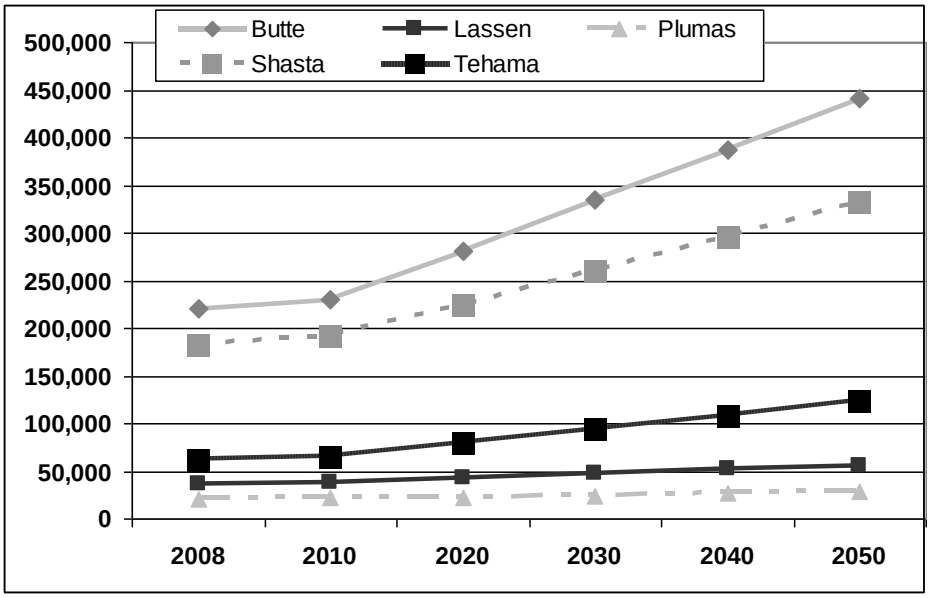
Table 50 reports the population for each of the five counties from 2001 to 2008. In recent years populations have remained relatively stable; Lassen and Plumas Counties have experienced minimal population growth, while Butte, Tehama and Shasta Counties have had slow, but steady growth. Shasta County has experienced the most growth in recent years; the county seat, Redding, is the largest town in the immediate vicinity, and provides more advanced medical facilities and retail outlets. The goods and services offered in Redding and nearby communities have likely contributed to the higher rate of growth. The amenities of the LNF also draw people to the area due to the outdoor activities they support. There have been no sharp increases or decreases in population to suggest significant changes in the economic and/or social structure of the counties. Growth rates in each county have remained slow in recent years. The state of California also experienced slow growth during this time period; however, it outpaced the majority of counties.

Table 50. Population and Growth Rates by County and State, 2001-2008

	Butte		Lassen		Plumas		Shasta		Tehama		California	
	Pop	% Change	Pop	% Change	Pop	% Change	Pop	% Change	Pop	% Change	Pop	% Change
2001	205,150	1.2%	33,883	0.3%	20,761	-0.2%	166,435	2.2%	56,221	0.6%	34,430,970	2.1%
2002	207,662	1.2%	33,827	-0.2%	20,827	0.3%	169,869	2.1%	56,915	1.2%	35,063,959	1.8%
2003	210,235	1.2%	34,076	0.7%	20,880	0.3%	172,987	1.8%	57,835	1.6%	35,652,700	1.7%
2004	212,393	1.0%	34,632	1.6%	20,967	0.4%	175,686	1.6%	58,797	1.7%	36,199,342	1.5%
2005	214,280	0.9%	34,998	1.1%	21,025	0.3%	177,717	1.2%	59,698	1.5%	36,675,346	1.3%
2006	216,351	1.0%	35,246	0.7%	21,011	-0.1%	179,259	0.9%	60,790	1.8%	37,114,598	1.2%
2007	218,312	0.9%	35,804	1.6%	20,941	-0.3%	180,666	0.8%	61,709	1.5%	37,559,440	1.2%
2008	220,407	1.0%	35,757	-0.1%	20,917	-0.1%	182,236	0.9%	62,419	1.2%	38,049,462	1.3%

Source: California DOF 2009

According to the California Department of Finance (California DOF 2009), populations are expected to continue to rise in future years. Figure 5 reports the projected population by decade until 2050. Shasta and Butte Counties are expected to experience the greatest growth. Butte County is located to the south-east of Tehama County, and contains the community of Chico, home California State University (CSU) Chico. Cities and towns in both counties allow for easy access into parts of the LNF. The natural amenities of Northern California and goods and services offered in Redding and Chico, make Shasta and Butte counties desirable retirement places. As populations continue to age, it is likely that these counties will experience a greater in-migration of retirees. Other counties in the study area are more remote, and aren't expected to experience as rapid a rate of growth. However, as other areas of Northern California become increasingly populated, it is likely that some people will look to these counties for a place of residence.



Source: California DOF 2009

Figure 5. Population Forecasts by County

In recent years, the natural amenities of national forests have attracted people to live nearby forest boundaries in order to have easy access for recreational purposes. Such changes in population are referred to as amenity led growth, and have been common in communities located nearby National Forest System (NFS) lands in recent years. A portion of the growth in Shasta and Butte Counties may be characterized as amenity led. Many retirees have left more congested areas to be closer to the visual and recreational amenities offered by forested lands. Similarly, working age individuals have been increasing commute times to live in more affordable, family friendly environments with nearby natural resource recreational opportunities. However, some of the nearby counties have been experiencing slow growth. This is likely due to the remoteness of the area and immense distance from

metropolitan centers. Retirees often demand medical services not readily available in these counties. In contrast, Shasta and Butte Counties, have more advanced retail outlets and medical facilities, and provide easy access to the Sacramento Valley via Interstate-5 and Highway 99. Thus, these counties have experienced steady growth in recent years, and are projected to have accelerated growth in the future. Infrastructure in Redding and Chico provide the basic services required by retirees and young families, while maintaining a close proximity to the forest. It is likely that Shasta and Butte Counties will continue to experience an in-migration of households into the future.

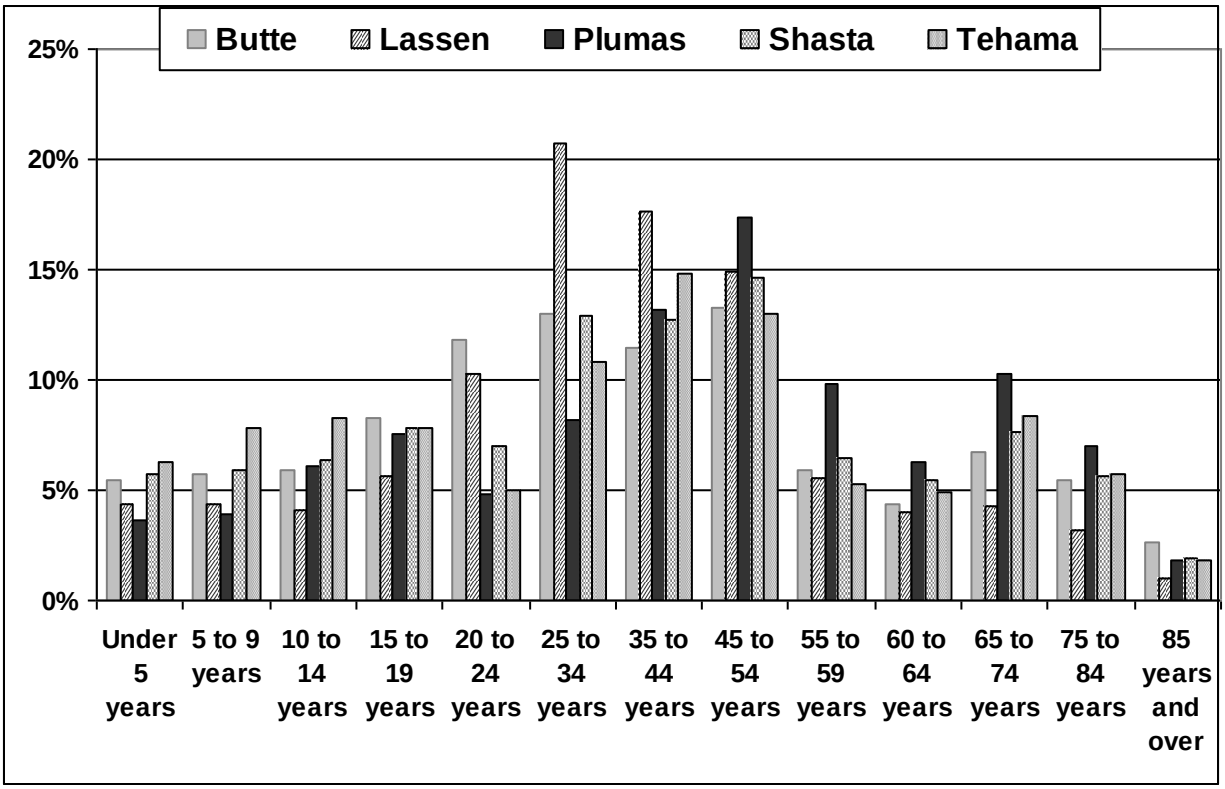
The median age in each county is higher than the median age for the state (Table 51). This suggests that residents of the study area are older than residents in more metropolitan areas of California. This could be due to the lack of adequate higher educational and job opportunities to draw and retain a younger population. Likewise, there may be a greater influence from retirees. Butte County has the lowest average age, likely due to the presence of CSU Chico. University towns tend to attract a younger demographic as well as maintain a diverse job market.

Table 51. Median Age of Residents by County and State

Butte County	34.7 years
Lassen County	35.2 years
Plumas County	46.0 years
Shasta County	38.5 years
Tehama County	37.1 years
California	34.5 years

Source: U.S. Census Bureau, n.d.

In terms of the distribution of age groups, all counties in the study area are dominantly middle aged (Figure 6). Plumas County tends toward an older age group, which is reflected in its median age of 46.0 years (Table 51). Butte County has a larger proportion of residents in the 20 to 24 year old age groups, likely due to the presence of CSU Chico. The remainder of the counties follows a relatively normal age distribution, with the majority of residents in the working age group. Lassen County has the largest proportion of residents in the 25 to 34 year old age group, suggesting a stronger job market for younger adults.



Source: U.S. Census Bureau, n.d.

Figure 6. Age Distribution by County

Table 52 reports the racial distribution for each county in the study area. According to Census definitions, Hispanic or Latino may be of any race. As defined by the U.S. Census Bureau, race and Hispanic origin are two different concepts; thus, people of Hispanic origin may identify with any race (U.S. Census Bureau 2003). The vast majority of residents around the LNF are Caucasian. This is a very different ethnic composition than the state average. As a whole, California is much more ethnically diverse than the study area. California's population is 59.8 percent Caucasian, where the distribution for the counties ranges from 71.0 percent in Lassen to 88.6 percent in Shasta. Nearly 36 percent of California's population comes from a Hispanic origin; whereas counties in the study area range from 7.4 percent to 19.3 percent. American Community Survey does not report estimates of the Hispanic population in Plumas County because the number of sample cases is too small. Of the five counties, Lassen is the most ethnically diverse with 29 percent of the population being something other than Caucasian. The Native American population has a much higher presence around the LNF than in the State as a whole. At the individual county level, Lassen and Plumas Counties have the highest proportions of Native Americans, 3.4 percent and 3.7 percent respectively.

Table 52. Racial Percentages of the Total Population by County and State

	Caucasian	African American	Am. Ind. & Alaska Native	Asian/ Pacific Islander	Other Race	2 of More Races	Hispanic Origin (of any race)
California	60.4%	6.3%	0.7%	12.6%	16.8%	3.3%	35.7%
Butte	83.5%	1.4%	1.2%	3.9%	5.0%	5.0%	12.3%
Lassen	71.0%	10.1%	3.4%	1.4%	11.6%	2.5%	15.0%
Plumas	87.1%	0.4%	3.7%	1.2%	3.8%	3.7%	*
Shasta	88.6%	0.9%	2.9%	2.4%	2.3%	2.9%	7.4%
Tehama	80.6%	0.2%	1.7%	1.0%	12.8%	3.7%	19.3%

Source: U.S. Census Bureau, n.d.
* Data cannot be displayed because the number of sample cases is too small.

Employment and Income Conditions

Employment and income statistics are important indicators of economic health. In recent years the study area has not received any substantial positive or negative changes in employment, which is similar to recent population trends. Total employment has remained steady for each county over the specified time period. Given the relative remoteness of many parts of the study area, jobs may not be as vulnerable to swings in market structure and labor demand as total employment at the state level. Table 53 reports the percent change in employment levels from the previous year for the five counties and the State of California. During the specified time period, each county experienced modest changes in employment numbers. Plumas County has experienced the greatest decline in employment. In counties with low population levels and volume of jobs, a relatively small change in employment could show up as a relatively large impact. Thus, it is important for land managers to assess the impact of future policy decisions on local employment opportunities.

Table 53. Change in Employment from Previous Year, 2002-2006

	2002	2003	2004	2005	2006	2007
California	-1.0%	-0.2%	1.0%	1.9%	1.8%	0.9%
Butte County	1.8%	-0.7%	0.6%	2.2%	1.7%	0.3%
Lassen County	5.8%	0.2%	-1.3%	-1.1%	0.9%	1.6%
Plumas County	1.3%	2.5%	2.3%	-5.0%	0.0%	-3.3%
Shasta County	3.3%	1.0%	-0.2%	-0.2%	2.5%	1.1%
Tehama County	2.7%	-1.2%	-0.4%	0.6%	2.4%	-2.7%
5 County Total	2.6%	0.1%	0.2%	0.6%	1.9%	0.2%

Source: US DOL BLS 2008

To assess the relative size of sectors in the local economy, data reported by the Minnesota IMPLAN Group (MIG) is utilized. MIG reports annual economic data for all counties in the United States. MIG utilizes national, state and local data sources to report county level employment, and includes full-time, part-time, seasonal and self employment. Because IMPLAN employment data is reported simply as jobs, not full time equivalents

(FTEs); one person with multiple jobs will show up more than once in the data. This prohibits the comparison to local population data provided by the US Census Bureau.

IMPLAN employment data is reported by economic sector, which is a set of local businesses by industry, grouped together according to similarities in the goods and services offered. Table 54 lists the proportion of total jobs in the study area. Government supports the largest percentage of jobs, followed by health and social services and retail trade.

Travel management decisions as they pertain to recreation may substantially affect the condition, and relative importance, of tourism based sectors in the local economy. The natural resources sector (including mining and agriculture, forestry, fishing, and hunting) makes up less than 5 percent of total employment in the area. Thus, natural resource based industries are not a major contributor to employment in the five counties overall; however, that sector could be of greater importance to individual counties.

According to the 2006 IMPLAN data, total employment in study area is 233,933 jobs; almost 81 percent of those jobs are in Butte and Shasta Counties. Lassen, Plumas and Tehama Counties account for 5.6 percent, 4.3 percent and 9.4 percent of total employment respectively. The government sector is the largest employer in all counties except for Butte, where it is a close second to health and social services. Proportionally, the agriculture, forestry, fishing and hunting sector is an important employer in Tehama County, accounting for 10 percent of total jobs. Many of the activities on LNF support jobs in this sector, making it a valuable source of economic stimulus. Retail trade and accommodation and foods services are also important sources of employment. Businesses in these sectors generate economic stimulus from activities on the LNF due to travelers purchasing goods and services while on their way to visit the forest. The importance of such activities varies by county. The more resilient economies of the larger counties are not as reliant on forest activities for economic stimulus.

Another indicator of economic health is the level of unemployment. All 5 counties have consistently maintained an unemployment rate higher than the state in recent years.

Table 55 reports the annual unemployment rate for the counties and the state from 2000 thru 2007. Butte, Lassen, Shasta and Tehama Counties have experienced similar rates, fluctuating between 6 and 8 percent. Plumas County has had the highest presence of unemployment, consistently experiencing rates above 8.5 percent since 2002. As jobs are created in a region, labor comes from two primary sources: local unemployment and in-migration of households. With the higher unemployment rates in the study area, it is likely that any new demands for labor would be supplied from the local labor market. Thus, any additional jobs created by activities on the LNF would likely not affect household migration patterns, and may serve to reduce unemployment rates.

Table 54. County employment by 2 digit NAICS code

	Butte	Lassen	Plumas	Shasta	Tehama	Total
Ag, Forestry, Fish & Hunting	4,648	541	215	1,585	2,184	9,174
Mining	79	25	20	190	129	442
Utilities	285	30	125	195	39	674
Construction	6,944	547	1,209	8,011	1,174	17,884
Manufacturing	4,157	30	812	3,095	2,561	10,655
Wholesale Trade	2,143	103	84	2,112	311	4,753
Transportation & Warehousing	2,199	243	367	3,470	1,371	7,650
Retail trade	12,569	1,288	848	12,827	2,501	30,034
Information	1,271	112	110	988	128	2,608
Finance & insurance	3,674	482	226	2,843	430	7,654
Real estate & rental	3,416	653	454	3,694	413	8,629
Professional- scientific & technical services	4,816	208	340	4,857	565	10,786
Management of companies	374	0	7	458	73	912
Administrative & waste services	4,129	213	282	3,969	761	9,354
Educational services	746	47	79	1,481	112	2,465
Health & social services	15,639	1,025	609	11,666	2,068	31,008
Arts- entertainment & recreation	1,485	50	535	1,448	312	3,830
Accommodation & food services	7,144	763	659	7,261	1,266	17,093
Other services	8,446	981	549	5,895	1,564	17,436
Government	15,631	5,858	2,418	13,052	3,932	40,891
Total	99,795	13,199	9,947	89,096	21,896	233,933

Source: MIG 2006

Income available to local residents directly impacts their ability to purchase goods and services. A total of 14.161 billion dollars of personal income was earned by local residents in 2005. This accounts for just 1.1 percent of the total personal income earned in California. Income is generated from the following sources and proportions: payments for labor (59 percent), transfer payments (24 percent) and dividends, interest and rent (17 percent). Dividends, interest and rent are forms of investment earnings, which along with transfer payments are considered non-labor forms of income. Transfer payments consist of a variety of government and non-government non-labor income payments, including: retirement and disability, medical assistance, social security, unemployment benefits, welfare and veterans' benefits. Earnings from dividends, interest and rent are sources of investment income generated through financial investments or other property income. Both sources of income contribute to economic resiliency because they are not directly tied to an individuals' employment status. Labor income is further broken down by wage and salary income, and

farm and non-farm proprietor's income. Proprietor's income is earnings from self employment. The majority of income for local residents is generated by wages and salaries (43 percent).

Table 55. Annual Unemployment Rates by Counties and State, 2000-2007 (Source: US DOL BLS 2008)

	Butte	Lassen	Plumas	Shasta	Tehama	CA
2000	6.2	7.1	7.1	6.1	6.5	4.9
2001	6.6	7.3	7.6	6.3	6.5	5.4
2002	7.4	7.7	8.4	7.2	7.2	6.7
2003	7.6	7.7	9.9	7.6	7.7	6.8
2004	7.4	7.6	9.8	7.6	7.4	6.2
2005	6.8	8.1	8.5	7.3	6.9	5.4
2006	6.2	7.9	7.7	6.6	6.5	4.9
2007	6.7	8.1	8.5	7.5	7.4	5.4

Table 56. Total personal income by source, all counties, 2005

Total Personal Income ($ Millions)	14,161
Income Source (Percent of Total Income)	
Labor	59%
Non-Labor	41%
Dividends, Interest and Rent	17%
Transfer Payments	24%

Source: Headwaters Economics 2007

Table 57 reports the personal income and source of income as a percent of total. Per capita personal income ranges from $22,420 in Tehama County to $33,800 in Plumas County. Labor income remains the primary source of earnings for residents of all Counties. Non-labor sources account for 44 percent of total income in Plumas and Tehama Counties.

Table 57. Personal Income by Source, 2005[a]

	Butte	Lassen	Plumas	Shasta	Tehama
Per Capita Personal Income ($'s)	28,034	22,981	33,800	29,104	22,420
Total Personal Income ($ Millions)	6,100	784	702	5,209	1,366
Income Source (Percent of Total Income)					
Labor	58%	65%	56%	60%	56%
Wage and Salary	42%	48%	37%	43%	40%
Non-farm Proprietors Income	10%	10%	11%	12%	8%
Farm Proprietors Income	0%	-1%	1%	0%	1%
Non-Labor	42%	35%	44%	40%	44%
Dividends, Interest and Rent	18%	13%	22%	16%	17%
Transfer Payments	24%	22%	22%	24%	27%

Source: Headwaters Economics 2007
[a] Does not sum to 100 percent because of adjustments made by the Bureau of Economic Analysis

Visitor Use

According to Executive Order 12862 (Office of the President 1993) information about the quality and quantity of recreation on NFS lands is required for national forest planning and implementation of the National Recreation Agenda. The National Visitor Use Monitoring (NVUM) program serves as the primary means of monitoring recreational activity at the national, regional and forest level, directing each forest to be surveyed once every 5 years, yielding consistent data regarding visitor use. The primary purpose of the collection of NVUM data is to provide reliable estimates of recreational visits to national forests. A detailed explanation of the methods used for estimating annual recreation use on NFS lands is provided in English et al. (2001).

During round two of NVUM, the LNF received 1,399,400 national forest visits, which is defined as the entry of one person onto the Forest to participate in recreation activities for an unspecified period of time (USDA FS 2009). During those visits, individuals participated in a variety of recreational activities. Table 58 reports the participation rates by activity, as well as designates the activities as motorized, non-motorized or other. The “total activity participation” column represents total participation in all activities and exceeds 100 percent since visitors are likely to participate in multiple activities during their time spent on the Forest. Of the activities chosen as the main reason for visiting the Forest, 10.9 percent fall into the motorized category and 27.1 percent in the non-motorized. Of the motorized activities, driving for pleasure was the most popular, accounting for 8.8 percent of main activities and 40.6 percent of total activity participation.

When assessing recreational use of the LNF, it is important to distinguish between local and non-local visitors. Non-local visitors are those who reside more than 30 straight line miles from the Forest boundary (Stynes and White 2005). This distinction allows for spending related to the Forest visit to be differentiated between locals and non-locals. It is impossible to determine what would happen to local forest related spending if the LNF were no longer in existence. However, it is likely that local residents would substitute other activities in the area if recreation on the LNF were no longer available and would still make expenditures at local businesses and firms. Expenditures by non-locals on the other hand, generates additional economic stimulus, and represents new money to the local economy. Non-local visitors account for 33 percent of the total annual visits; this suggests that a large portion of expenditures contributed to Forest visits represents new money to the local economy.

Money spent by Forest visitors helps support jobs and income in the local economy.

Table 60 reports the annual total spending associated with national forest visits. Non-locals staying the night off the Forest spend the most during their trip. Overall, 76 percent of total spending is by non-locals. Visitors make expenditures on a variety of goods and services during their trip. Lodging, food and fuel account for the majority of spending. Table 61

reports average expenditures per party per trip by category. Non-locals staying off the Forest spend the most among all market segments; due in large part to the additional expense of lodging at non-LNF facilities.

Table 58. Activity participation on the LNF

Activity	Activity Emphasis for Road & Trail Use	Total Activity Participation (%)[a/b]	Percent as Main Activity (%)[c/d]
Snowmobiling	Motorized	1.4	1.4
Driving for Pleasure	Motorized	40.6	8.8
OHV Use	Motorized	5.1	0.7
Other Motorized Activity	Motorized	2.5	0
		Motorized Subtotal	**10.9**
Hiking/Walking	Non-motorized	60.5	17.4
Bicycling	Non-motorized	5.1	3.5
Other Non-motorized	Non-motorized	8.7	2
Cross-country skiing	Non-motorized	2.8	2.8
Backpacking	Non-motorized	1.6	1.4
Horseback Riding	Non-motorized	0.1	0
		Non-motorized Subtotal	**27.1**
Downhill Skiing	Other	2.8	2.8
Fishing	Other	16	10.2
Viewing Natural Features	Other	53.9	8.7
Relaxing	Other	32.7	9.2
Motorized Water Activities	Other	5.6	0.9
Hunting	Other	24.5	19.5
Non-motorized Water	Other	0.9	0.1
Developed Camping	Other	12.5	3.1
Primitive Camping	Other	7.3	1.4
Picnicking	Other	4.3	0.3
Viewing Wildlife	Other	44.7	0.8
Sightseeing	Other	0	0
Resort Use	Other	3.6	0.1
Visiting Historic Sites	Other	6.2	0.1
Nature Study	Other	4.9	0.2
Gathering Forest Products	Other	14.5	4.9
Nature Center Activities	Other	4.4	0.1
No Activity Reported	Other	0.9	0.9
		Other Subtotal	**63.3**
		Total	**101.3**

[a] Survey respondents could select multiple activities so this column may total to more than 100%.
[b] This column represents the percent of survey respondents who indicated participation in this activity.
[c] Survey respondents were asked to select just one activity as their main reason for visiting the forest. However, some respondents selected more than one, so this column may total to more than 100%.

[d] This column represents the percent of survey respondents who indicated this activity as their main activity.
Source: USDA FS 2008b

According to the data in Table 58, motorized activities account for 10.9 percent of main activities on the LNF. Cordell et al. (2008) reports that participation in OHV activities has experienced an increasing trend in recent years; participants in the U.S. increased from 37.6 million in 1999 to 51.6 million in 2003. More recent estimates of OHV participants show a decrease to 44.4 million in 2005 thru 2007. Nonetheless, OHV use remains a major source of recreation in the U.S. as estimates for 2005 thru 2007 report that 19.2 percent of Americans age 16 and older have participated in OHV recreation at least once within the last year. California is the highest ranked state amongst OHV users with 4.99 million participants or 11.6 percent of the U.S. total (Cordell et al. 2008). From 1999 to 2007, the average annual growth rate of OHV registration in California was 12.8 percent. This suggests that OHV use as an outdoor activity is gaining popularity among California residents; which is likely to result in an increased demand for OHV activities on the LNF.

Table 59. Distribution of National Forest visits by market segment

	Non-local Segments			Local Segments			Non-Primary	Total
	Day	Overnight on LNF	Overnight off LNF	Day	Overnight on LNF	Overnight off LNF		
Percent of LNF Visits	15.89	12.38	4.82	49.87	3.04	1.64	12.36	100.0

Source: USDA FS 2009

Lifestyles, Attitudes, Beliefs and Values

Northern California is largely dominated by natural resource based activities that support a rural lifestyle. A rural lifestyle is one that relies on agricultural opportunities and outdoor recreation supported by natural resources to maintain a sense of self sufficiency and self-worth. Natural amenities are an important factor for many residents while deciding to reside in the study area. In addition to impacting lifestyles, natural amenities affect attitudes, beliefs and values. This notion varies by individual, and affects their use and ties to the LNF. This section provides an assessment of the influence of Forest management on the lifestyles, attitudes, beliefs and values of residents of the study area.

Activities occurring on the LNF have many different influences on the lifestyles of local residents. Foremost, the Forest supports employment opportunities through the extractive capacity of natural resources as well as the economic activity generated by Forest visitors. In turn, a person's employment status affects his or her lifestyle. The economic contribution of Forest activities specific to this Travel Management Plan is addressed in much greater detail below; however, it is important to note that such issues also affect lifestyles. Natural resource based activities play an integral role in the lifestyle of many residents in the study area. From employment status to leisure activities, natural resources on the LNF impact both social and economic conditions.

Table 60. Annual total spending associated with National Forest visits by market segment (Source: USDA FS 2009)

National Forest Visits Excluding Downhill Skiing	Non-local Segments			Local Segments			Total
	Day	Overnight on LNF	Overnight off LNF	Day	Overnight on LNF	Overnight off LNF	
Total Spending ($1,000s)	345	7,398	20,686	4,528	1,797	2,886	37,640
National Forest Visits Downhill Skiing Only	**Non-local Segments**			**Local Segments**			Total
	Day	Overnight		Day	Overnight		
Total Spending ($1,000s)	6	443		76	83		609

Table 61. Average spending of National Forest visitor groups by market segment, dollars per group per trip

	Non-local Segments			Local Segments			Non-Primary
	Day	Overnight on LNF	Overnight off LNF	Day	Overnight on LNF	Overnight off LNF	
Lodging	0.00	25.30	64.85	0.00	16.24	17.62	48.78
Restaurant	13.60	25.26	58.91	6.12	13.61	21.49	44.80
Groceries	7.61	36.55	31.28	5.41	41.15	23.46	21.04
Gas and Oil	15.99	37.28	35.79	11.67	27.70	25.93	28.52
Other Transportation	0.98	3.00	7.54	0.21	0.21	1.09	5.10
Activities	3.87	8.04	15.49	1.82	3.80	6.76	9.67
Admissions /fees	5.24	10.23	9.02	3.42	10.54	8.37	6.97
Souvenirs /other	4.31	15.59	22.37	4.20	11.24	11.42	18.64
Total	51.60	161.25	245.25	32.85	124.49	116.14	183.52

Source: USDA FS 2009

Management of LNF resources affects the livelihoods of individuals and groups in many ways. Many residents of the study area associate their attitudes, beliefs and values with outdoor recreational opportunities and natural amenities. The effects of resource management are different for each person due to disparities in their ties to the forest. Multiple social groups exist within the study area, each with their own concerns for travel management. One such group is individuals with a shared concern regarding the utilization of forest resources. Both private and commercial removal of forest products occurs in the study area; for many, their livelihoods revolve around the wood products industry. Those concerned with resource utilization base their attitudes, beliefs and values on the opportunity to make direct use of forest resources. This part of the population base is likely to be more concerned with policies regarding timber management than they would with

recreation and travel, unless travel management imposes restrictions on their ability to operate.

Another group of individuals have a shared concern about resource conservation; they typically value natural resources more for their amenity values rather than economic values. Concerns exhibited by this group include the non-extractive use of natural resources. They value forests for their recreation and natural amenity qualities rather than extractive capacity. The abundance of natural amenities was likely a motivating factor in their decision to reside nearby the LNF. A similar social group is recreationists. This is a large diverse group that includes local residents and visitors from outside the study area. This group values the opportunity to escape from urban environments through outdoor recreation. The availability of recreational opportunities directly affects their attitudes, beliefs and values. Travel management planning is likely to be of more importance to recreationists than other social groups. Attitudes, beliefs and values may differ among individuals in this group, as some may be advocates of motorized recreation and others may not. The overall social wellbeing of this group is closely related to the management of recreational opportunities.

Many Native Americans also reside in the study area. Their attitudes, beliefs and values go way beyond the management of recreational opportunities and forest products. Many traditions and their cultural heritage stem from the use of forest resources. Native Americans indigenous to the area include the Hoopa, Yana, Wintu, Achuimawi, Shasta and Chirmariko; many of whom still maintain traditional values and practices. The forest provides sources of native foods and medicines as well as serves as a venue for traditional activities. In addition to providing subsistence and cultural amenities, the forest also serves spiritual functions for Native Americans. Their attitudes, values and beliefs depend heavily on the use of forest resources. Maintaining access to cultural sites is important; however travel across such sites may degrade the cultural environment. In many cases, maintaining and restoring the forest to its native state enhances the cultural values experienced by Native Americans.

Contemporary Native American uses of the Forest include cultural and spiritual events, fishing, hunting, food gathering, collection of medicinal plants, and the collection of basketry materials. Numerous sites on national forests are used for traditional cultural activities (ceremonies, gatherings, etc.). Depending on the site, access may be provided by existing roads, trails, or cross-country motorized travel. Often, important places to local Native Americans are those that supply native foods or provide a spiritual connection to the land. Harvesting of native foods is very important to local tribes. NFS Lands provide fish, acorns, wild plums, berries, bulbs, and many other foods vital to traditional diets. Traditional food sources serve to regulate health conditions of many Native Americans (Martinez 2008). As Native Americans have moved away from traditional foods, negative health effects have been encountered; diabetes is one chronic condition affecting many Native Americans forced away from traditional foods (Martinez 2008). Thus, the availability of Federal lands for food harvesting is an important issue to local tribes. Furthermore, Native Americans have a

spiritual connection to the environment and native landscapes. Maintaining this type of relationship with the lands managed by the LNF is important to local tribes for passing along knowledge to future generations.

Parties with a wide variety of interests have a stake in this travel management plan. There are many cases of conflicting interests. Just as attitudes, beliefs and values differ across stakeholders, so do their uses of the forest and their desired direction for travel management. Four reoccurring issues have emerged during travel management planning in Northern California. These issues arose among public stakeholders as a result of their attitudes, beliefs and values towards the use of national forests. The first issue concerns the availability of motorized recreation. The concern is that any reduction in miles of routes and prohibition of cross-country travel would adversely affect the quality of motorized recreation experiences. This is a shared concern among many OHV enthusiasts. Another issue of concern is regarding motorized access to forest sites. This issue is common among participants of activities occurring off NFTS roads and trails. The fear is that such restrictions in travel would limit access for activities such as dispersed camping, hunting, fishing, sightseeing and other recreational opportunities.

The remaining issues involve consideration for non-motorized recreation and environmental impacts. This includes fears regarding the adverse effects of motorized activities on non-motorized recreation. Noise pollution, resource damage and insufficient enforcement are all concerns of stakeholders valuing the non-motorized recreation opportunities and natural amenities on the forest. Such occurrences could adversely affect the recreational experiences and aesthetic values observed by nature-oriented visitors. Similarly, there are concerns regarding the environmental impacts of motorized travel. The fear is that public motorized travel creates natural resource damage such as sedimentation, erosion, spread of noxious weeds and decreased wildlife habitat and populations. The proposed action would limit such motorized travel to system roads and designated trails, prohibiting cross-county travel. This could serve to reduce environmental impacts, but motorized use of roads and trails may still contribute to resource degradation. These concerns reflect differences in the attitudes, beliefs and values among interested parties. Those characteristics shared among advocates of motorized recreation differ from those common to supporters of natural resource and environmental issues. Balancing the concerns of all parties is a difficult task faced by forest managers. Non-congruities among the attitudes, values and belief systems of stakeholders complicate the social dynamic under which they must operate. However, understanding the realities of such dissimilarities in the social environment is crucial to developing a comprehensive travel management plan.

Specific activities of concern include: dispersed camping, OHV use, big game retrieval, and non-motorized forms of recreation. Many dispersed campers greatly value the ability to travel cross-county to access remote sites. This opportunity would be lost under action alternatives. Likewise, hunters could experience trouble retrieving downed big game if they

weren't allowed motorized access off of designated roads and trails. This is of particular importance to the elderly and those with physical handicaps with limited ability to walk long distances to retrieve downed game. Loss of cross-county travel would negatively impact the well-being of these stakeholders. They may look to recreate elsewhere, but that would result in lost traditions for many families accessing the same sites for many years. These user groups value access and ability to travel on the Forests, and any loss in those could negatively impact their quality of life.

The relationship between the LNF and the lifestyles, attitudes, beliefs and values of its constituents has many components. Affects vary by communities of interest according to their uses of the forest. Communities of interest bring together stakeholders with shared interests in the framing and resolution of a problem (Fischer 2001). Recreational and environmental interest groups are becoming increasingly involved in the forest management process. Their lifestyles, attitudes, beliefs and values also depend on the use and management of natural resources. The Native American community will continue to utilize the forest for cultural and traditional activities. Their way of life depends on the management of natural resources. With such a variety of communities of interest, the LNF influences livelihoods in many ways. Balancing the interests of each group is an issue that must be taken into account during the travel management process. Ultimately, the decision will affect the lifestyles, attitudes, beliefs and values of individuals in many different ways, some for the better and some for the worse. The full effects of travel management planning on the LNF will not be observable until after implementation of the final plan.

Environmental Justice

As stated in Executive Order 12898, it is required that all federal actions consider the potential of disproportionate effects on minority and low-income populations in the local region. The principals of Environmental Justice require agencies to address the equity and fairness implications associated with Federal land management actions.

According to the American Community Survey and US Census data reported in Table 52 above, it is suggested that the Native American population meets the Environmental Justice criterion as a minority population meaningfully greater than the general population of the state. Therefore decision makers on the LNF should pay careful attention to the potential impacts of management actions on Native Americans.

Table 62 reports the number of individuals below the poverty level and poverty rates for the five counties in the study area and California in 2000 and 2005. All counties except for Plumas have poverty rates higher than that of the state. Poverty rates in Butte, Plumas and Tehama counties increased from 2000 to 2005. As of 2005, Butte and Tehama Counties have the highest poverty rates in the study area at 19.2 percent and 17.8 percent respectively. Such poverty rates suggest that a substantial proportion of the existing population should be considered as a low income group. Therefore, decisions regarding

future management actions on the forest should carefully assess the affects on low income populations in the study area.

Table 62. Poverty Status by State and County, 2000 and 2005

	2005		2000	
	Number	Percent	Number	Percent
California	4,669,056	13.3%	4,304,909	12.7%
Butte County	39,786	19.2%	34,558	17.2%
Lassen County	4,280	16.9%	4,312	17.5%
Plumas County	2,452	11.6%	2,290	11.1%
Shasta County	24,200	13.8%	24,195	14.7%
Tehama County	10,643	17.8%	9,605	17.2%

Source: U.S. Census Bureau 2008

In cases where the management decisions on the forest are expected to create jobs and income in the local economy, it is unlikely that there would be a disproportionate adverse affect on minority and low income populations. Individuals in that population may benefit from any increase in jobs and income. Alternatively, future management decisions that may negatively impact local employment and income conditions should carefully assess the distribution of effects across population demographics, paying careful attention to Native American and low income populations.

While Native American and low-income populations may exist in greater presence in the study area than the general population of the state of California, none of the alternatives are expected to have disproportionately high and adverse human health or environmental effects. Impacts to local communities are expected to be negligible, and there is no reason to suspect that any impacts will disproportionately affect minority and low income populations.

Civil Rights

USDA civil rights policy requires each agency to analyze the civil rights impact(s) of policies, actions, or decisions that will affect federally conducted and federally assisted programs and activities. A civil rights impact analysis (CRIA) facilitates the identification of the effects of eligibility criteria, methods of administration, or other agency-imposed requirements that may adversely and disproportionately impact employees or program beneficiaries based on their membership in a protected group. Protected groups include multiples of similarly situated persons who may be distinguished by their common race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetics, political beliefs, or receipt of income from any public assistance program.

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 in this FEIS. Public involvement occurred during two periods:

- Public collaboration process, 2004-2007
- 30-day scoping period for the Notice of Intent (NOI)

Beginning in 2004, the Lassen NF held numerous open house meetings concerning this project in communities across northeastern California. Meetings were held to inform the public about implementation of the OHV MOI and Travel Management Rule; encourage participation in the unauthorized route inventory and review process; and identify specific routes and open riding areas they wished to designate for motor vehicle use.

From October to December 2006, Lassen NF asked for the public collaboration, through release of a "route designation feedback form" made available via the Lassen NF internet website, to identify which unauthorized routes should be added to the NFTS for motor vehicle travel. The public was also asked to recommend unauthorized routes which should not be designated to the NFS or should be converted to a non-motorized trail. Approximately 3,700 feedback forms were received, which provided comments on the NFTS and unauthorized routes and identified resource concerns. The Lassen NF used this information to assist in development of the proposed action published in the Notice of Intent.

Restrictions on motor vehicle use that are applied consistently to everyone are not discriminatory. However, some groups could be impacted more than others. The following concerns are common among parties interested in travel management planning:

Gathering of Special Forest Products

It is known that many people, including members of protected groups, use motor vehicles to gather special forest products including mushrooms, greenery, firewood, posts, poles, etc. Such products are gathered for both personal and commercial use. Some protected groups are known to be very active in gathering certain special forest Products. Concerns have been raised that the prohibition on cross country travel will restrict such activities to designated roads or trails, and thereby limit people's ability to gather such products and disproportionately impact protected groups.

Currently, under 36 CFR 261.6, removing any timber, tree or other forest product, except as authorized by a special-use authorization, timber sale contract, or Federal law or regulation is prohibited. While permitted activities may be exempted from the prohibition on cross-country motorized travel when provided in the permit (36 CFR 212.51 (8)), analysis of such exemptions is outside the scope of this document. Such activities have been, and will continue to be, subject to separate, site-specific National Environmental Policy Act (NEPA) analysis before permits are issued.

A prohibition on cross-country motorized travel may result in additional travel time for those who gather forest products, as they may be required to walk rather than drive to gathering sites. In addition, removal of large products (posts and poles) may be limited to sites adjacent to roads. Regardless of the product, all gatherers of forest products will be equally affected by the prohibition; no protected groups will be disproportionately affected.

Impacts on People with Disabilities and the Elderly

Concerns have been raised about the impact of travel management on people with disabilities and the elderly. These groups are more dependent on motor vehicles to access and enjoy National Forests. Many dispersed recreation and forest product gathering sites are detached from NFTS roads and trails; it is not possible to develop a route system that would fulfill every stakeholders need. Permitted activities may be addressed under separate analyses.

Implementation of the Travel Management Rule, Subpart B, including the prohibition of cross- country motorized travel, is forest-wide and applies to all forest users equally. There is no legal requirement to allow people with disabilities to use motor vehicles on roads, on trails, and in areas that are closed to motor vehicle use. Restrictions on motor vehicle use that are applied consistently to everyone are not discriminatory. Generally, granting an exemption from designations for people with disabilities would not be consistent with the resource protection and other management objectives of travel management and would fundamentally alter the nature of the Forest Service's travel management program (29 U.S.C. 794; 7 CFR 15e.103).

Under section 504 of the Rehabilitation Act of 1973, no person with a disability can be denied participation in a Federal program that is available to all other people solely because of his or her disability. Consistent with 36 CFR 212.1, FSM 2353.05, and Title V, Section 507(c), of the Americans With Disabilities Act, wheelchairs and mobility devices, including those that are battery-powered, that are designed solely for use by a mobility-impaired person for locomotion and that are suitable for use in an indoor pedestrian area, are allowed on all NFS lands that are open to foot travel.

Access by Native Americans

Concerns have been raised by Native Americans and tribal representatives that travel management proposals would unduly restrict access to sacred sites or traditional gathering areas that are accessed via motorized cross-country travel, including unauthorized routes. Elderly or infirm tribal members may be prevented from participating in tribal activities if motor vehicle access is denied. Such access has been traditionally granted as long as resource damage can be prevented. Motor vehicle use that is specifically authorized under a written authorization issued under Federal law or regulations is exempt from route designation ((36 CFR 212.51 (8)). The Forest Supervisor can provide such authorization. This will ensure that motor vehicle access to sacred sites or gathering areas may continue, and access would not be affected under management alternatives.

Environmental Consequences

Principles of economic impact analysis are relied upon to estimate the effects of travel management alternatives on the economic environment. “Economic impact analyses seek to determine short-term effects that Forest Service programs have on economic conditions in defined impact areas in which the planning area occurs” (FSM 2009a). As prescribed by FSM 1900, short-term effects are those that occur during the first 10 years of a longer planning cycle. Economic impact analyses investigate the effects of the alternative development scenarios on employment and income. The relative size of the local communities plays an important role in the assessment of job and income impacts to the economy. Broader, more diverse, economies will likely be more resilient to changes in jobs and income than smaller, more rural, communities. For example, a loss of ten jobs in a large metropolitan area will likely have very little impact on the overall health of the economy. However, the same loss in jobs in a small rural community may severely affect local economic conditions. Thus, when assessing the magnitude of impacts to employment and income across alternatives, it is important to keep in mind the relative importance of those economic factors to the specified study area.

Models of the local economy were built using IMPLAN Professional 2.0 software and 2006 data. For the purposes of this report, the local economy is defined the same as the study area. Changes in activity on the LNF may have several different consequences for the condition of the economic environment. Ultimately, a change in the activities occurring on the forest would change the local economic stimulus. A change in economic stimulus (e.g. increased recreational visits) would likely change the total level of jobs and income. In order to estimate the level of change, IMPLAN is utilized to develop response coefficients which estimate the level of jobs and income generated per thousand visits by activity type. The response coefficients are then input into the Travel Management Economic Contribution Application (TMECA). TMECA is a spreadsheet that the uses these response coefficients along with data collected from the NVUM survey to estimate the local economic contribution of different types of recreational activities based on whether the recreationists stayed only for a day or overnight (USDA FS, n.d.).

NVUM reports estimates of current visitor use by activity type based on interviews of forest visitors as they leave the forest. Thus, the data available represents the conditions under the no action alternative. There is no means of predicting the change in visitor use across management alternatives. Due to these limitations an economic impact analysis cannot be conducted for the various alternatives. Economic contributions calculated in TMECA are reported for the no action alternative. Response coefficients for each activity are also reported, which allows for inferences to be made regarding the economic implications of changes in visitor use under the action alternatives. Any change in visitor use that would occur as a result of implementation of an action alternative would impact the economy

according to the response coefficients. Thus, the discussion of the economic consequences of the action alternatives is based on the response coefficients reported in TMECA.

Response coefficients estimate impacts in three parts. Direct impacts, are the response of an industry to demand for the goods or services it produces. The employment and labor income that result from the production of output to meet demand are direct effects. However, direct effects are only a part of the picture. There are many interdependencies between businesses, consumers, and the natural resources on which economic activity depends. IMPLAN modeling allows a more complete examination of these complex linkages. In addition to direct effects, each sector also has indirect and induced effects. Indirect effects are produced when a sector must purchase supplies and services from other industries in order to produce output sufficient to meet demand. The employment and labor income generated in other industries as a result are referred to as indirect effects. Induced effects represent the employment and labor income stimulated throughout the local economy as a result of the expenditure of new household income generated by direct and indirect employment.

In addition to impacts on the local economy, there would also be changes to the current condition of the social environment under the action alternatives. As reported in the lifestyles, attitudes, beliefs and values section above, individuals are affected differently due to their unique ties to the forest. Thus, increases in the social welfare of one group may be offset by decreases to another group. Estimation of net social welfare across alternatives is outside the scope of this analysis. Thus, the effects analysis reported below relies on a qualitative assessment of changes in social conditions stemming from the specifications of the action alternatives.

Incomplete and Insufficient Information

Insufficient information exists to accurately estimate changes in recreation use that would occur under implementation of the action alternatives analyzed in this report. Although certain trends in visitor use may be predicted from the guidelines set forth under each alternative, there is no method and/or data available to estimate actual changes in motorized and non-motorized recreation. The lack of this information prohibits the ability to conduct an economic impact analysis to estimate differences in economic conditions across alternatives. Current visitation data represents use under the no action and is used to conduct an economic contribution analysis based on existing conditions. Those contributions serve as a baseline for comparison to the effects of action alternatives. Discussion of those effects is based on the response coefficients by activity and visit type and includes a qualitative assessment of potential economic implications. As more data becomes available regarding recreation use in the future, the response coefficients may be used to estimate specific economic impacts at that time.

Response Coefficients by Activity Type

Table 63 reports the estimated employment and labor income response coefficients by activity type for local and non-local recreation. Both day and overnight (OVN) trips are accounted for. Non-primary (NP) visits are cases where recreation on the LNF was not the primary purpose for the trip. Local visitors are defined as those visitors whose primary residence is within 30 straight line miles of the forest visited (Stynes and White 2005). Non-local visitors are all those who are not considered local. The response coefficients indicate the jobs and labor income supported per thousand visits by activity type. Table 63 indicates that non-local visitation generates larger economic impacts than local recreation because differences in expenditure habits (Table 61). Therefore, increasing visitation by non-local forest users will result in the creation of more jobs and income in the study area than the same increase in visitation by local forest users. The total economic effects vary widely by activity type. Non-local overnight snowmobiling and cross-country skiing visits generate the most jobs and income in the study area. Per every thousand visits, cross-county skiing supports 3.866 direct jobs and 1.323 indirect and induced jobs, as well as $84,147 in direct labor income and $43,985 in indirect and induced labor income. Non-local overnight snowmobiling is a close second, supporting 3.698 direct jobs and 1.216 indirect and induced jobs, as well as $77,291 in direct labor income and $40,332 in indirect and induced labor income per thousand visits.

Snowmobiling and cross-country skiing (Table 58) account for a very small percentage of recreation on the LNF. Two of the most common activities are relaxing and viewing natural features. Those activities are combined in the all other activities group. Non-local overnight visits for those activities support, on average, 2.135 direct jobs and 0.863 indirect and induced jobs, as well as $64,032 in direct labor income and $25,781 in indirect and induced labor income per thousand visits.

Economic effects vary by the amount of spending and by the type of activity. It is important to remain aware that these numbers reflect an economic structure that is a snapshot in time. The data used for this analysis reflects the economic conditions of the study area as they were in 2006. Therefore the results may not be applicable to visitation numbers that are dramatically different from current recreation levels. If visitation were to change substantially, there could be a structural shift in the economy as spending patterns changed and these results would not reflect the changed composition of the local economy.

Alternative 1 – No-action

Under the no action alternative, no changes would be made to the current National Forest Transportation System (NFTS) and no cross-county travel prohibition would be put into place. No Travel Management Rule would be implemented and no motor vehicle use map (MVUM) produced. Unauthorized routes would continue to have no status or authorization

as NFTS facilities, and motor vehicle travel by the public would not be limited to designated routes.

Table 63. Employment and labor income response coefficients by activity type

		Employment		Labor Income (2006 dollars)	
		(Jobs per 1,000 Party-Trips)		($ 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	0.172	0.065	$4,279	$2,139
	Local OVN	0.811	0.310	$19,720	$10,380
	NonLocal Day	0.397	0.133	$9,360	$4,206
	NonLocal OVN	2.708	0.945	$61,365	$31,242
	NP	0.172	0.065	$4,279	$2,139
Backpacking	Local Day	-	-	$0	$0
	Local OVN	0.713	0.310	$19,162	$10,614
	NonLocal Day	-	-	$0	$0
	NonLocal OVN	0.929	0.368	$24,767	$11,993
	NP	0.713	0.310	$19,162	$10,614
Cross-country Ski	Local Day	0.330	0.121	$7,677	$4,005
	Local OVN	2.320	0.793	$50,484	$26,390
	NonLocal Day	0.519	0.190	$12,059	$6,292
	NonLocal OVN	3.866	1.323	$84,147	$43,985
	NP	0.330	0.121	$7,677	$4,005
Motorized Use					
OHV Use	Local Day	0.295	0.117	$7,661	$3,871
	Local OVN	0.829	0.323	$20,354	$10,877
	NonLocal Day	0.463	0.184	$12,043	$6,084
	NonLocal OVN	1.382	0.538	$33,925	$18,129
	NP	0.295	0.117	$7,661	$3,871
Driving	Local Day	0.200	0.071	$4,799	$2,319
	Local OVN	1.221	0.395	$25,499	$13,020
	NonLocal Day	0.314	0.112	$7,547	$3,647
	NonLocal OVN	2.036	0.658	$42,505	$21,702
	NP	0.200	0.071	$4,799	$2,319
Snowmobile	Local Day	0.521	0.207	$13,773	$6,794
	Local OVN	2.219	0.729	$46,372	$24,198
	NonLocal Day	0.895	0.344	$22,724	$11,261
	NonLocal OVN	3.698	1.216	$77,291	$40,332
	NP	0.521	0.207	$13,773	$6,794
All Other Use					
All Other Activities*	Local Day	0.285	0.121	$8,269	$3,824

		Employment		Labor Income (2006 dollars)	
		(Jobs per 1,000 Party-Trips)		($ per 1,000 Party-Trips)	
		Direct Effects	Indirect & Induced Effects	Direct Effects	Indirect & Induced Effects
	Local OVN	1.025	0.467	$33,509	$14,408
	NonLocal Day	0.521	0.197	$13,850	$6,101
	NonLocal OVN	2.135	0.863	$64,032	$25,781
	NP	0.285	0.121	$8,269	$3,824

Source: USDA FS 2008b and MIG 2006
*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.

Direct and Indirect Effects

Since no Travel Management Rule would be implemented there is no anticipated change in motorized or non-motorized use. Therefore it is assumed that current levels of recreation provide an accurate representation of the effects of visitation on the local economy. There are no predictions of changes to current economic conditions. The effects reported below are simply the total economic contribution of current recreation levels on the forest.

The only change in recreation on the forest would be that occurring as a natural progression from changes in population and tastes and preferences for recreational activities. Contributions to employment and labor income are estimated with use data and expenditure profiles generated through the NVUM process. Table 64 reports employment and labor income by activity type. The contributions of local and non-local residents are reported separately because spending by local residents for recreation on the forest does not represent new money to the economy. If local residents could not recreate on the LNF, they could find other forms of recreation in the study area and maintain local recreational expenditures. Therefore employment and labor income supported by this type of spending are not necessarily dependent on the opportunities provided by the forest.

Under current recreation use on the LNF, a total of 165.5 jobs and $4,422,755 in labor income are supported by non-motorized activities. This includes direct, indirect and induced activity resulting from the expenditures of forest visitors. Non-local visitors participating in hiking/walking on the forest support the most jobs and labor income among non-motorized activities with 69.8 jobs and $1,831,731 in labor income. Total motorized activities support 44.1 jobs and $1,158,105 in labor income in the study area. Driving for pleasure supports the most economic activity among motorized recreation; 15.7 jobs and $419,407 in labor income by locals and 12.9 jobs and $319,931 in labor income by non-locals. Even though average expenditures by non-locals are greater than those of local visitors (Table 61), in

some cases there are more total visits by locals which results in a greater economic contribution than that of non-locals (e.g. driving for pleasure). The majority of economic stimulus supported by recreation on the forest is from “all other” activities. Those activities include: 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. Visitor use in these activities combined support 372.4 jobs and $10,948,891 in labor income.

Table 64. Employment and labor income contribution by activity type

	Employment (# of jobs)		Labor Income (2008 dollars)	
	Direct	Indirect & Induced	Direct	Indirect & Induced
Non-Motorized Use				
Backpacking - Local	2.7	1.2	75,248	41,680
Non-local	3.2	1.3	89,634	43,401
Hiking/Walking - Local	19.8	7.5	506,473	256,739
Non-local	51.8	18.0	1,217,285	614,446
Horseback Riding - Local	0.0	0.0	0	0
Non-local	0.0	0.0	0	0
Bicycling - Local	4.0	1.5	101,877	51,643
Non-local	10.4	3.6	244,856	123,595
Cross-country Skiing - Local	4.6	1.6	107,323	56,029
Non-local	17.3	5.9	390,270	203,986
Other Non-motorized - Local	2.3	0.9	58,215	29,510
Non-local	5.9	2.1	139,918	70,626
Total Non-motorized	**122.0**	**43.6**	**2,931,099**	**1,491,656**
Subtotal: Non-Motorized		**165.5**		**$4,422,755**
Motorized Use				
OHV Use - Local	1.2	0.5	32,666	16,920
Non-local	1.5	0.6	37,556	19,885
Driving for Pleasure - Local	11.6	4.1	281,960	137,447
Non-local	9.7	3.2	212,284	107,647
Snowmobiling - Local	4.5	1.6	111,437	56,201
Non-local	4.3	1.4	94,939	49,160
Other Motorized Activity - Local	0.0	0.0	0	0
Non-local	0.0	0.0	0	0
Total Motorized	**32.7**	**11.4**	**770,843**	**387,262**
Subtotal: Motorized		**44.1**		**$1,158,105**
All Other Use				
All Other Activities - Local	114.6	48.7	3,318,016	1,659,124
Non-local	150.96	58.14	4,020,644	1,951,107

	Employment (# of jobs)		Labor Income (2008 dollars)	
	Direct	Indirect & Induced	Direct	Indirect & Induced
Total Other	**265.6**	**106.8**	**7,338,660**	**3,610,231**
Subtotal: All Other		**372.4**		**$10,948,891**
Grand Total	**420.3**	**161.8**	**11,040,602**	**5,489,148**
Grand subtotal		**582.1**		**$16,529,751**

Source: USDA FS 2008b and MIG 2006

Table 65 reports the percent of total employment and labor income supported by each activity type. Direct jobs supported by all other activities accounts for 45.63 percent of all jobs contributed to the local economy from recreation on the LNF, and indirect and induced jobs account for another 18.35 percent. Total motorized activities accounts for 7.58 percent of jobs and 7.01 percent of labor income contributed. In terms of total employment and income in the study area, recreation on the LNF accounts for 0.498 percent of jobs and 0.349 percent of labor income (Table 66). Non-local motorized use on the forest supports just 0.009 percent and 0.006 percent of jobs and labor income in the study area respectively.

Table 65. Percent of total employment and labor income contributed 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	0.46%	0.21%	0.46%	0.25%
Non-local	0.55%	0.22%	0.54%	0.26%
Hiking/Walking - Local	3.40%	1.29%	3.06%	1.55%
Non-local	8.90%	3.09%	7.36%	3.72%
Horseback Riding - Local	0.00%	0.00%	0.00%	0.00%
Non-local	0.00%	0.00%	0.00%	0.00%
Bicycling - Local	0.69%	0.26%	0.62%	0.31%
Non-local	1.79%	0.62%	1.48%	0.75%
Cross-country Skiing - Local	0.79%	0.27%	0.65%	0.34%
Non-local	2.97%	1.01%	2.36%	1.23%
Other Non-motorized - Local	0.40%	0.15%	0.35%	0.18%
Non-local	1.01%	0.36%	0.85%	0.43%
Total Non-motorized	**20.96%**	**7.49%**	**17.73%**	**9.02%**
Motorized Use				
OHV Use - Local	0.21%	0.09%	0.20%	0.10%
Non-local	0.26%	0.10%	0.23%	0.12%
Driving for Pleasure - Local	1.99%	0.70%	1.71%	0.83%
Non-local	1.67%	0.55%	1.28%	0.65%

	Employment		Labor Income(2008 dollars)	
	(% of full & part-time jobs)		% of Total Income	
	Direct	Indirect & Induced	Direct	Indirect & Induced
Snowmobiling - Local	0.77%	0.27%	0.67%	0.34%
Non-local	0.74%	0.24%	0.57%	0.30%
Other Motorized Activity - Local	0.00%	0.00%	0.00%	0.00%
Non-local	0.00%	0.00%	0.00%	0.00%
Total Motorized	**5.62%**	**1.96%**	**4.66%**	**2.34%**
All Other Use				
All Other Activities - Local	19.69%	8.37%	20.07%	10.04%
Non-local	25.93%	9.99%	24.32%	11.80%
Total Other	45.63%	18.35%	44.40%	21.84%
Totals	**72.2%**	**27.8%**	**66.79%**	**33.21%**
	100.0%		**100.0%**	

Source: USDA FS 2008b and MIG 2006

Under the no action alternative there would be no change occurring to the activities taking place on the forest. Thus, the employment and income figures reported above represent the contribution of current activities to the local economy. There would be no change in employment and income as a result of implementation of this alternative. Because of this there are no specific direct and indirect effects that would occur. The information reported represents the status quo, and does not imply changes in economic activity resulting from this alternative.

Cumulative Effects

Given that there are no measurable direct and indirect effects that would occur under the no action alternative, there would also be no measurable cumulative effects.

Table 66. Percent of Total Study Area Employment and Total Area Labor Income

		Employment Effects (full and part time jobs)	Labor Income (2008 dollars)
Total Non-Motorized Use	Local	0.020%	0.014%
	NonLocal	0.051%	0.033%
Total Motorized Use	Local	0.010%	0.007%
	NonLocal	0.009%	0.006%
Total All Other Use	Local	0.070%	0.053%
	NonLocal	0.089%	0.063%
	Total Use	0.249%	0.175%
Total for Study Area		**233,933**	**$9,469,358,000**

Source: USDA FS 2008b and MIG 2006

Alternative 2 – Proposed Action

The proposed action is comprised of the prohibition of cross-county travel and changes to the existing NFTS as described in the Notice of Intent (NOI) published in the Federal Register on October 25, 2007 (USDA FS 2007b). Cross-county travel is defined as motor vehicle travel off designated NFS roads, NFS trails and areas by the public except as allowed by permit or other authorization. Cross-country travel by snowmobiles is not included in the exclusion. A total of 21 miles of unauthorized routes would be added to the NFTS, 16 miles as maintenance level (ML) 2 roads and 5 miles as motorized trails. Additionally, 13 miles of ML 3 and 4 roads would be designated for motorized mixed use by highway and non-highway legal vehicles.

Direct and Indirect Effects

This alternative would impose restrictions on allowable motorized recreation since vehicles would be limited to authorized routes defined by the MVUM, cross-country travel would be prohibited. Such restrictions could result in fewer visitor days for motorized recreation and other activities requiring cross-county travel. Motorized recreation accounts for 10.9 percent of main activities (Table 58); thus, there could be some impact to annual visitation rates for motorized activities requiring cross-county travel. The addition of 21 miles of NFTS roads and trails could serve to mitigate some of the loss in motorized recreation, as visitors would still be able to partake in motorized activities on those roads and trails which are currently unauthorized. Overall, total employment supported by non-local motorized recreation on the LNF accounts for only 0.009 percent of total jobs in the study area; motorized recreation by local residents supports another .01 percent (Table 66). Therefore the total economic effects of changes in motorized recreation would be minimal compared to the overall economic activity in the study area. The effects, however, may not be evenly distributed across communities in the five counties. For example, businesses in close proximity to popular motorized recreation spots that would no longer be accessible under this alternative are likely to be more affected than similar businesses in other parts of the study area. Due to limitations in the data, estimating the effects at such a small scale is not possible. It is important, however, that decision makers are aware that some communities may experience greater changes in jobs and income than others.

Changes in levels of motorized recreation could stimulate a transformation in recreational visits for non-motorized and other activities. This could serve to mitigate adverse economic impacts resulting from fewer motorized recreation visits. Non-motorized and other recreational activities account for a large portion of visits to the LNF. Less motorized recreation may increase the quality of the experience for these visitors. Currently data does not exist to estimate changes in jobs and income resulting from the substitution effect between motorized and other recreational activities. Economic impacts vary widely across activity types, thus the direct and indirect effects depend heavily on changes in recreation use that would result from implementation of this alternative. As reported in the contribution

analysis for the no action alternative, total jobs and income supported by recreation on the Forest is a very small percentage of total economic activity. Therefore any economic impacts that would be realized under this alternative would be negligible.

Although economic effects appear to be minimal, implications for social conditions may be more recognized by local residents. Analysis of the social environment indicates that motorized and non-motorized forms of recreation are important to a variety of user groups. Advocates of motorized recreation would have less access to areas where they could legally recreate. This would adversely impact the value they experience from use of the forest. The additional roads and trails that would be included in the NFTS suggest that some new motorized recreational opportunities would exist despite restrictions in cross-country travel. However, there would likely be a net loss in motorized recreational visits. The total value experienced by these stakeholders would decline as opportunities to participate in such forms of recreation decline. Additionally, user groups concerned with other forms of recreation requiring motorized access may also be adversely affected. For example, dispersed camping and gathering forest products are common activities on NFS lands. The prohibition of cross-county travel would limit motorized access to only those sites accessible by authorized routes. For some, traveling to other areas to replace lost access on the LNF may be difficult. The effects of going elsewhere for forest activities include increased travel time and fuel consumption, as well as additional expenses such as campground fees. Furthermore, the quality of the experience at other sites may not be comparable to the quality they have traditionally experienced on the LNF.

The prohibition of cross-county travel would improve conditions of natural resources on the forest, which could also increase opportunities for non-motorized recreation. Advocates of non-motorized recreation and user groups concerned with environmental degradation are also active in the study area. Such stakeholders would likely experience an increase in total benefits. There is a tradeoff between opportunities provided for different user groups. Resources on the LNF are in fixed supply, thus as opportunities for one group increases it is possible that opportunities for other user groups could decrease. Under the proposed action, it is likely that opportunities for non-motorized recreation would increase, while opportunities for motorized recreation decrease, relative to that under the no action. There appears to be a negative relationship between motorized and non-motorized activities, i.e. increases in one lead to decreases in the other. In terms of economic impacts, it is likely that changes in use by one group would mitigate impacts resulting from changes in use by other groups. In terms of net social welfare, a decrease in social wellbeing for one group may be offset by an increase for another. However, there may be individual user groups that are adversely affected. Currently there is no means of estimating the net impact to social welfare.

Cumulative Effects

Cumulative effects include the total change in social and economic conditions that would result from the specifications under this alternative in conjunction with the direct and indirect

effects of other present and reasonably foreseeable activities being conducted in the study area. For example, any environmental change as a result of the proposed action would be in addition to other travel management activities occurring simultaneously in the region on both public and private lands. On the margin, other projects affecting cross-county travel and motorized recreation are likely to have similar effects on the social and economic environment as reported above. Individually, such projects may not have much bearing on local communities; however, cumulatively, they may substantially impact social and economic conditions.

Appendix C of this EIS reports present and reasonably foreseeable actions that could contribute to cumulative effects. The estimated direct and indirect effects of each project are unknown. Individually, each project would likely have a minimal impact on social and economic conditions; however, cumulatively they may substantially affect forest visits. This could change employment and income conditions in the study area, as well as influence the lifestyles, attitudes, beliefs and values of residents. The degree to which the socioeconomic environment would be impacted, as well as the distribution of effects, cannot be determined from the information available.

In addition to travel management planning on the LNF, other national forests are undergoing similar efforts. Thus, travel on nearby NFS lands will likely be changing. This may affect the availability of substitute activities. Other forests are in various stages of travel management, thus there is no information available that addresses the aggregate social and economic implications of all plans being developed in the study area.

Lands under other ownership may also undergo changes to transportation systems that would influence cumulative effects. Currently, the Bureau of Land Management (BLM) oversees a large land base that supports a variety of motorized recreational opportunities. The Redding Field Office manages some of the BLM lands in the study area. The Chappie-Shasta OHV Area offers opportunities for motorized recreation and is co-managed by the BLM Redding Field Office and the Shasta-Trinity NF. There are currently no projects that would substantially influence motorized recreation on these lands (Zaffarano 2009). Additionally, the Eagle Lake Field Office manages the Fort Sage Special Recreation Management Area. This area consists of approximately 22,000 acres of BLM land managed primarily for OHV use and winter deer habitat (USDI BLM 2009). This area could serve as a substitute recreation site for displaced LNF visitors.

Lands under private ownership offer additional opportunities for motorized recreation. Both authorized and unauthorized travel across private lands occurs in the study area. There may be some projects to prohibit or improve motorized recreation by large scale lands owners that could impact social and economic conditions; however, the majority of projects would likely be small scale, and would not dramatically alter recreational habits. Surveying private land owners in the study area is outside the scope of this analysis, thus actual implications for cumulative effects remains unknown.

Alternative 3

Under this alternative cross-country travel would be prohibited without adding any changes to the existing NFTS. There would be no currently unauthorized trails or roads added, and there would be no change to vehicle class restrictions or seasons of use.

Direct and Indirect Effects

This alternative prohibits cross-country travel while maintaining the existing NFTS. Thus, opportunities for motorized travel would be less than that under both the no action and proposed action alternatives. The principles reported under the proposed action that describe the effects to different interest groups also apply to this alternative. There would be additional opportunities for non-motorized recreation compared to those that would occur under the proposed action, thus benefits experienced by these user groups would increase. On the contrary, there would be fewer opportunities for motorized recreation. This would result in decreased social benefits experienced by these user groups. The substitution of recreational activities would create unevenly distributed effects across interest groups; however, the degree to which individual lifestyles are affected is unknown.

Interest groups concerned with motorized access and recreation would experience less social benefits because there would be fewer opportunities for travel on the Forest. Alternatively, it is likely that decreases in motorized travel would improve opportunities for resource conservation and non-motorized recreation; thus these interest groups would experience a net increase in benefits. The distribution of social effects is not quantifiable given constraints in time and methods available. It is impossible to predict with certainty whether or not net social welfare is better or worse under this alternative compared to any of the others.

In addition to changes in social indicators, there would continue to be a trade-off in the economic effects associated with changes in recreational habits. Economic activity lost due to decreased motorized visits may be offset by additional stimulus generated by an increase in visits for non-motorized recreation. Recreation on the LNF accounts for a small portion of economic activity and would yield negligible impacts. The social effects, however, are likely to be more realized by local residents. There would be a decrease in opportunities and social values for individuals passionate about motorized recreation. Conversely, advocates of non-motorized recreation and conservation of natural resources would experience improvements in lifestyle and social values relative to the no action and proposed action alternatives.

Cumulative Effects

Other projects in the study area that may contribute to cumulative effects are described under the proposed action and Appendix C. Under alternative 3 there would be a greater displacement of motorized recreators compared to the proposed action. However, substitute activities would exist within the study area. Cumulative effects would be similar to those

reported under the proposed action paired with any changes in the levels and distribution of direct and indirect effects on the social environment that would result from this alternative.

Alternative 4

This alternative emphasizes natural resource protection while adding 10 miles of unauthorized routes as ML 2 roads and changes the maintenance level of 79 miles of system roads from ML 3 to ML 2. Cross-county travel would be prohibited and there would be some changes to seasonality use as described in Chapter 2. Under this alternative a combination of vehicle class changes and minimal addition of unauthorized routes to the NFTS are used to address concerns about both dispersed recreation access and riding opportunities, while constraining the resource and economic impacts from additional of routes.

Direct and Indirect Effects

This alternative addresses concerns for impacts to natural resources. This would allow for additional opportunities for non-motorized recreation compared to those that would occur under the proposed action, and designation of routes would be restricted to minimize impacts to natural resources. Therefore, social benefits to non-motorized and environmental interest groups would increase. Alternatively, there would be fewer opportunities for motorized recreation. There would continue to be a tradeoff among motorized and non-motorized activities, resulting in a loss of wellbeing to advocates of motorized recreation and a gain in social welfare to conservationists and participants of other activities. The distribution of effects across stakeholders remains unknown; however benefits would be skewed towards opponents of motorized recreation.

Activities participated in, and ties to the forest vary by individual. Thus, the substitution of recreational activities would continue to create unevenly distributed effects across interest groups; however, the degree to which individual lifestyles are affected is unknown. Due to the strategic authorization of routes, there would be a greater decrease in opportunities and social values for individuals passionate about motorized recreation compared to the proposed action. Conversely, advocates of non-motorized recreation and conservation of natural resources would experience greater social benefits.

Direct and indirect effects on the social environment would likely be realized by local residents more than the economic effects. Net changes in economic activity would be negligible. Therefore, levels of employment and income would not be substantially different than under the no action.

Cumulative Effects

The cumulative effects would be similar to those reported under the proposed action in conjunction with any changes in the levels and distribution of direct and indirect effects resulting from this alternative.

Alternative 5 and Modified 5—Preferred Alternative

Alternative 5 and Modified 5 respond to the issue of access and the availability of motorized recreation. Public scoping resulted in many suggestions for additional routes that would enhance the quality of motorized recreation and access to dispersed recreational activities. Cross-county travel would continue be prohibited on the Forest. A total of 53 miles of unauthorized routes would be added to the existing NFTS and changes to vehicle class and season of use would occur as described in Chapter 2.

Direct and Indirect Effects

This alternative would yield the greatest opportunity for motorized access and recreation among action alternatives. Cross-county travel would still be prohibited, which could result in motorized recreation levels being less than that under the no action; but there would be more roads and trails providing opportunities for travel in comparison to other action alternatives. This would provide additional opportunities for motorized recreation, and provide access to various sites on the forest for activities such as hunting, dispersed camping, wildlife viewing, etc. There would be the least displacement of visitors participating in motorized travel among the action alternatives; thus there would also be the smallest decrease in social benefits experienced by those user groups.

Prohibition of cross-county travel would improve opportunities for resource conservation and non-motorized recreation relative to the no action; however the addition of authorized routes would limit increases in social benefits below that of the other action alternatives. Implementation of Alternative 5 or Modified 5 would still enrich the lifestyles of individuals concerned with environmental protection and non-motorized activities as there would be greater restrictions in motorized travel on the forest compared to that under the no action.

The economic stimulus derived by forest use represents a small portion of total activity in the area. Thus, direct and indirect effects on the economy would remain negligible. Social indicators would be affected, yet there remains a tradeoff among the values experienced by visitors participating in different activities. For example, losses in social benefits by one group may be offset by gains in another. This could yield little or no change in net social welfare. The levels and distribution of effects on the social environment remain unquantifiable. Thus, there is no estimate of true impacts to society. It is apparent, however, that this alternative would yield the greatest benefit to advocates of motorized recreation, and the least benefit to opposing interest groups, among all the action alternatives.

Cumulative Effects

Under Alternative 5 and Modified 5 there would be less displacement of motorized recreators than would occur under any other action alternative. However, there would also be less increase in the quality of non-motorized activities. The cumulative effects would be similar to those reported under the proposed action paired with any changes in the levels and distribution of direct and indirect effects on the social environment that would result from this alternative.

3.7 Air Quality

Changes Between the DEIS and the FEIS

Changes to the air quality section included only minor copy-editing. Route designation changes between the DEIS and the FEIS did not affect the outcome of the Air Quality indicators. No route changes encompassed areas with Air Quality issues such as: pyroxenite or serpentinite bedrock occurring under routes that could potentially release asbestos; route changes on diatomaceous material that can lead to respiratory illness. There is an additional discussion on climate change.

Introduction

This section describes the Lassen National Forest affected environment for air quality. It describes the area potentially affected by the alternatives and existing resource conditions within that area. This analysis covers all air basins affected by the alternatives discussed in this DEIS. Measurement indicators are used to describe the existing conditions within the analysis. The measurement indicators are also used in the analysis to compare, quantify, and describe how each alternative addresses resource concerns as they pertain to air quality.

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

Statute, Regulation, Lassen National Forest Land and Resource Management Plan (Forest Plan) and other direction relevant and specific to the proposed action relevant to air quality resources includes:

Federal Laws Relevant to Travel Management Projects

Federal Clean Air Act. The Federal Clean Air Act (**CAA**) passed in 1970, was last amended in 1990 (42 United States Code (**USC**) § 7401 et seq.), and is the basis for national air pollution control.

Regional Haze Rule (1990 Clean Air Act amendments), 40 CFR Section 51 (common to all forests). 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 visibility should be returned to natural conditions. Class I areas include wilderness or national parks greater than 5,000 acres which existed on August 7, 1977.

General Conformity Rule (1990 Clean Air Act Amendments) of the Clean Air Act (42 USC §7401 (176)(c)(51)(W) and 42 USC § 7401(176)(c)(93)(B)) (common to all forests). The U.S. Environmental Protection Agency (**EPA**) passed the final General Conformity rule in 1993. Under the rule, Federal agencies must work with state and local governments in a

nonattainment or maintenance area (e.g., for ozone or particulate matter), to ensure that Federal actions conform to the initiatives established in the applicable state implementation plan.

State Laws Relevant to Travel Management Projects

California Clean Air Act (CA H&S § 39660 et seq.) (common to all forests). 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 Act (Cal EPA ARB 2009).

California EPA Air Resources Board off-road recreational vehicle emissions standards rulemaking (common to all forests). In 1994, the California EPA Air Resources Board (**CARB**) approved new off-highway recreational vehicle regulations (amended in 1998). The rulemaking established emission standards for OHVs, including off-road motorcycles and ATVs (Cal EPA ARB 2009). Off-highway vehicle registration became contingent on vehicle compliance to California emissions standards. Off-highway vehicles that met emission standards were eligible for OHV Green Sticker registration with a year-round operating period, while vehicles not meeting emissions standards fell under the OHV Red Sticker program with a limited operational season.

Lassen National Forest 1992 Land and Resource Management Plan (Forest Plan). Applicable Standards and Guides from the Forest Plan (USDA FS PSW Region 1993: chapter 4:15) are as follows:

Maintain air quality to meet or exceed legal requirements of appropriate levels of government.

Comply with the CAA as amended, and state and local air quality regulations.

Effects Analysis Methodology

Scope of Analysis

The analysis area for air quality includes the entire forest, except the wilderness areas on the Lassen National forest. The analysis area lies within three air basins: Mountain Counties, Northeast Plateau, and Sacramento Valley.

Information Sources

Information for this analysis came from Lassen NF GIS databases for geology and transportation. Maps of Federal nonattainment areas for PM2.5 and ozone were used. These maps were provided by Trent Procter, Regional Air Quality Specialist for Forest Service Pacific Southwest Region. Analyses were done in GIS.

Assumptions and Indicators

Assumptions

California Air Resource Board accounts for and regulates tailpipe emissions through its green sticker program (Cal EPA ARB 2008). This project would not have an effect on the type and volume of tailpipe emissions. Consequently, tailpipe emissions from motor vehicles were not analyzed.

"No adverse change in attainment status is expected to occur as a result of these projects (Procter 2008)." Consequently, effects on status of attainment for PM2.5 and 8-hour ozone were not analyzed.

Motorized vehicle use includes their use on NFSRs, NFSTs, unauthorized routes, and cross-country travel on known locations of serpentinite and pyroxenite rock. These types of travel on these rock types pose a human health risk from the inhalation of naturally occurring asbestos. Asbestos is associated with ultramafic rock: serpentinite, dunite, peridotite, pyroxenite, and hornblendite (Churchill and Hill 2000). Naturally occurring asbestos may occur on Lassen NF as chrysotile or amphibole asbestos. Asbestos is a known carcinogen and inhalation of asbestos may result in the development of lung cancer or mesothelioma (California DOC 2007). There are 445 mapped acres of serpentinite rock on the Lassen NF.

Assumptions about Climate Change

The Environmental Protection Agency (EPA) (2007) developed a "State of Knowledge" paper that outlines what is known and what is uncertain about global climate change. The following elements of climate change are known with near certainty:

Human activities are changing the composition of Earth's atmosphere. Increasing levels of greenhouse gases like carbon dioxide (CO2) in the atmosphere since pre-industrial times are well-documented and understood.

The atmospheric buildup of CO2 and other greenhouse gases is largely the result of human activities such as the burning of fossil fuels.

An "unequivocal" warming trend of about 1.0 to 1.7 F occurred from 1906-2005. Warming occurred in both the Northern and Southern Hemispheres and over the oceans (IPCC, 2007).

The major greenhouse gases emitted by human activities remain in the atmosphere for periods ranging from decades to centuries. It is therefore virtually certain that atmospheric concentrations of greenhouse gases will continue to rise over the next few decades.

Increasing greenhouse gas concentrations tend to warm the planet.

According to EPA (2007), however, it is uncertain how much warming will occur, how fast that warming will occur, and how the warming will affect the rest of the climate system including precipitation patterns.

Given what is and is not known about global climate change, the following discussion outlines the cumulative effects of this project on greenhouse gas emissions and effects of climate change on forest resources.

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, making any discussion of potential site-specific effects of global climate change on forest resources speculative.

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, nor is it expected that attempting to do so would provide a practical or meaningful analysis of project effects. 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.

Air Quality Indicators

Indicator 1: Cross-country travel on serpentinite rock.
Indicator 2: Miles of unauthorized routes on serpentinite rock.

Affected Environment and Environmental Consequences

Affected Environment

Table 67summarizes the characteristics of air basins within the Lassen National Forest.

Table 67 Air quality characteristics of the Travel Management analysis area within the Lassen NF

Landscape	Sierra Nevada Mountains (northern end of range) and Cascade Mountain range (southern end of range); Elevation ranges between 2,000 feet (Foothills near Tehama State Wildlife Refuge) and 7,800 feet (unnamed butte north of Caribou Wilderness)
Class I Airsheds[a]	Caribou Wilderness and Thousand Lakes Wilderness
Class II Airsheds[a]	Ishi Wilderness and remainder of Lassen National Forest
Air Basins [b]	Northeast Plateau – includes Eagle Lake Ranger District and portions of Hat Creek Ranger District Mountain Counties – includes portions of Almanor Ranger District Sacramento Valley – includes portions of Almanor Ranger District and Hat Creek Ranger Distric
2006 Federal Nonattainment areas for Ozone[c]	Almanor Ranger District within Butte County (**Error! Reference source ot found.**, Map 19 of Map Package)
2006 Federal Nonattainment area for PM 2.5 [b,c]	The entire forest lies within unclassified and/or attainment areas for PM2.5
Area of ultramafic rock (indicator of naturally occurring asbestos)	445 acres of serpentinite rock within Plumas and Butte counties

Note: This table includes the entirety of all air basins which have a portion of their land within the analysis area; aSource: USDA FS PSW Region 1993; bSource: Cal EPA ARB 2009; 2008 standard is 0.0075 ppm for maximum 8-hour average; cPM2.5 is particulate matter less than 2.5 microns in size.

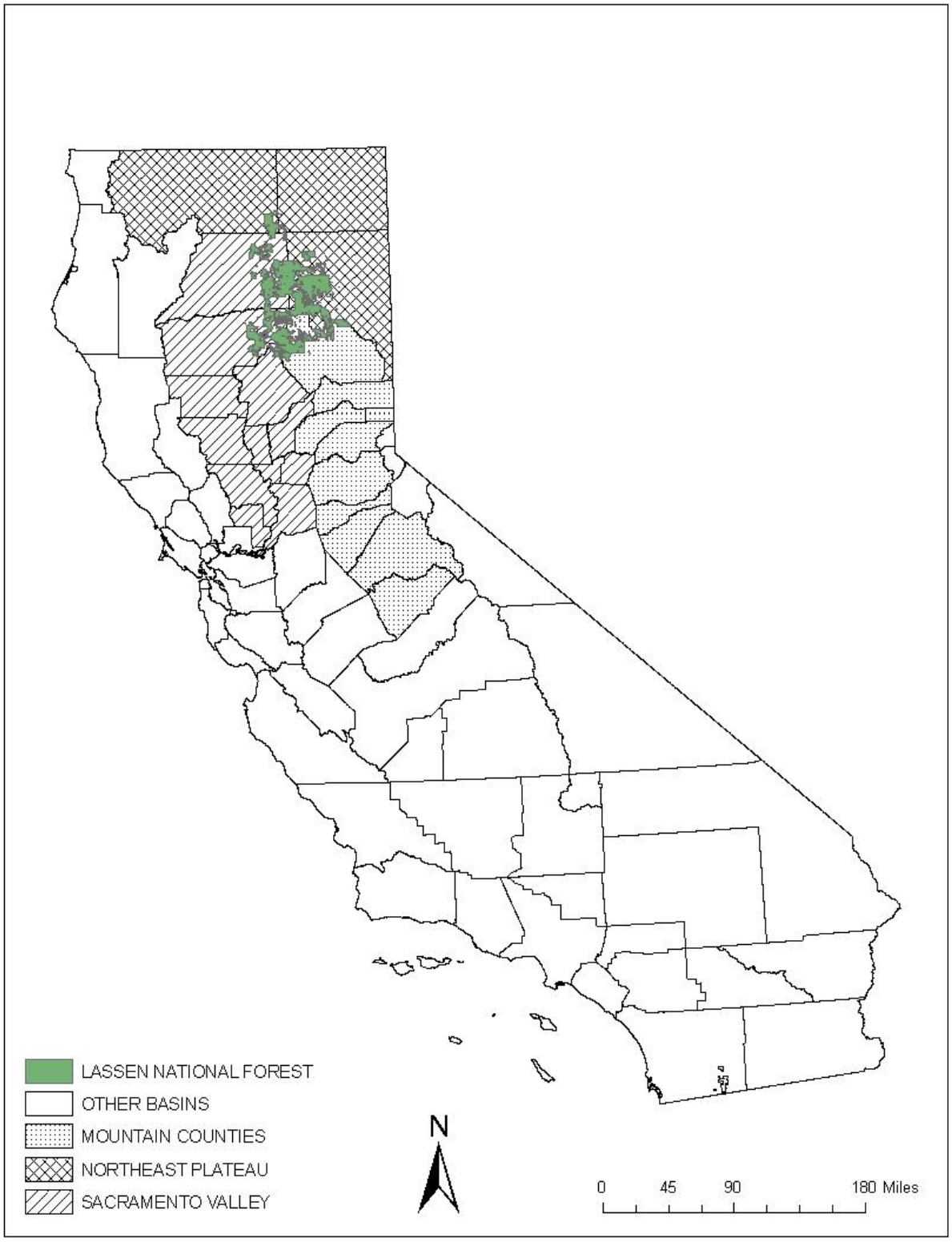


Figure 7 Map showing Lassen National Forest and Associated California air basins (Source: Cal EPA ARB 2009.)

Figure 8 Map Lassen National Forest and Federal ozone nonattainment and unclassified/attainment areas (Source: Cal EPA ARB 2009.)

Environmental Consequences

Direct/Indirect Effects

Alternative 1

Indicator Measure 1: Cross-country travel on serpentinite rock

Under Alternative 1, cross-country travel would not be prohibited, including 445 acres of serpentinite rock. This would pose a risk to human health due to exposure to naturally occurring asbestos released by cross-country travel on serpentinite rock (Table 68).

Indicator Measure 2: Miles of unauthorized routes on serpentinite rock

Within the analysis area, 250515UC03 is the only unauthorized route, which lies on serpentinite rock. Consequently, there would be a human health risk would be posed by motorized use on 250515UC03.

Alternative 2

Indicator Measure 1: Cross-country travel on serpentinite rock

Under Alternative 2, cross-country travel would be prohibited and this area includes 445 acres of serpentinite rock. Consequently, there would be no risk to human health due to exposure to naturally occurring asbestos released by cross-country travel on serpentinite rock (Table 68).

Indicator Measure 2: Miles of unauthorized routes on serpentinite rock

There are no unauthorized routes that lie on serpentinite rock that are being added to the NFTS. Consequently, there would be no human health risk posed by motorized use from naturally occurring asbestos by adding 21 miles of unauthorized routes to the NFTS.

Alternative 3

Indicator Measure 1: Cross-country travel on serpentinite rock

Under Alternative 3, cross-country travel would be prohibited and this area includes 445 acres of serpentinite rock. Consequently, there would be no risk to human health due to exposure to naturally occurring asbestos released by cross-country travel on serpentinite rock (Table 68).

Indicator Measure 2: Miles of unauthorized routes on serpentinite rock

Within the analysis area, no unauthorized routes are being added to the NFTS. Consequently, there would be no unauthorized routes that lie on serpentinite rock added to the NFTS.

Alternative 4

Indicator Measure 1: Cross-country travel on serpentinite rock

Under Alternative 4, cross-country travel would be prohibited, including 445 acres of serpentinite rock. There would be no human health due to exposure to naturally occurring asbestos released by cross-country travel on serpentinite rock (Table 68).

Indicator Measure 2: Miles of unauthorized routes on serpentinite rock

Within the analysis area, none of the 10 miles of unauthorized routes are being added to the NFTS as ML2 roads. None of the unauthorized routes lie on serpentinite rock. Consequently, there would be no human health risk from naturally occurring asbestos by adding 10 miles of unauthorized routes under this alternative.

Alternative 5 and Modified Alternative 5

Indicator Measure 1: Cross-country travel on serpentinite rock

Under Alternative 5 and Modified Alternative 5, cross-country travel would be prohibited, including across 445 acres of serpentinite rock. There would be no human health due to exposure to naturally occurring asbestos released by cross-country travel on serpentinite rock (Table 68).

Indicator Measure 2: Miles of unauthorized routes on serpentinite rock

Within the analysis area, 53 miles of unauthorized routes in Alternative 5 or 56 miles in Modified Alternative 5 would be added to the NFTS as motorized trails and ML2 roads. None of the unauthorized routes lie on serpentinite rock. Consequently, there would be no human health risk from naturally occurring asbestos by adding 10 miles of unauthorized routes under either of these alternatives.

Table 68 Comparison of alternatives for air quality

	No Action	Alt. 2	Alt. 3	Alt. 4	Alt. 5 And Mod Alt. 5
Indicator 1	There would be a human health risk from naturally occurring asbestos	No potential human health risk	No potential human health risk	No potential human health risk	No potential human health risk
Indicator 2	There would be a human health risk from naturally occurring asbestos	No potential human health risk	No potential human health risk	No potential human health risk	No potential human health risk
Air Quality Rating	**1**	**5**	**5**	**5**	**5**

Source: Air quality analysis for this DEIS.

Summary

Alternative 1 does not provide for human health protection from naturally occurring asbestos, as cross-country would be allowed on areas with serpentinite rock. In addition, 250515UC03 which lies on serpentinite rock would be added to the NFTS. Motorized use on this unauthorized route presents a human health risk from naturally occurring asbestos. Alternatives 2, 3, 4, and 5 provide for human health protection from naturally occurring

asbestos, as cross-country would not be allowed on areas with serpentinite rock. None of the unauthorized routes proposed for addition to the NFTS lie on serpentinite rock.

3.8 Soil Resources

Changes Between the DEIS and the FEIS

Changes to the soil resources section included reworking of the section structure, the addition of several indicators used to assess resource concerns, and changes to a rating system used to evaluate Alternatives. Structural changes included listing of all indicators in applicable Alternative Actions. Prior to this addition, there was a lack of consistency throughout the Environmental Effects section and as such major structural revisions were made in this section. Additionally, new indicators were added for assessing resource concerns including: 1) acreage of total routes per alternative to assess effects on productivity; 2) miles of routes with high EHRs with seasonal restrictions of use; and 3) miles of routes with high EHRs with changes in route class designation. Because the GIS analysis for these indicators was the same as for the first and only indicator used in the DEIS (miles of routes by EHR), the calculations necessary to make use of additional indicators were based on existing data. Other changes included: minor corrections for consistency among tables; corrections for sentence structure, grammar, punctuation, and spelling. A rating system was incorporated into the FEIS that contained all of the indicators by Alternative.

Introduction

Soil resources provide many essential functions for NFS lands. Soil 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 alternatives could potentially impact soil productivity and its other ecosystem functions and are therefore addressed here.

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

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

National Forest Management Act of 1976. This act created the Renewable Resource Program, which recognized the “fundamental need to protect and where appropriate, improve the quality of soil, water, and air resources.”

National Forest Service Soil Management Handbook, FSH 2509.18. The Soil Management Handbook (FSH 1991a) provides national direction that defines soil productivity and components of soil productivity, establishes guidance for measuring soil productivity, and establishes thresholds to assist in forest planning.

Pacific Southwest Region Soil Management Handbook Supplement. The Forest Service Pacific Southwest Region Soil Management Handbook Supplement (Pacific Southwest Region FSH Supplement No. 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 of routes authorized for travel in various kinds of motor vehicles.

Regional Forester's Letter (dated February 5, 2007). This letter provided clarification to forest supervisors on the appropriate use of the Pacific Southwest Region Soil Management Handbook Supplement (Pacific Southwest Region FSH Supplement No. 2509.18-95-1). It states in part:

> Analysis or evaluation of soil condition is the intended use of the thresholds and indicators in Pacific Southwest Region 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.

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

Lassen NF LRMP. Lassen NF provides the following LRMP direction for soil resources (USDA FS PSW Region 1993: chapter 4):

Prevent irreversible losses of soil productivity (27).

Assess impacts of proposed projects on soil resources, and take appropriate mitigative action (27).

Retain ground-covering litter, duff, and/or vegetation on at least 90 percent of non-rocky riparian areas, except when removal is needed to improve vegetative diversity or wildlife habitat (41).

Field-verify existing reconnaissance soil resources inventory data (Order 3 surveys) for each land-disturbing project (27).

Conduct detailed soil surveys (usually Order 2) for all project areas that have an erosion hazard rating of "high" or "very high" (according to the Pacific Southwest Region rating system), landslides or unstable areas, potential re-vegetation or regeneration problems, active erosion, or a significant potential to contribute to cumulative degradation of water quality (27).

Assess each proposed regeneration harvest area to assure the soil is capable of supporting the establishment of trees within 5 years (27).

Assess each proposed re-vegetation area to assure the soil is capable of supporting the establishment of grass or brush within 2 years (27).

Occasionally, small openings in the riparian canopy created by wind thrown trees, tree mortality due to insects and disease, or harvesting, may require tree planting to assure future canopy cover. When preparing these openings for planting, limit ground-disturbing activities to the minimum needed for tree establishment. Use hand-scalping to clear small areas (usually less than 4 square feet per tree) of vegetation and duff for planting individual trees. Hand pile debris (slash) as needed instead of tractor piling or brush raking (52).

Provide a sustained quantity of forest products by selecting silvicultural practices from the full range available on an individual stand basis, in accordance with biological requirements, economic efficiency, and forest goals for other resources (29).

Rehabilitate areas of significant soil degradation caused by OHVs. Close trails and areas to motorized use if necessary to protect soils (61).

Develop special management practices for all activities on diatomaceous earth to reduce erosion and maintain soil productivity (90).

Map the occurrence of unstable Eocene non-marine soils in detail (Order 2 Survey) (208, 212).

Map the occurrence of unstable Eocene non-marine deposits and granitic soils in detail (Order 2 Survey) before conducting ground-disturbing activities (216).

Monitor and take necessary actions to prevent damage to meadows and soils in the High Lakes area (272).

Restrict tractor logging on cinder cone slopes steeper than 20 percent (98, 118, 121, 126, 148, 152, 155, 167, 176, 180).

Prohibit tractor logging on rhyolitic soils with slopes steeper than 35 percent (102, 192, 196, 228).

Additional management direction in the LRMP (USDA FS PSW Region 1993: chapter 4: 27) provides the following standards for assessing soil condition and for evaluating the effects of the Motorized Travel Management project on soil productivity:

The areal extent of detrimental soil disturbance (**DSD**) will not exceed 15 percent of the area dedicated to growing vegetation.

Soil cover is sufficient to prevent the rate of accelerated soil erosion from exceeding the rate of soil formation.

Soil porosity is at least 90 percent of the measurements found under undisturbed or natural conditions. (The current wording in the LRMP provides desired conditions that "soil porosity and bulk density are at least 90 percent of the measurements found under undisturbed or natural conditions," but it is not correct to imply that soil porosity and soil bulk density have a direct relationship.)

Organic matter is present in amounts sufficient to prevent significant short- or long-term nutrient cycle deficits.

Soil organic matter in the upper 12 inches of soil is at least 85 percent of the total soil organic matter found under undisturbed or natural conditions.

Litter and duff occur on at least 50 percent of the area.

Large woody material, when occurring in the forested area, is at least five logs per acre in contact with the soil surface, and represents the total range of decomposition.

Effects Analysis Methodology

Route analysis for the Lassen NF Motorized Travel Management DEIS was conducted with a GIS analysis and visual ground observations.

In order to conduct the GIS analysis, data sources were acquired through the Natural Resources Conservation Service (**NRCS**) Soil Data Mart and locally:

Shasta County area, California (CA607)

Tehama County, California (CA645)

Shasta-Trinity National Forest area, parts of Humboldt, Siskiyou, Shasta, Tehama, and Trinity Counties, California (CA707)

Lassen NF GIS soil layer, acquired locally through the Lassen NF GIS library

The key aspect of the analysis is the relationship of travel routes and the erodible nature of soils on Lassen NF. Negative impacts from vehicular traffic on soil can vary depending on several environmental factors. Soils were therefore assessed by texture, slope, permeability, parent material, and professional knowledge, and then classified by GIS polygons into one of four erosion hazard ratings (**EHR**): Very High, High, Moderate, or Low. Erosion hazard rating evaluations of data from sources listed below used Pacific Southwest Region Erosion Hazard Rating determinations (Roath 2006), as adapted to local conditions by professional observations and judgment. Through GIS – EHR classification unauthorized routes were identified and investigated for potential or current resource issues, prior to being added to the NFTS. The EHR classification system is also valuable when combined with on-going site

monitoring for roads added to the NFTS, changes in maintenance levels (ML), or motorized mixed-use designation.

The Very High EHR designation generally includes steep slopes (with gradients greater than 50 percent) and the presence of rhyolitic soil with a high K (soil erodibility) factor. Rhyolitic soil is derived from volcanic rock (Rhyolite) that is generally light in color (felsic), has substantial silica content (> 69%), and is considered to be associated with higher erosion rates. The High EHR designation was associated with soils having less-steep slopes (with gradients between 35 and 50 percent) and a less-high K factor. The Moderate EHR designation was placed on soils having gentle to moderate slopes (with gradients between 15 and 35 percent), more stable textures, and a lower K factor. The Low EHR rating was given to soils on flat to gentle slopes (with gradients less than 15 percent), stable soil textures, and a low K factor.

For GIS analysis, all unauthorized routes were buffered by 20 feet from the midline of the road and the maximum EHR value for the entire route length was assigned to that route. Unauthorized routes with Very High and High EHRs were field verified to assess potential discrepancies between GIS analysis and actual conditions. Visits to routes in the field confirmed and provided documentation of recent vehicular traffic, overall ground conditions, evidence of erosion, general route construction, and proximity to watershed features. Documentation of these visits is in the Project Record. According to GIS analysis and field observations, the resulting EHR groups were compared among alternatives, resulting in miles of road within a specific soil erosion class.

In order to quantify the effects of changes in the NFTS on soil productivity, the total acreage affected by each alternative was estimated. This estimate was obtained by multiplying the route distance by the approximate road width using a mean road width of 20 feet.

Data Sources

Natural Resources Conservation Service GIS spatial and tabular data (Tehama County, California; Shasta County, California; and the Shasta-Trinity National Forest area and parts of Humboldt, Siskiyou, Shasta, Tehama, and Trinity Counties, California).

Lassen National Forest GIS spatial data.

Lassen National Forest soil survey.

Route inventories collected in Step 1 of the Travel Management process and associated tabular data sets.

Site-specific Erosion Hazard Rating route inspections.

Soil Resources Indicators

Direct and Indirect Effects of the Prohibition of Cross Country Travel.

Short-term time frame: 1 year

Long-term time frame: 20 years because climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this time frame speculative.

Spatial boundary: Area of land managed by the Lassen National Forest

Indicator Measure 1: Erosion Hazard Rating for miles of unauthorized routes subject to motorized traffic. Erosion Hazard Ratings of Very High or High indicate potential resource concern.

Indicator Measure 2: Surface area of unauthorized routes subject to motorized traffic. This area is equivalent to the total acreage of roads replacing vegetative productive potential.

Short-term timeframe: 1 year

Long-term timeframe: 20 years because climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this time frame speculative.

Spatial Boundary: Area of land managed by the Lassen National Forest

Methodology: GIS analysis of: 1) unauthorized routes subject to motorized traffic, and 2) existing unauthorized routes compared to GIS layers displaying Pacific Southwest Region EHR ratings (as adjusted by local professional experience and observations). Following GIS analysis, EHR ratings were field-verified. Route distances were multiplied by route width (using a mean route width of 20 feet) to calculate areal extent of roads.

Rationale: General guidelines in FSH 2509.18, Soil Management Handbook, and Pacific Southwest Region Supplement No. 2509.18-95-1.

Direct effects: Detrimental conditions have arisen from cross-country motor vehicle travel, which may often lead to the creation of unauthorized routes within the project area. These conditions include soil compaction, displacement, and loss of depth, resulting in a loss of productivity and hydrologic function. Unauthorized routes were not designed using engineering, hydrologic, or soil quality standards or guidelines and therefore threaten other resources spatially situated near affected soils. The potential for continued degradation of soil resources will continue and is likely to increase with unmanaged access.

Indirect effects: Soil erosion is anticipated in areas having Very High or High EHRs, especially if cross-country travel is allowed. Unauthorized routes were created without water control measures, prevention or mitigation of compaction, or maintenance of hydrologic function in mind. The loss of vegetation and reduction in soil productivity due to cross-country travel and travel on unauthorized routes would result in increased erosion. No water-controlling design features were included to offer protection from concentrated water originating from unauthorized routes, and this increases the risk of detrimental erosion occurrences, which in turn would further diminish soil productivity and hydrologic function. Increased compaction or reduced soil porosity of sensitive soils also increases erosion and

adversely affects soil productivity and the hydrologic function. These effects would continue on unauthorized routes despite their restriction or closure; therefore, continued monitoring would be needed.

Direct and Indirect Effects of Adding Facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, Including Identifying Seasons of Use and Vehicle Class Changes to the Existing NFTS

Short-term time frame: 1 year

Long-term time frame: 20 years because climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this time frame speculative.

Spatial boundary: Area of land managed by the Lassen National Forest

Indicator Measure 1: Erosion Hazard Rating for miles of unauthorized routes subject to motorized traffic. Erosion Hazard Ratings of Very High or High indicate potential resource concerns.

Indicator Measure 2: Surface area of unauthorized routes subject to motorized traffic. This area is equivalent to the total acreage of roads replacing vegetative productive potential.

Indicator Measure 3: Miles of roads with maintenance level changes by Maximum EHRs. Erosion Hazard Ratings of Very High or High indicate potential resource concerns.

Indicator Measure 4: Miles of routes closed to motorized use during periods of wet weather by Maximum EHRs. Route closures during wet weather aid in protecting soils from compaction when soils are wet and the increased potential for soil displacement causing ruts, rills and gullies.

Methodology: GIS analysis of: 1) unauthorized routes subject to motorized traffic, and 2) existing unauthorized routes compared to GIS layers displaying Pacific Southwest Region EHR ratings (as adjusted by local professional experience and observations). Following GIS analysis, EHR ratings were field-verified. Route distances were multiplied by route width (using a mean route width of 20 feet) to calculate areal extent of roads. Soil analysis includes a GIS query of all NTFS routes with existing seasonal restrictions. Analyses also consider additional road closures via changes in the NFTS by Alternative.

Rationale: Analysis guidelines in FSH 2509.18, Soil Management Handbook, and Pacific Southwest Region Supplement No. 2509.18-95-1.

Direct Effects: There are no direct effects associated with adding unauthorized roads and trails to the NFTS. Simply by occurring or existing, cross-country travel and unauthorized routes have already impacted soil resources by displacing soil, reducing soil depth, and compacting soil, all of which result in degraded soil productivity. Cross-country travel and unauthorized routes have also negatively affected soil hydrologic function through the loss of soil cover, reduction in soil porosity, and lack of properly designed water control devices. Adding unauthorized routes to the NFTS as NFTS roads and NFTS trails has no direct effect because the resource damage involved in the creation of those routes occurred in the past.

Indirect Effects: Indirect effects of adding unauthorized roads and trails to the NFTS, along with identifying seasons of use and vehicle class, will protect soil resources through the implementation of scheduled maintenance, installation of properly designed water control devices, and scheduled inspections. Seasonal restrictions to motorized vehicle use aids in reducing soil compaction and erosion when soils are most vulnerable to structural damage from increased soil moisture and runoff events.

Cumulative Soil Effects

Short-term timeframe: N/A; cumulative effects analysis was done only for the long-term time frame.

Long-term time frame: 20 years because climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this time frame speculative.

Spatial boundary: Area of land managed by the Lassen National Forest

Affected Environment and Environmental Consequences

Affected Environment

Soil resources on Lassen NF are varied, with diverse parent materials present. The southern reaches of the Cascade Mountain Range and Modoc Plateau, both in the northern portion of Lassen NF, are volcanically derived and include basalt, rhyolite, andesite, cinders, and ash. These soils typically provide a greater abundance of nutrients and are generally considered to be more productive soils than the southern portion of Lassen NF which is occupied by the Sierra Nevada Mountain Range. Parent materials for soils in this southern region include granites, metamorphosed rock, and non-marine sediments. These soils tend to be less productive.

Soils found on Lassen NF are dominated by coarse-textured loams and often have a substantial percentage of rock fragments. Higher concentrations of rock fragments are generally found in areas of lower precipitation where weathering is reduced. Finer-textured soils, such as clay loam, are typically found in the subsurface and commonly occur in the western reaches of Lassen NF, where precipitation levels are typically higher. Soil depth varies considerably. Steep slopes and areas of lower precipitation often have minimal soil development covering a shallow parent material. Reduced slopes and areas of higher precipitation often have much deeper soil. Lassen NF soils are included and described in the Tehama County soil survey (USDA Soil Conservation Service and FS 1967) and the Soil Survey of Lassen National Forest Area, California (Kliewer 1994).

The overall change in land elevation on the Lassen NF is approximately 6,000 feet. Lake Britton, in the northeastern portion of Lassen NF, lies at approximately 2,500 feet, and Crater Peak in the Thousand Lakes Wilderness Area rises to 8,677 feet. The western and southern sections of the forest are comprised of gentle to steep slopes; the northern and eastern sections have larger swaths of gently sloping and flatter stretches of land. The

majority of precipitation occurs on Lassen NF from about late October to early May. At elevations above 5,000 feet, the majority of precipitation occurs as snow, and very little rainfall occurs during the summer months. The amount of annual precipitation ranges from about 16 inches along the Lassen NF eastern boundary and the northern Little Valley area, to 80 or 90 inches in and around Lassen Volcanic National Park, Philbrook Reservoir, and Snow Mountain. The median annual precipitation is approximately 30 to 50 inches. East of the Lassen NF boundary is high desert country with only 6 to 10 inches of annual precipitation.

Lassen NF has diverse vegetation because of its wide ranges in precipitation and elevation. In the upper elevations, white pine, red and white fir, and manzanita grow well. Lodgepole pine, willow, alder, and ceanothus, snowbrush, and grasses can also be found at this elevation. The lower elevations typically see various oaks (blue, live, and black), grasses, and ceanothus. The western and wetter portion of the forest supports lodgepole pine and white fir. Drier areas in the north and east typically have mountain mahogany, juniper, and sagebrush.

Forest soils within the project area have experienced compaction and disturbance in past decades, primarily due to vegetative management operations and railroad activities. These disturbances are often referred to as ‘legacy compaction’ and generally occur near landings, main skid trails, and older trails or roads. Compaction and disturbance have resulted from some recreational activities in the form of user-created unauthorized routes. Some of these disturbed areas are exhibiting signs of recovery. Protective implementations such as integrated design features (IDFs) and best management practices are used to limit the amount of future disturbance during recent and current forest operations on the soil dedicated to vegetation growth and soils dedicated to transportation systems. National Forest System roads, NFS trails, and unauthorized routes present widespread compacted surfaces throughout the Lassen NF.

There are 1,089 miles of unauthorized routes present within the project area, as are 3,615 miles of NFS roads and NFS trails (see Section 1.2 Background and Section 3.1 Transportation System). The unauthorized route mileage represents approximately 2,640 acres of area dedicated to growing vegetation, using the assumption of a 20 foot width (10 foot wide with distance on either side for vehicle parking), having soil productivity decreased through detrimental impacts. Some unauthorized routes are user-created and did not follow engineering, hydrological, or soil resources guidelines in their creation. The remaining routes were built, rather than designed to engineering standards, by contractors and were anticipated to be employed for temporary use only. The engineering standards pertain to grade, compaction, and drainage concerns. National Forest System roads, NFS trails, and unauthorized routes are all found on soils with have Very High, High, Moderate, and Low EHRs.

The result is a mix of user-created routes and routes used for vegetation management which generally were created without specific regard to soil concerns. Many routes have experienced displaced soil through rutting, rilling, gullying, and associated water movement. Displacement of soil can reduce the overall depth of the soil thus reducing productivity, channel water flow and potentially increase the erosive potential of surface water, and increase the potential for sedimentation by destroying the soil structure. The extent to which erosion affects a given route will vary with usage and grade. A route will undergo more damage with more frequent use. Maintenance level 3, 4, and 5 NFS roads near greater population densities are likely to degrade quicker than roads of an equivalent maintenance level in more remote areas. As such, a route receiving less traffic is likely to contribute less sediment downslope, given that proper erosion controls (e.g. waterbars, rolling dips, and hardened surfaces) controls are in place. Reduction in sediment development will follow the reduction in maintenance levels.

Rutting has been observed on native-surfaced routes with grades of 10 percent or more while off-highway vehicle (OHV) routes with 20 – 25 percent grades have experienced severe gully erosion. Routes created on non-skeletal fine-textured soils such as clay loams required increased maintenance at grades between 12 and 15 percent. Typically, grades in excess of 20 percent will trigger maintenance demands for most soil textures.

A small portion of these routes are in poor condition, and have degraded soil productivity in close proximity to the route, primarily due to compaction from vehicular use outside the route. Predominantly, erosion due to roads and routes having a high grade did not result in the loss of productivity in soils within close proximity to the road or route. Observed unauthorized routes on the Lassen NF were generally found to be on grades much less than 10 percent. For example, soils in the proximity of routes ULA489A and UNE047 have experienced compaction from route proliferation. Unauthorized routes reduce soil porosity, altering the soil hydrologic ability to hold and move water naturally. The cumulative effects of soil impacts attributed to unauthorized routes can be seen in the loss of soil productivity and in the inability of soil resource to grow vegetation.

Environmental Consequences

Alternative 1 – No action

Direct/indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel.

Under the No-action Alternative, cross-country travel would not be prohibited. Consequently, there would continue to be resource damage caused by continued motorized use on these unauthorized routes. Two indicators below summarize the effects on soil resources

Indicator Measure 1: Miles of unauthorized routes with High or Very High Maximum EHRs

Under the No-action Alternative, according to a GIS analysis of roads with 'High' or 'Very High' maximum EHR, 86 miles of unauthorized roads currently have high erosion potential. Under the No-action Alternative, these routes would remain open to motorized vehicles. Displacement of soil can reduce the overall depth of the soil thus reducing productivity, channel water flow and potentially increase the erosive potential of surface water, and increase the potential for sedimentation by destabilizing the soil structure.

Indicator Measure 2: Surface area of unauthorized routes

Under the No-action Alternative, according to a GIS analysis of road mileage multiplied by a mean road width of 20 feet, 2,640 acres are currently occupied by unauthorized routes. These routes are at high risk of soil compaction from motorized vehicles and consequently long-term losses in soil productivity. Under the No-action Alternative, these routes would remain open to motorized vehicles. The direct effect from continued cross-country travel would be soil compaction (loss of soil porosity), soil displacement and soil cover loss, and loss of soil depth all of which would have an overall effect of reducing soil water holding capacity and soil productivity. Loss of soil productivity results in a loss or decrease of established vegetation, decreased forest litter and duff layers resulting from annual litterfall and needlecast, and eventual relocation of soil to a downslope area or waterbody.

Direct/Indirect Effects of Adding Facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, Including Identifying Seasons of Use and Vehicle Class Changes to the Existing NFTS

Under the No-action Alternative, facilities would not be added, there would be no seasonal restrictions implemented, and no vehicle class changes would be added to the NFTS. Four indicators below summarize the effects on soil resources.

Indicator Measure 1-3: Miles of unauthorized routes with High or Very High Maximum EHR; Surface area of unauthorized routes Indicator Measure 3; Miles of roads with maintenance level changes by Maximum EHRs

Under the No-action Alternative, no facilities are being added to the NFTS such that miles of routes and surface area covered by routes will not be affected by this Alternative.

Indicator Measure 4: Miles of routes closed to motorized use during periods of wet weather by Maximum EHRs

Under the No-action Alternative, 0.0 miles of NFTS roads would be seasonally closed during wet periods (December 1 to April 30) for resource protection. Consequently, there would continue to be a risk of erosion and compaction from motorized use of the existing road system during wet periods. The absence of wet season closures for resource protection would be inconsistent with the LRMP, as the Lassen National Forest would not be implementing BMP 2-24 (Traffic Control during Wet Periods).

Alternative 2

Direct/indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel

Under Alternative 2, cross-country motorized vehicle travel would be prohibited throughout the over one million acres comprising the Lassen National Forest. Motorized vehicle traffic would be restricted to authorized roads on the NFTS. Consequently, further resource damage caused by cross-country travel would cease. Eventually, this will lead to enhancement of productivity as roads are replaced by vegetation. Two indicators below summarize the effects on soil resources.

Indicator Measure 1: Miles of unauthorized routes with High or Very High Maximum EHRs

Under Alternative 2, according to a GIS analysis of roads with 'High' or 'Very High' maximum EHR, motorized vehicles would be prohibited on 84.9 miles of unauthorized routes that currently have 'High' or 'Very High' erosion potential. Restricting cross-country motor-vehicle travel will prevent further displacement of soil and vegetation, which should permit the recovery of damaged soils, allow for the regrowth of soil-stabilizing vegetation, and replace the protective surface litter layer.

Indicator Measure 2: Surface area of unauthorized routes

Under Alternative 2, according to a GIS analysis of road mileage multiplied by a mean road width of 20 feet, motorized travel would be prohibited across 2,590 acres that currently have roads. Rehabilitation of compacted surfaces on unauthorized routes from cessation of traffic is anticipated to occur in approximately 20 years. However, the period of recovery may vary considerably on soils having steep slopes, fine soil textures, and substantial amounts of disturbance. Given time, thermal effects (e.g., freeze and thaw) and bioturbation (e.g., plant root penetration, animal and insect burrowing) should help restore soil porosity and decrease soil bulk density (i.e. compaction). Decreased compaction should increase soil productivity through increased soil water holding capacity and access to nutrients from increased forest floor maintained on route paths.

Direct/Indirect Effects of Adding Facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, Including Identifying Seasons of Use and Vehicle Class Changes to the Existing NFTS

Under Alternative 2, unauthorized route additions to the NFTS are planned. The effects of these additions on soil resources are discussed below according to four indicators.

Indicator Measure 1: Miles of unauthorized routes with High or Very High Maximum EHRs

Under Alternative 2, there would be a total of 11 unauthorized routes on 1.1 miles of road with 'High' or 'Very High' EHRs added to the NFTS (Table 1). The majority of erosion observed was minor with surface rill erosion noted on routes ULA172 and ULA254 (Appendix A). Evidence of wet weather travel (e.g. displacement through rutting) was noted on routes UNO180 and UNH001. Severe erosion in the form of gullying, approximately 100

feet of erosion on a 5-10% gradient, was noted on route ULA177 (Appendix A). The majority of erosion observed on the other routes was minor. All routes with a 'Very High' or 'High' EHR will be monitored following GYR monitoring protocols (Appendix D) to assess the existence of a resource concern.

Indicator Measure 2: Surface area of unauthorized routes

Under Alternative 2, there would be a total of 50 acres of additional land dedicated to the NFTS. The direct effect of adding roads to the system is a reduction in forest productivity. This area would potentially be at risk for long-term decreases in soil productivity due to soil compaction and vegetative removal from motorized vehicles.

Indicator Measure 3: Miles of roads with maintenance level changes by Maximum EHRs

Under Alternative 2, there are no proposed maintenance level changes.

Indicator Measure 4: Miles of routes closed to motorized use during periods of wet weather by Maximum EHRs

According to Alternative 2, there will be 0.8 miles of unauthorized road added to the NFTS that will incur seasonal use restrictions. This will aid in preventing rutting, soil erosion and soil compaction. Rutting caused by excessive treading concentrates runoff and can lead to gully erosion.

Table 69 Routes proposed for addition to the NFTS in Alternative 2, by miles, for Very High and High EHRs

Erosion Hazard Rating – Very High		
Route Number	**Final Disposition**	**Miles**
ULA156	Maintenance Level 2 Road	0.05
Erosion Hazard Rating – High		
Route Number	**Final Disposition**	**Miles**
ULA171	Maintenance Level 2 Road	0.01
ULA177	Motorized Trail	0.16
ULA172	Motorized Trail	0.09
UBC105	Maintenance Level 2 Road	0.28
UNW337	Maintenance Level 2 Road	0.04
ULA164	Maintenance Level 2 Road	0.07
UBC115	Maintenance Level 2 Road	0.27
UBC021	Motorized Trail	0.06
UNW100	Maintenance Level 2 Road	0.01
ULA163	Maintenance Level 2 Road	0.10
	Total Miles (Very High and High)	**1.14**

Source: GIS queries Nov. 13, 2009.

Alternative 3

Direct/indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel.

Under Alternative 3, cross-country motorized vehicle travel would be prohibited throughout the over one million acres comprising the Lassen National Forest. Motorized vehicle traffic would be restricted to authorized roads on the NFTS. Consequently, further resource damage caused by cross-country travel would cease. Eventually, this will lead to enhancement of productivity as roads are replaced by vegetation. Two indicators below summarize the effects on soil resources.

Indicator Measure 1: Miles of unauthorized routes with High or Very High Maximum EHRs

Under Alternative 3, according to a GIS analysis of roads with 'High' or 'Very High' maximum EHR, motorized vehicles would be prohibited on 86 miles of unauthorized routes that currently have 'High' or 'Very High' erosion potential. Restricting cross-country motor-vehicle travel will prevent further displacement of soil and vegetation, which should permit the recovery of damaged soils, allow for the regrowth of soil-stabilizing vegetation, and replace the protective surface litter layer.

Indicator Measure 2: Surface area of unauthorized routes

Under Alternative 3, according to a GIS analysis of road mileage multiplied by a mean road width of 20 feet, motorized travel would be prohibited across 2,640 acres that currently have roads. Rehabilitation of compacted surfaces on unauthorized routes from cessation of traffic is anticipated to occur in approximately 20 years. However, the period of recovery may vary considerably on soils having steep slopes, fine soil textures, and substantial amounts of disturbance. Given time, thermal effects (e.g., freeze and thaw) and bioturbation (e.g., plant root penetration, animal and insect burrowing) should help restore soil porosity and decrease soil bulk density (i.e. compaction). Decreased compaction should increase soil productivity through increased soil water holding capacity and access to nutrients from increased forest floor maintained on route paths.

Direct/Indirect Effects of Adding Facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, Including Identifying Seasons of Use and Vehicle Class Changes to the Existing NFTS

There are no direct or indirect effects to the soil resource under Alternative 3 as no changes to the existing NFTS are proposed. The effects of Alternative 3 on soil resources are assessed below by four indicators.

Indicator Measures 1: Miles of unauthorized routes with High or Very High Maximum EHRs

No additional routes to the NFTS with 'Very High' or 'High' EHRs.

Indicator Measure 2: Surface area of unauthorized routes

No increase in surface area.

Indicator Measure 3: Miles of roads with maintenance level changes by Maximum EHRs

No maintenance level changes.

Indicator Measure 4: Miles of routes closed to motorized use during periods of wet weather by Maximum EHRs

Under Alternative 3, due to the prohibition of motorized traffic on unauthorized routes, soil resources that are threatened by the presence of roads would be protected in both dry and wet seasons.

Alternative 4

Direct/indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel.

Under Alternative 4, cross-country motorized vehicle travel would be prohibited throughout the over one million acres comprising the Lassen National Forest. Motorized vehicle traffic would be restricted to authorized roads on the NFTS. Consequently, further resource damage caused by cross-country travel would cease. Eventually, this will lead to enhancement of productivity as roads are replaced by vegetation. Two indicators below summarize the effects on soil resources.

Indicator Measure 1: Miles of unauthorized routes with High or Very High Maximum EHRs

Under Alternative 4, according to a GIS analysis of roads with ‘High’ or ‘Very High’ maximum EHR, motorized vehicles would be prohibited on 84.8 miles of unauthorized routes that currently have ‘High’ or ‘Very High’ erosion potential. Restricting cross-country motor-vehicle travel will prevent further displacement of soil and vegetation, which should permit the recovery of damaged soils, allow for the regrowth of soil-stabilizing vegetation, and replace the protective surface litter layer.

Indicator Measure 2: Surface area of unauthorized routes

Under Alternative 4, according to a GIS analysis of road mileage multiplied by a mean road width of 20 feet, motorized travel would be prohibited across 2,616 acres that currently have roads. Rehabilitation of compacted surfaces on unauthorized routes from cessation of traffic is anticipated to occur in approximately 20 years. However, the period of recovery may vary considerably on soils having steep slopes, fine soil textures, and substantial amounts of disturbance. Given time, thermal effects (e.g., freeze and thaw) and bioturbation (e.g., plant root penetration, animal and insect burrowing) should help restore soil porosity and decrease soil bulk density (i.e. compaction). Decreased compaction should increase soil productivity through increased soil water holding capacity and access to nutrients from increased forest floor maintained on route paths.

Direct/Indirect Effects of Adding Facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, Including Identifying Seasons of Use and Vehicle Class Changes to the Existing NFTS

Under Alternative 4, unauthorized route additions, maintenance level changes and seasonal restrictions to the NFTS are planned. The effects of these additions on soil resources are discussed below according to four indicators.

Indicator Measure 1: Miles of unauthorized routes with High or Very High Maximum EHRs

Under Alternative 4, there would be a total of 7 unauthorized routes on 1.2 miles of road with 'High' or 'Very High' EHRs added to the NFTS (Table 2). Minor rutting and rilling perpendicular to route path were observed on route 320306UC01 (Appendix A). This will be mitigated by installation of proper drainages and continued monitoring (Appendix A). Sedimentation from route 340327UC03 was observed to be reaching the steam. Mitigation measures on this route will include seasonal closure of the route as well as continued monitoring. All other routes were determined to be free of excessive erosion. All routes with a 'Very High' or 'High' EHR will be monitored following GYR monitoring protocols (Appendix D) to assess the existence of a resource concern.

Indicator Measure 2: Surface area of unauthorized routes

Under Alternative 4, there would be a total of 24 acres of additional land dedicated to the NFTS. The direct effect of adding roads to the system is a reduction in forest productivity. This area would potentially be at risk for long-term decreases in soil productivity due to soil compaction and vegetative removal from motorized vehicles.

Indicator Measure 3: Miles of roads with maintenance level changes by Maximum EHRs

Under Alternative 4, there would be a total of 79 miles of road with maintenance level changes from ML 3 to ML 2 roads. Of these 79 miles of road, according to GIS analysis, 13.5 miles have 'Very High' or 'High' EHRs. This is a resource concern because the potential to mitigate potential road conditions that negatively affect soil resources is diminished. Continued use of ML 2 roads in areas of high erosional hazard will likely result in severe long-term degradation of soil resources as a consequence of topsoil removal and increased potential for rutting and rilling. However, reduced use of roads and continued monitoring of these roads via road-condition surveys (especially in high EHR zones) will reduce negative impacts associated with class level changes.

Indicator Measure 4: Miles of routes closed to motorized use during periods of wet weather by Maximum EHRs

According to Alternative 4, there will be 80 miles of roads that will closed to wet weather use, including 33 miles with 'Very High' or 'High' EHRs. This will reduce the risk of detrimental impacts to soil such as rutting, soil erosion and soil compaction, especially on high EHR roads.

Table 70 Routes numbers proposed for addition to the NFTS in Alternative 4, by miles, for Very High and High EHRs

Erosion Hazard Rating – Very High		
Route Number	**Final Disposition**	**Miles**
260225UC21	Maintenance Level 2 Road	0.25
320306UC01	Maintenance Level 2 Road	0.26
Erosion Hazard Rating – High		
Route Number	**Final Disposition**	**Miles**
UBB889	Maintenance Level 2 Road	0.08
UNE499	Maintenance Level 2 Road	0.48
340327UC02	Maintenance Level 2 Road	< 0.01
340327UC03	Maintenance Level 2 Road	0.10
UBB727	Maintenance Level 2 Road	0.07
	Total Miles (Very High and High)	**1.24**

Source: GIS queries Nov. 13, 2009.

Modified Alternative 5

Direct/indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel.

Under Alternative 5, cross-country motorized vehicle travel would be prohibited throughout the over one million acres comprising the Lassen National Forest. Motorized vehicle traffic would be restricted to authorized roads on the NFTS. Consequently, further resource damage caused by cross-country travel would cease. Eventually, this will lead to enhancement of productivity as roads are replaced by vegetation. Two indicators below summarize the effects on soil resources.

Indicator Measure 1: Miles of unauthorized routes with High or Very High Maximum EHRs

Under Modified Alternative 5, according to a GIS analysis of roads with ‘High’ or ‘Very High’ maximum EHR, motorized vehicles would be prohibited on 81.1 miles of unauthorized routes that currently have ‘High’ or ‘Very High’ erosion potential. This represents a decrease of 0.2 miles in the Modified Alternative 5 compared to Alternative 5. Restricting cross-country motor-vehicle travel will prevent further displacement of soil and vegetation, which should permit the recovery of damaged soils, allow for the regrowth of soil-stabilizing vegetation, and replace the protective surface litter layer.

Indicator Measure 2: Surface area of unauthorized routes

Under Modified Alternative 5, according to a GIS analysis of road mileage multiplied by a mean road width of 20 feet, motorized travel would be prohibited across 2,504 acres that currently have roads. This represents a decrease of 7 acres in Modified Alternative 5 compared to Alternative 5. Rehabilitation of compacted surfaces on unauthorized routes from cessation of traffic is anticipated to occur in approximately 20 years. However, the period of recovery may vary considerably on soils having steep slopes, fine soil textures,

and substantial amounts of disturbance. Given time, thermal effects (e.g., freeze and thaw) and bioturbation (e.g., plant root penetration, animal and insect burrowing) should help restore soil porosity and decrease soil bulk density (i.e. compaction). Decreased compaction should increase soil productivity through increased soil water holding capacity and access to nutrients from increased forest floor maintained on route paths.

Direct/Indirect Effects of Adding Facilities (presently unauthorized roads, trails, and/or areas) to the NFTS, Including Identifying Seasons of Use and Vehicle Class Changes to the Existing NFTS

Under Modified Alternative 5, unauthorized route additions, maintenance level changes and seasonal restrictions to the NFTS are planned. The effects of these additions on soil resources are discussed below according to four indicators.

Indicator Measure 1: Miles of unauthorized routes with High or Very High Maximum EHRs

Under Modified Alternative 5, there would be a total of 27 unauthorized routes on 4.9 miles of road with 'High' or 'Very High' EHRs added to the NFTS (Table 3). This is an increase of 1 route and 0.2 miles of routes from Alternative 5 to the Modified Alternative 5. Rilling was observed on routes ULA254, ULA163, ULA172, and 320306UC01 while gullying, a more severe erosion characteristic, was noted on ULA098 (Appendix A). Soil displacement from rutting was noted on routes UNH001, UNO180, UTD001, 320306UC01, ULA174, UBB865, and UBB872B. All routes with a 'Very High' or 'High' EHR will be monitored following GYR monitoring protocols (Appendix D) to assess the existence of a resource concern. Where existing resource concerns are present, proper mitigation will be enacted.

Indicator Measure 2: Surface area of unauthorized routes

Under Modified Alternative 5, there would be a total of 136 acres of land dedicated to the NFTS. This is an increase of 7 acres from Alternative 5 to Modified Alternative 5. The direct effect of adding roads to the system is a reduction in forest productivity. This area would potentially be at risk for long-term decreases in soil productivity due to soil compaction and vegetative removal from motorized vehicles.

Indicator Measure 3: Miles of roads with maintenance level changes by Maximum EHRs

Under Modified Alternative 5, there would be a total of 80 miles of road with maintenance level changes from ML 3 to ML 2 roads (an increase of 0.6 miles from Alternative 5). Of these 80 miles of road, according to GIS analysis, 13.5 miles have 'Very High' or 'High' EHRs. Continued use of ML 2 roads in areas of high erosional hazard has the potential to result in severe long-term degradation of soil resources as a consequence of topsoil removal and increased potential for rutting and rilling. However, reduced use of roads and continued monitoring of these roads via road-condition surveys (especially in high EHR zones) will reduce negative impacts associated with class level changes.

Under Modified Alternative 5, there would be 6.0 miles of road with maintenance level changes from ML 1-Open to Motorized Trail. Of these 6.0 miles, 1 mile has EHRs of 'Very High' or 'High'. Because ML 1 roads are closed to vehicular traffic, changing the class from ML 1 to Motorized Trail would be expected to result in greater use of these roads. As a result of greater use, negative impacts will increase such as increased compaction and increased erosion potential.

Indicator Measure 4: Miles of routes closed to motorized use during periods of wet weather by Maximum EHRs

Under Modified Alternative 5, there will be 80.0 miles of roads that will closed to wet weather use, including 32.9 miles with 'Very High' or 'High' EHRs. This is an increase in 0.2 miles of seasonal closures from Alternative 5 to Modified Alternative 5. This will reduce the risk of detrimental impacts to soil such as rutting, soil erosion and soil compaction, especially on high EHR roads.

On-Going and Reasonably Foreseeable Future Actions Potentially Contributing to Cumulative Effects

Appendix C (On Going and Reasonably Foreseeable Future Actions Potentially Contributing to Cumulative Effects) lists upcoming projects that may have an effect on the soil resource. Larger acreage projects that are on-going and involve the use of potentially soil disturbing equipment include: Minnow Aspen, Oak, and Pine Enhancement (AOPE) Timber Sale; Houseman Timber Sale, and; Panner Timber Sale. Reasonably foreseeable projects that may affect the soil resource include: Lotts AOPE Timber Sale; Ebey vegetation project, and; Scotts John Forest Health project. Other activities planned or on-going within the Lassen NF boundary include various rangeland projects, fuels reductions, and smaller service contracts. These should not impact the soil resource negatively if prescribed integrated design features and best management practices are followed.

Conclusions

Based on five indicators relevant to assessing the protection of soil resources, the analysis of environmental consequences suggests that Alternative 3 protects soil resources most effectively while the No-action Alternative (Alternative 1) does not protect soil resources (Table 4). The analysis also suggests that Alternative 2, 4 and Modified 5 are approximately equal in their protection of soil resources. The following discussion outlines the benefits and weaknesses of each Alternative in terms of protecting the soil resource.

Table 71 Routes numbers proposed for addition to the NFTS in Modified Alternative 5, by miles, for Very High and High EHRs.

Erosion Hazard Rating – Very High		
Route Number	**Final Disposition**	**Miles**
ULA156	Motorized Trail	0.05
260225UC21	Maintenance Level 2 Road	0.25
320306UC01	Maintenance Level 2 Road	0.26
UNC181	Motorized Trail	1.63
UNH528	Motorized Trail	< 0.01
UTD001	Motorized Trail	0.03
Erosion Hazard Rating – High		
Route Number	**Final Disposition**	**Miles**
UBB889	Maintenance Level 2 Road	0.08
340327UC02	Maintenance Level 2 Road	< 0.01
UNE499	Maintenance Level 2 Road	0.48
ULA174	Motorized Trail	0.05
UBB865	Motorized Trail	0.03
ULA061	Motorized Trail	0.11
3403227UC03	Maintenance Level 2 Road	0.10
ULA098	Motorized Trail	0.05
UBB727	Maintenance Level 2 Road	0.07
321009UC01	Motorized Trail	0.80
ULA164	Motorized Trail	0.07
UBC115	Motorized Trail	0.27
280512UC02	Motorized Trail	0.06
280512UC01	Motorized Trail	0.03
UBC021	Motorized Trail	0.06
UNW100	Motorized Trail	0.01
UBB872A	Motorized Trail	0.01
UBB872C	Motorized Trail	0.01
ULA163	Motorized Trail	0.10
UNW337	Motorized Trail	0.04
ULA479	Motorized Trail	0.23
	Total Miles (Very High and High)	**4.88**

Source: GIS queries Nov. 13, 2009.

Alternative 1

The No-action Alternative has the highest potential of any Alternative to damage soil resources. Alternative 1 has the most miles of unauthorized routes with ‘High’ and ‘Very High’ that are open to motorized vehicle use with a total of 86 miles. In fact, Alternative 1 has 18 times more roads with high EHRs than Alternative 5 (the next closest number of unauthorized miles with high EHRs – 4.7 miles). This means that adoption of Alternative 1 is at least 18 times more likely than all of the other Alternatives to result in erosion problems

including increased sedimentation to streams, and increased rutting and rilling. Alternative 1 will most adversely affect soil productivity across the extent of the Lassen National Forest as 2,640 acres of land currently occupied by roads will remain open to vehicular traffic. This will result in long-term soil compaction and the continued replacement of areas previously vegetated with unproductive roads. There are no maintenance level changes and hence there is no increased potential for soil resource damage as a result of the adoption of Alternative 1 per Indicator 3. The No-action Alternative offers no protection to soil resources during the wet season (i.e. no wet weather restrictions) when soil is most prone to damage by excessive compaction, rutting and runoff.

Alternative 2

Alternative 2 is rated higher than the No-action Alternative but lower than Alternative 3 in terms of the ability to protect soil resources. Under Alternative 2, only 1.1 miles of unauthorized roads with high EHRs will be added to the NFTS. The total acreage of roads to be added to the Lassen NF NFTS under Alternative 2 is 50 acres. These 50 acres represents a long-term loss in soil productivity as vegetation will be unlikely to grow on road surfaces. However, the 2,590 acres of land that currently have unauthorized routes through which travel will be prohibited under Alternative 2 will have the potential to recover vegetative production. There are no maintenance level changes and hence there is no increased potential for soil resource damage as a result of the adoption of Alternative 2 per Indicator 3. Because travel will be prohibited on unauthorized routes not adopted into the NFTS, 99 percent of the 86 miles of existing unauthorized roads with high EHRs will have wet season restrictions.

Alternative 3

Alternative 3 has the greatest ability to protect soil resources. Under Alternative 3, 0 miles of unauthorized routes will be added to the NFTS so there will be the most limited erosion potential of all of the Alternatives. Prohibition of travel on all existing unauthorized routes will mean that 2,640 acres of land currently covered by roads will potentially be restored to forest production. There are no maintenance level changes and hence there is no increased potential for soil resource damage as a result of the adoption of Alternative 3 per Indicator 3. Motorized travel will be prohibited on all unauthorized routes so that wet season travel will not occur on these roads. In effect, closing these roads will provide better resource protection than restricting their use to a particular season. In summary, Alternative 3 has equal to or greater resource protection than all other Alternatives for each Indicator other than Indicator Measure 4. This is because under Alternatives 4 and 5, wet season restrictions will be implemented on 79 miles of existing NFTS roads, 33 miles of which have ‘High’ or ‘Very High’ EHRs. Due to this resource protection in Alternatives 4 and 5, they are rated only as slightly less favorable for adoption compared to Alternative 3.

Alternative 4

Alternative 4 is rated higher than the No-action Alternative but lower than Alternative 3 in terms of the ability to protect soil resources. Under Alternative 4, only 1.2 miles of unauthorized roads with high EHRs will be added to the NFTS. The total acreage of roads to be added to the Lassen NF NFTS under Alternative 4 is 24 acres. These 24 acres represents a long-term loss in soil productivity as vegetation will be unlikely to grow on road surfaces. However, the 2,616 acres of land that currently have unauthorized routes through which travel will be prohibited under Alternative 4 will have the potential to recover vegetative production. Maintenance level changes proposed under Alternative 4 decreases protection of the soil resources due to limited remediation and monitoring of NFTS ML2 roads. Because travel will be prohibited on unauthorized routes not adopted into the NFTS, 99 percent of the 86 miles of existing unauthorized roads with high EHRs will have wet season restrictions. Furthermore, Alternative 4 proposes 80 miles of additional seasonal restrictions on existing NFTS roads, 33 miles of which have 'Very High' or 'High' EHRs. While this is an advantage over Alternatives 1, 2 and 3, it does not outweigh the advantages of Alternative 3 that include: 1) reduced acreage used by roads, and; 2) an increase in resource protection as a result of maintenance level changes in Alternative 4. Alternative 4 has the same average rating as Alternatives 2 and 5, but due to subtle benefits of Alternative 4 (less acreage compared to Alternative 2; less changes to maintenance levels compared to Alternative 5).

Modified Alternative 5

Alternative 5 is rated higher than the No-action Alternative but lower than Alternative 3 in terms of the ability to protect soil resources. Under Alternative 5, 4.9 miles of unauthorized roads with high EHRs will be added to the NFTS. The total acreage of roads to be added to the Lassen NF NFTS under Alternative 5 is 136 acres. These 136 acres represents a long-term loss in soil productivity as vegetation will be unlikely to grow on road surfaces. Maintenance level changes proposed under Modified Alternative 5 decreases protection of the soil resources due to limited remediation and monitoring of NFTS ML2 roads and the opening of ML1 roads to Motorized Trails. Because travel will be prohibited on unauthorized routes not adopted into the NFTS, 94 percent of the 86 miles of existing unauthorized roads with high EHRs will have wet season restrictions. Furthermore, Modified Alternative 5 proposes 88 miles of additional seasonal restrictions on existing NFTS roads, 32.9 miles of which have 'Very High' or 'High' EHRs. While this is an advantage over Alternatives 1, 2 and 3, it does not outweigh the advantages of Alternative 3 that include: 1) reduced acreage used by roads, and; 2) an increase in resource protection as a result of maintenance level changes in Modified Alternative 5.

Table 72 Summary of effects analysis across all alternatives by indicator and rating based on a grading system of potential of the alternative to damage soil resources.

Soil Resources Indicator		Rating of Alternatives for Each Indicator[a]				
		Alt 1	**Alt 2**	**Alt3**	**Alt 4**	**Alt 5**
Indicator Measure 1: Miles of unauthorized routes with 'High' or 'Very High' Maximum EHRs open to motorized vehicle use		86 **R5**	1.1 **R1**	0 **R1**	1.2 **R1**	4.9 **R2**
Indicator Measure 2: Surface acreage of unauthorized routes open to motorized vehicle use		2,640 **R5**	50 **R2**	0 **R1**	24 **R2**	136 **R3**
Indicator Measure 3: Miles of roads with maintenance level changes	ML3 – ML2	0	0	0	79	79.6
	ML3 – ML2 (EHR > High)	0	0	0	14	14
	ML1 - Trail	0	0	0	0	6.0
	ML1 – Trail (EHR > High)	0	0	0	0	1
	Rating	**R1**	**R1**	**R1**	**R2**	**R3**
Indicator Measure 4: Wet season restrictions	Miles of road currently on NFTS with high EHR and wet season closure	0	0	0	33	33.2
	Percent of unauthorized roads with high EHR that have a wet season closure*	0	99	100	99	94
	Rating	**R5**	**R2**	**R2**	**R1**	**R1**
Average Rating		**R4**	**R2**	**R1**	**R2**	**R2**

*Percent of unauthorized roads with high EHRs and wet season closures includes both roads that are scheduled to be closed in wet months and roads where travel is prohibited all year. R1 – Very low resource damage potential; R2 – Low resource damage potential; R3 – Moderate resource damage potential; R4 – High resource damage potential; R5 – Severe resource damage potential.

3.9 Hydrological Resources

Changes Between the DEIS and the FEIS

Changes to this section included, restructuring of the Environmental Consequences, copy-editing throughout, changes to route analyses and an updated rating system used to rate alternatives by resource indicators. In the Environmental Consequences section, each action is analyzed consistently by indicator for each alternative. An error was corrected based on site specific analysis in terms of overestimating the amount of meadows that would be affected by the action alternatives. The cumulative watershed effects analysis was enhanced by using Hydrologic Unit Code (HUC) 6 and 7 watersheds from the Herger-Feinstein Quincy Library EIS in 1999. This provided an opportunity to compare the watersheds that were considered to have a "High" equivalent-roaded acreage and therefore "High" risk of cumulative watershed effects then to the present action, with specific reference to the change in route density that will happen through this action. In the Conclusion section, the updated rating system replaced the ranking system that was provided in the DEIS. A rating rather than ranking allowed for better comparison when there was essentially no difference between the alternatives. Also provided in the Conclusion section, a summary of the Riparian Conservation Objectives (RCO) is provided in the conclusions, rather than as an indicator. A route by route discussion of each route that occurs in RCAs or Meadows in the action alternatives was added to Appendix F to meet Standard and Guide #92 for meeting the RCOs.

Introduction

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). In 2007, the EPA and USFS entered into an agreement to coordinate efforts for protecting water quality on NFS lands. Management activities on National Forest lands must be planned and implemented to protect the hydrologic functions of Forest watersheds, including the volume, timing and quality of stream flow. The use of roads, trails and other areas on National Forests for public operation of motor vehicles has the potential to affect these hydrologic functions through interception of runoff, compaction of soils and detachment of sediment. Management decisions to eliminate cross-country motorized travel, add new routes and areas to the NFTS and make changes to the existing NFTS must consider effects on watershed functions.

The Hydrological Resources section describes the potential effects on water resources on the action alternatives. The document is broken-up into different sections. The Analysis Framework describes the applicable statutes, regulations, Forest Plan and other direction that is applicable to water resources for this project. The Effects Analysis Methodology provides specific assumptions, data sources, and analysis methodology. Each action was

analyzed using an indicator which was then It describes the existing resource conditions within the Lassen National Forest and follows with the potential impacts of changes (alternative proposals) to the NFTS on water resources. Measurement indicators are used to describe the existing conditions for watersheds within the analysis area. The measurement indicators are also used in the analysis to compare, quantify and describe how each alternative addresses resource concerns as they pertain to streams, reservoirs, lakes, meadows, bogs, fens, wetlands, vernal pools and springs. At the end of the Environmental Consequences section there is a Conclusion Section that provides a summary of the RCO findings and a detailed RCO analysis can be found for each unauthorized route proposed for addition to the NFTS within RCAs in Appendix F. At the end of these analyses there is a summarized comparison of alternatives (Table 78), which provides a rating system for each indicator by alternative, allowing the reader to easily compare the alternatives. A rating of 5 indicates the alternative has the least impact for the specified resource; a rating of 1 indicates the alternative is the most impact for specified resource, a rating of 3 indicates that the effect is neutral. Watershed ratings summarize the overall watershed risk for each alternative. The Compliance with the Forest Plan and Other Direction follows.

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

Regulatory Environment

Federal and State Laws

Clean Water Act of 1948, as amended in 1972 and 1987, establishes as Federal policy the control of point- and non-point-source pollution and assigns to 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) California Water Code (**CWC**)**,** 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 (CWC §§ 13000 to 13485) apply to waters on the National Forests and are directed at protecting the beneficial uses of water. Of particular relevance to the proposed action is Section 13369, which deals with non-point-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 EPA to enforce the Clean Water Act in California.

Management Direction

The following list of standards and guidelines and those listed in Table 73, are a subset of all applicable Land and Resource Management Plan (LRMP) direction and this project is being analyzed for consistency to all applicable LRMP standards and guidelines for hydrology.

Sierra Nevada Forest Plan Amendment: Final Supplemental Environmental Impact Statement Record of Decision: Forestwide Standards & Guidelines (2004)

Wheeled Vehicles

Standard and Guideline 69. Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle (OHV) use areas. Unless otherwise restricted by current Forest Plans or other specific area Standards and Guidelines, cross-country travl by over-snow vehicles would continue.

Road Construction, Reconstruction and Relocation

Standard and Guideline 70. To protect watershed resource, meet the following Standards for road construction, road reconstruction, and road relocation: (1) design new stream crossings and replacement stream crossing for at least the 100-year flood, including bedload and debris; (2) design stream crossings to minimize the diversion of streamflow out of the channel and down the road in the event of a crossing failure; (3) design stream crossings to minimize disruption of natural hydrologic flow paths, including minimizing diversion of streamflow and interception of surface and subsurface water; (4) avoid wetlands or minimize effects to natural flow patterns in wetlands; and (5) avoid road construction in meadows.

Riparian Conservation Areas (RCA): Activity-Related Standards and Guidelines

Standard and Guideline 92. Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species.

Riparian Conservation Objective 1

Standard and Guideline 96. Ensure that management activities do not adversely affect water temperatures necessary for local aquatic- and riparian-dependent species assemblages.

Riparian Conservation Objective 2

Standard and Guideline 100. Maintain and restore hydrologic connectivity of streams, meadows, wetlands and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity.

Standard and Guideline 101. Ensure that culverts or other stream crossings do not create barriers to upstream or downstream passage for aquatic-dependent species. Locate water drafting sites to avoid adverse effects to stream flows and depletion of pool habitat. Where possible, maintain and restore the timing, variability and duration of floodplain inundation and water table elevation in meadows, wetlands and other special aquatic features.

Standard and Guideline 102. Prior to activities that could adversely affect streams, determine if relevant stream characteristics are within the range of natural variability. If characteristics are outside of the range of natural variability, implement mitigation measures and short-term restoration actions needed to prevent further declines or cause an upward trend in conditions. Evaluate required long-term restoration actions and implement them according to their status among other restoration needs.

Standard and Guideline 103. Prevent disturbance to stream banks and natural lake and pond shorelines caused by resource activities (e.g., livestock, off-highway vehicles and dispersed recreation) from exceeding 20 percent of stream reach or 20 percent of natural lake and pond shorelines. Disturbance includes bank sloughing, chiseling, trampling and other means of exposing bare soil or cutting plant roots. This standard does not apply to developed recreation sites; sites authorized under special use permits and designated OHV routes.

Riparian Conservation Objective 4

Ensure that management activities within RCAs and CARs enhance or maintain physical and biological characteristics associated with aquatic- and riparian-dependent species.

Standard and Guideline 116. Identify roads, trails, OHV trails and staging areas, developed recreation sites, dispersed campgrounds, special use permits, grazing permits and day-use sites during landscape analysis. Identify conditions that degrade water quality or habitat for aquatic- and riparian-dependent species. At the project level, evaluate and consider actions to ensure consistency with standards and guidelines or desired conditions.

Riparian Conservation Objective 5

Standard and Guideline 118. Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans and wheeled vehicles. Criteria for defining bogs and fens include the presence of plants in the genus *Meesia* and three sundew species (*Drosera* spp.). Complete initial plant inventories of bogs and fens within grazing allotments prior to re-issuing permits.

Table 73 Lassen National Forest Land and Resource Management Plan (1992)

Page	Forestwide Guidelines
Ch. 4, Sec. E, p. 4-31, WR a. (1-2)	a. Provide water of sufficient quality and quantity to meet current needs. Meet additional future demand where compatible with other resource needs. (1) Implement Best Management Practices (BMP) (1992 LRMP Appendix Q) to meet water quality objectives stated in 22. c. below and maintain and improve the quality of surface waters on Lassen NF. Identify methods for applying the BMPs during environmental analysis of proposed projects and incorporate them into project planning documents. (2) Provide water for Lassen NF uses by filing for and maintaining all water rights needed for such uses. Deny special use permit applications and protest other parties' water rights applications that jeopardize Forest uses or fish and wildlife needs.
Ch. 4, Sec. E, p. 4-32, WR b. (4)	(4) Conduct formal cumulative watershed effects analysis in accordance with Pacific Southwest Region FSH 2509.22, Chapter 20. Adjust project impacts and/or timing to keep disturbance below the appropriate threshold of concern (TOC) in all affected sub-basins and watersheds.
Ch. 4, Sec. E, p. 4-32, WR b. (5)	(5) Where formal analysis of a project's cumulative watershed effects is not necessary or feasible, document the reasons and limit disturbance to five percent per decade in sensitive areas, per Land Management Planning Direction for the Pacific Southwest Region (4-1.H.2.b(2)). Sensitive areas are defined as watershed acres that have high erosion potential, steep slopes, or high instability. See FEIS Glossary under "sensitive watershed lands."
Ch. 4, Sec. E, p. 4-32, WR c. (1-2)	c. Comply with Federal, State, regional and local water quality regulations, requirements and standards. (1) Comply with discharge requirements of the Clean Water Act, state drinking water and sanitary regulations and State and Regional Water Quality Control Board basin plans and rulings. (2) Take immediate remedial action if activities under Forest Service management violate water quality standards.
Ch. 4, Sec. E, p. 4-33, WR d. (3)	(3) Analyze environmental effects of proposed projects within riparian areas in a NEPA document.
Ch. 4, Sec. F, p. 4-51, D, FI #3	3. Where natural conditions permit, achieve or maintain stable channel conditions over at least 80 percent of the total linear distance of stream channels.
LRMP Ch. 4, Sec. F, p. 4-50, D, FC #1	1. Limit stream crossings to stable rock or gravel areas or where stream bank damage will be minimal. Where this is not feasible, develop crossings that minimize disturbance to riparian-dependent resources. Crossings will be as near right angles as possible.
LRMP Ch. 4, Sec. F, p. 4-50, D, FC #2	2. Disperse flows from ditches or culverts to keep upland area run-off from reaching riparian zones.
Ch. 4, Sec. F, p. 4-50, D, FC #3	3. Route roadside drainage through armored ditches or culverts across erodible areas.

Page	Forestwide Guidelines
Ch. 4, Sec. F, p. 4-51, D, FC #6	6. Out slope roads to minimize collection of water.
Ch. 4, Sec. F, p. 4-52, D, RC #3	3. Confine off-highway vehicles, except over-snow vehicles, to designated roads, trails and stream crossings in riparian areas.

Pacific Southwest Region Best Management Practices

Best Management Practices. Non-point source pollution on National Forests is managed through the Regional Water Quality Management Plan (USDA FS PSW Region 2000), which relies on implementation of prescribed best management practices. 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) (Appendix I). All NFS roads and trails open to OHV use are required to comply with these BMPs.

Of particular relevance for motorized 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.

Effects Analysis Methodology

The direct and indirect effects as well as, cumulative watershed effects will be analyzed for each of the action alternatives. Each alternative was analyzed for the three actions and cumulative effects. Direct and indirect effects of each project alternative will be analyzed together for three separate action components, in addition to cumulative watershed effects:

1. Prohibition of cross-country motorized vehicle travel
2. Addition of unauthorized routes to the NFTS
3. Changes to the existing NFTS

Key indicators were used to summarize the direct and indirect effects of the actions for Alternatives 2, 4 and 5 and comparing them to the No-action Alternative. Road and trail density per HFQLG watershed and perennial RCAs within HFQLG watersheds are summarized by alternative in the cumulative watershed effects section for ease of comparison.

Assumptions

Assumptions used for the analysis are based on published literature and professional experience as a hydrologist with the USDA Forest Service in California (Pacific Southwest Region). These sources of information framed the key indicators used for analyzing the environmental consequences of each alternative on watershed resources.

Assumption 1: The prohibition of cross-country travel would reduce future land disturbance on the Forest and would allow passive recovery of unauthorized routes that have already disturbed the landscape.

Assumption 2: Most roads and trails within meadows impair the hydrologic function of meadows.

Assumption 3: The primary pollutant of concern in forested environments is eroded sediment from unpaved roads and trails, fill slopes and cut slopes. According to West (2002), roads and trails in forested lands are the number one source of potential non-point source of pollution. Fine-grained sediment that reaches water bodies can impair aquatic habitat (Fulton and West 2002), by filling in redds and inter-gravel spaces, necessary for juvenile fish (Reid 1993).

Assumption 4: Higher traffic levels on unpaved roads and trails lead to increased surface erosion and potential sedimentation of streams. Surface erosion of roads and trails depends on road grade, soil types, traffic levels and climate. Increased rates of erosion lead to increased sedimentation in down-gradient surface water bodies (Dissmeyer 2000: Chapter 10, Fulton and West 2002).

Assumption 5: This project is not creating a new disturbance on the landscape, as the unauthorized routes already exist on the landscape. In other words, the addition of unauthorized routes to the NFTS as roads and trails would not increase the percentage of land disturbed because these routes already exist on the landscape.

Assumption 6: A change in maintenance level objective will not involve any ground disturbing activities. Although the road will weather over time, the maintenance interval would be the same as it is for any other ML2 road and therefore maintenance would address any resource problems that may arise, therefore a change in objective maintenance level will not have an effect on watershed condition.

Assumption 7: All unauthorized routes are assumed to have a native surface and are erodible. None of the unauthorized routes are engineered and do not have drainage ditches, that can enlarge the drainage network (Wemple et al. 1996) or erode and deliver sediment to surface water bodies (Gucinski et al. 2001).

Assumption 8: Unauthorized routes not added to the NFTS under the action alternatives would continue to appear like roads and trails for the short term. Until all motorized use ceases and vegetation recovers, some routes will continue to be sources of erosion and sedimentation to streams especially without active restoration. In the long term, these routes would re-vegetate, which would reduce and/or eliminate erosion and sedimentation of water bodies. This assumption particularly applies to the cumulative watershed effects discussion. Revegetation of routes may take from 5-10 years to become impassable.

Assumption 9: Mixed use changes that do not involve a change in maintenance level will not affect the hydrologic resources since the change is purely administrative and does not involve any changes to conditions on the ground.

Assumption 10: Global climate change is expected to substantially affect California over the next 50 years (California DWR 2007). Precipitation is likely to become more variable from year to year. Warmer temperatures will reduce the proportion of precipitation that falls as snow and increase the proportion that falls as rain. This shift will result in higher peak flows, more frequent flooding, increased erosion, reduced summer baseflows, more frequent droughts and increased summertime stream temperatures.

These expected changes have several implications for OHV use effects on water resources on National Forests:

a. As floods become more frequent and of greater magnitude, roads and trails will likely be subjected to greater stresses from higher runoff. Erosion of route surfaces and route/stream crossings will become more common. Ephemeral channels will carry water more frequently than in the past.

b. The role of roads and trails in increasing runoff and peak flows (Ziemer 1981, Jones and Grant 1996) is likely to increase. Cumulative watershed effects in watersheds near their thresholds of concern may become more common.

c. Protection and restoration of meadows and other riparian areas that extend the duration of baseflows will be increasingly important as snowpack diminishes. Routes through riparian areas that are currently not causing resource damage could cause damage in the future as runoff becomes more extreme.

d. Seasons of use for routes may need to be modified as precipitation and temperature patterns change. Routes normally closed by snow may remain accessible to users but may be damaged by OHV use when wet.

Data Sources

Two types of data were used for the hydrology analysis: site-specific and GIS. Site specific data was primarily used to identify unauthorized routes and a handful of system roads and trails with chronic erosion problems or ones that are sources of sediment to surface water bodies. In addition, the data were used to pinpoint unauthorized routes that have direct and indirect effects on meadows and stream and lake/pond morphology. For example, a technician may have observed that an unauthorized route may be causing stream bank erosion. Site specific data came from the following protocols:

Unauthorized Route District Inventory: One source of information came from Almanor Ranger District hydrologic site reviews. Data was collected on site specific hydrology and soils problems related to specific routes being added to the NFTS. The data was collected in the summer 2007. The information was provided in the form of an excel spreadsheet. Thirty routes were inventoried using 7 field indicators:

1. Route near RHCA.

2. Route through meadow.
3. Usage (high, moderate, low).
4. Stream crossings (yes or no).
5. Excessively steep, defined as >10% (yes or no).
6. Route erosion defined as tire ruts/gully (yes or no).
7. District hydrologist recommendations and comments for each route were provided.

Watershed/Soils Travel Management Field Form for Unauthorized Routes (Tangenberg 2007): This protocol was used for all unauthorized routes being proposed as additions to NFTS. Forestwide data was collected between 2005 and 2008 by Travel Management project specialists on site specific hydrology and soils problems related to specific routes being added to the NFTS. Photos of each route were taken for most of the forms. Data from these forms were documented in the route cards (Appendix A). Five indicators were collected:

1. Evidence of traffic.
2. Bare earth (%).
3. Needles/Grass (%).
4. Large vegetation defined as trees, shrubs, down logs (%).
5. Evidence of erosion, defined as tire ruts, rills and gullies.

GIS queries were performed by the project hydrologist and the project GIS specialist for the following analyses:

1. Miles of unauthorized routes or additions to the NFTS in meadows for each alternative (Indicator #1).
2. Numbers of perennial streams crossed by unauthorized routes or additions to the NFTS for each alternative (Indicator #1).
3. All unauthorized routes within RCAs (excluding meadows) proposed for addition to the NFTS for each alternative. This list was used to conduct an RCO analysis for each unauthorized route within RCAs (Indicator #1).
4. Total miles of proposed road and trail additions that will be restricted for wet weather and winter recreation (Indicator #2).
5. Total miles of NFTS roads and trails with seasonal restrictions on them for wet weather, winter recreation and hunting (Indicator #2).

6. Road density of unauthorized routes and NFTS roads and trails in HFQLG watersheds (Indicator #3).
7. Road density of unauthorized routes and NFTS roads and trails within perennial RCAs in HFQLG watersheds (Indicator #3).

Water Resources Indicators

Direct and Indirect Effects of the Prohibition of Cross Country Travel/ Direct and Indirect Effects of Adding Facilities (presently unauthorized routes) to the NFTS

Indicator Measure 1 was used for both the prohibition of cross-country travel and the effects of adding facilities to the NFTS.

Indicator Measure 1: Miles through Riparian Conservation Areas (RCA), include proposed additions to the NFTS in RCAs and associated seasonal wet weather closures, miles of routes through meadows and associated seasonal wet weather closures, number of perennial stream crossings.

Short-term timeframe: 1 year

Long-term timeframe: 25-30 years because climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this timeframe speculative.

Spatial Boundary: Project Area

Methodology: The GIS data queries show which routes occur in RCAs and meadows and the associated seasonal closures and the number of perennial stream crossings.

RCAs: RCAs are considered sensitive watershed areas, adjacent to lakes, reservoirs, ponds, springs, perennial and intermittent streams (not including meadows); they warrant special consideration due to their proximity to watercourses. Roads are major sources of sediment to streams (Gucinski et al. 2001) and potential sites for stream capture by the road therefore routes adjacent to these areas were analyzed separately.

Meadows: A route through a meadow can modify the hydrologic function of meadows by lowering water tables which then causes accelerated erosion, or by altering flow paths. It is assumed for this analysis that most roads and trails within meadows impair the hydrologic function of meadows. Little research on the effects of roads and trails on meadow hydrology could be found (Jemison and Neary 2000). Professional experience assessing roads and trails in meadows show roads and trails often cause damming of groundwater; modification of surface runoff; lowering of water tables and accelerated erosion impacts, such as gullying, head-cutting and rutting.

With regards to the meadows analysis, the GIS vegetation data (Lassen National Forest Montane Meadow) was very coarse data, overestimating the number of miles of unauthorized routes in meadows. Field verification using the Watershed/Soils Travel Management Field Forms narrowed the number of miles of unauthorized routes in meadows to those that were actually within meadows.

Stream Crossings: On perennial streams, beneficial uses could be impaired from sediment delivery from roads and trails. The hydrologic analysis includes unauthorized routes crossing perennial streams. Route crossings of streams were analyzed using a GIS query and subsequent verification determined through field observations. Road/stream crossings are major sources of sediment to streams (Gucinski et al. 2001) and potential sites for stream capture by the road. Stream capture by roads and trails can cause eroded sediment from the road to reach water bodies and gully formation off the road prism (Montgomery 1994). All crossings of perennial streams by unauthorized routes are assumed to be sources of sediment to streams. Crossings for unauthorized routes are assumed to be unimproved fords, as they are not maintained to NFTS standards. On the other hand, BMPs have been installed on a majority of NFTS roads and trails to reduce erosion and sedimentation at crossings and to prevent stream capture.

Direct and Indirect Effects of Changing the NFTS, Including Identifying Seasons of Use and Vehicle Class Changes to the Existing NFTS.

Indicator Measure 2: Miles of NFTS roads and trails prohibited from motorized use during periods of wet weather. This measure is a risk indicator of accelerated surface erosion or sediment reaching streams during wet periods. The analysis for vehicle class change for a change in objective maintenance level is strictly qualitative. The analysis for ML1 to ML2 change is in relation again to the RCAs and will be analyzed as they relate to meadows, stream crossings and presence of RCAs.

Short-term timeframe: 1 year

Long-term timeframe: 25 years because climate change, unforeseeable future projects, demographic changes, etc. makes assumptions beyond this timeframe speculative.

Spatial Boundary: Project Area

Methodology: This analysis was a three part analysis involving season of use, vehicle class changes and changes from ML1 to ML2.

Seasonal of Use: Hydrologic analysis includes a GIS query of all NTFS routes with seasonal restrictions for wet weather, winter recreation and hunting. Restricting use of roads and trails during wet periods for resource protection on native surface roads and trails would immediately benefit watershed function by reducing erosion and sedimentation of water bodies or in certain cases reducing damage to the roads from ponding and rutting. Native surface roads and trails are susceptible to surface erosion, especially during periods when the road surface is wet or saturated (Coe 2006, Grace and Clinton 2006). The three types of surface erosion that are of concern are tire ruts, rills and gullies. Tire ruts are generally formed by use of wheeled vehicle on wet soils; ruts can concentrate water which can result in the formation of rills and gullies. Both rills and gullies are formed through the displacement of soil from concentrated water. The literature does a poor job of distinguishing a rill from a gully. For purposes of this analysis, a rill was classified as

measuring 20 feet in length and at least 2 inches deep (USDA FS PSW Region 2002). A gully was assumed to be larger than a rill and there is gray area determining when a rill becomes a gully. According to Dunne and Leopold (1978), a gully can have a depth between 1 foot and tens of feet deep and a foot wide to tens of feet wide. Gullies documented and observed during this project were less than 10 feet wide and less than 3 feet deep.

Vehicle class: Changes in vehicle class come in two forms, one for which mixed use will be authorized on ML3 and ML4 NFTS roads and one for which a change in the objective maintenance level would occur. In the first instance, there will be no alternative specific analysis, as a change in vehicle class designation to allow both highway and non-highway vehicles to drive on the same road should have no effect on resources. In the second instance, a change in the objective maintenance level, some discussion will occur for each of the action alternatives; however the discussion is strictly qualitative in nature.

Change in ML from ML1 (closed) to ML2: The analysis for ML1 to ML2 change is in relation again to the RCAs and will be analyzed as they relate to meadows, stream crossings and presence of RCAs, see the above discussion for indicator 1 for further explanation. Additionally, any documented problems will be highlighted and the associated mitigation to bring the proposed additions to the NFTS on to the MVUM.

Cumulative Effects

Road densities near streams, such as densities within (RCA's) can serve as a measure of route connectivity to stream channels. Overall watershed road density can be used as a risk assessment of cumulative watershed effects. A comprehensive report in the Columbia River Basin and parts of the Klamath River Basin showed an inverse relationship between high road density and aquatic habitat (Quigley and Arbelbide 1997: part 67). Chronic sources of sediment of surface water bodies on the Lassen NF are mainly due to NFTS roads. Elevated levels of sediment can impair water quality for drinking water, swimming, or hydro power to name a few beneficial uses. Hence, the mileage of roads per watershed in units of mile of road per square mile of land is an important tool for providing a risk rating of cumulative watershed effects for this analysis. Of greater importance is road density within riparian conservation areas of perennial streams. Roads and trails near perennial streams are more likely to have an effect on stream function than those outside of RCA's, due to their proximity to streams. These roads and trails are critical sources of sediment and hydrologists and fisheries biologists focus their attention to these roads and trails when evaluating the effects of projects on the Lassen NF. Fine-grained sediment can fill spawning gravels necessary for the survival of juvenile fish.

Indicator Measure 3: This analysis is composed of three parts (1) the road/route density (miles per square mile) within HFQLG watersheds; (2) the road/route density (miles per square mile) within RCAs of these watersheds; and (3) the number of miles of proposed

additions to the NFTS within the 5 watersheds that were considered to have “high” risk of cumulative watershed effects in the 1999 HFQLG FEIS.

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

Long-term timeframe: 25 to 30 years

Spatial boundary: Motorized road and trail density calculations are based on watersheds created for the Herger-Feinstein Quincy Library Group (HFQLG) Forest Recovery Act EIS and ROD. These watersheds are generally on a HUC 6-7 scale.

Methodology: This analysis is composed of three parts (1) The road/route density within HFQLG watersheds, (2) The road/route density within RCAs of these watersheds, and (3) The number of miles of proposed additions to the NFTS within the 5 watersheds that were considered to have “high” risk of cumulative watershed effects in the 1999 HFQLG FEIS.

In order to calculate the road/route density within HFQLG watersheds, the road/route location GIS layer was used in conjunction with the HFQLG watershed GIS layer and the corporate NFTS roads GIS layer to calculate the total miles of routes, proposed trails and roads open to motorized traffic on both public and private lands for each alternative. This analysis is confined to roads, trails and unauthorized routes on Lassen National Forest land. For the sake of accuracy, watersheds that had less than one square mile of Lassen National Forest land were eliminated from this analysis. Other limitations to this calculation include unauthorized routes not found during data call and errors in the INFRA database such as missing roads or included roads removed from the NFTS.

For each alternative, the density of roads and routes that would be open to motorized vehicle traffic within each analysis watershed is compared with a cautionary density value. The cautionary value does not represent an exact level at which a detrimental Cumulative Watershed Effect (CWE) would occur. Rather, it serves as a “yellow flag” indicator of risk of significant adverse cumulative effects occurring within a watershed. Analysis watersheds that have exceeded this density level require additional, focused analysis, as presented below in the “Environmental Consequences” section. The exact level of road/route density that would result in a detrimental CWE is dependent upon a variety of factors that are specific to each analysis watershed. These factors include soil type, hillslope gradient and road location.

Based upon past experience and observations on the Lassen NF, for the purpose of this project analysis, Forest watershed staff determined a road/route density cautionary level of 2.5 miles per square mile. There is an objective for road density in anadromous fisheries watersheds within the Lassen NF of less than 2.5 miles per square mile (USDA FS PSW Region 2001: Volume 4: Appendix I-103). The Forest has used this as one measure to evaluate general watershed condition. This value was used for the entire analysis. It is assumed that road densities greater than 2.5 miles per square mile pose an increased risk to water quality in a watershed. Of higher concern are those roads and trails near perennial

streams or within RCAs of perennials streams, as there is a higher risk of sediment reaching them from these roads and trails. Higher road densities indicate a higher risk of water quality impairment. Water quality concerns result from increased sediment delivery to streams from roads and trails and their associated cut and fill slopes. Fine-grained sediment from roads and trails can impair water quality by degrading aquatic habitat; altering the taste and quality of drinking water, or make lakes, reservoirs and ponds less attractive for swimmers. These are a few examples of how road-borne sediment can impair water quality.

In order to calculate the road/route density within HFQLG watershed RCAs, RCAs were identified through a buffered analysis of perennial, intermittent streams, lakes, ponds, springs and reservoirs. The RCAs were overlaid with the route location Forest GIS layer. A road density calculation for RCAs was conducted by dividing the number of miles of road within RCAs with the total amount of RCAs on Lassen National Forest land within each HFQLG watershed. As explained above, watersheds with less than one square mile of Lassen National Forest Land were eliminated from the analysis.

As stated above, for this FEIS, motorized road and trail density is used as the indicator for cumulative watershed effects. For Forest timber projects, the typical indicator used to assess cumulative watershed effects is ERA, but ERA is not a good indicator for this project. To illustrate this, consider that for a watershed with very high existing motorized route density (6.5 mi/mi^2), the total miles of routes in the watershed (92 miles) comprises less than 2% of the watershed area, a small fraction of the TOC. The total mileage of unauthorized routes in this watershed is 39 miles. Allowing for the narrower width of the trails, the unauthorized routes comprise less than 0.4% of the watershed area, a small and likely insignificant fraction of the typical TOC. Unlike timber projects that can affect broad areas of a watershed, the relatively small area disturbed by motorized routes does not reflect the effect these routes can have on watershed condition. Past modeling on North 49, Eblis, Corral Fire Salvage, Moonlight Fire Salvage and Old Station Fuels Reduction projects has shown that roads account for less than 0.5% of total ERA in a watershed. Finally, this project only intends to add 0 and 56 miles of unauthorized routes to the NFTS across the project area, which has an area of 1.1 million acres. The ERA method would not show any detectable differences within the 125 HFQLG watersheds. The effect of greatest concern to watershed condition is not the area disturbed but, rather, the general effect of motorized roads and trails concentrating natural runoff patterns and often channeling runoff to a point that leads to excessive erosion of the route and adjacent landscape. Narrow trails can disrupt natural drainage patterns and concentrate runoff to the same degree as roads. Therefore, total motorized road and trail density was chosen as the indicator for analyzing cumulative watershed effects.

The HFQLG watersheds were used in this indicator measure in order to facilitate discussion surrounding equivalent-roaded area (ERA) analysis and those areas that were considered to have a “high” risk of cumulative watershed effects, in 1999 when the HFQLG

FEIS was completed, Davis Creek, Harvey Valley, Martin Creek, North Fork Battle Creek and South Fork Battle Creek (for the purposes of discussion, names were derived from the HUC-6 watershed layer, since the HFQLG layer contained only watershed numbers).

The percentage of land disturbed in Lassen National Forest watersheds has increased since the 1999 HFQLG EIS as reflected in the reported increase in Equivalent Roaded Acres (ERA). The ERA measure is derived from site disturbance coefficients used to track general changes in hydrologic function of watersheds. The coefficients have been developed by comparing the effect of a land use activity to that of a road in terms of altering surface runoff patterns and timing. For example, ERAs are typically modeled so that one acre of single-tree selection harvest with tractor yarding is equivalent to 0.15 to 0.2 acres of roaded landscape. The ERA increase of 17,500 acres across the entire HFQLG FRA pilot project area, including Lassen National Forest, Plumas National Forest and Sierraville Ranger District on the Tahoe National Forest, as reported in the 2008 Monitoring Report, when expressed as a percentage of watershed area, results in a 1.4% average increase (from 5.1% to 6.5%). However, this average increase results when the ERA increase is applied to only the HUC-7 subwatershed areas in which work occurred (a total of approx. 1.2 million acres). Much of the HFQLG watershed areas were devoid of work between 1999 and 2008. When the ERA increase of 17,500 acres is applied over the entire area of HFQLG watersheds in which work occurred (approx. 2.3 million acres), the resulting average increase is 0.8%.

Table 74. Summary of HFQLG Question 17 Monitoring Plan Results (2008).

Watershed Condition Indicator	Total acreage of sub-watersheds reporting	Unit of Measure	Pre-Project Condition	Post-Project Condition
Road Density	788,000 acres	miles per square mile	2.97	2.88
Near-Stream Road Density	308,000 acres	miles per square mile	3.62	3.42
Equivalent Roaded Acres (ERA)	1,220,000 acres	equivalent roaded acres	61,800 (5.1%)	79,400 (6.5%)
Near-Stream ERA	17,700 acres	equivalent roaded acres	472	489
Number of Road/Stream Crossings	571,000 acres	number	3,108	3,051

For the purposes of cumulative effects on this project, past actions are represented by the existing condition of Lassen National Forest watersheds. The existing condition of Lassen National Forest watersheds and the sensitivity to disturbance of these watersheds were analyzed in Appendix N of the 1999 Final EIS for the Herger-Feinstein Quincy Library Group Forest Recovery Act (HFQLG FRA). This analysis was performed for all watersheds containing Lassen National Forest System lands. The watersheds were analyzed at a scale

that ranged between Hydrologic Unit Code 7 (HUC) and HUC-6. The watersheds range in size from 510 to 50,941 acres; with an average size of 11,045. Watershed sensitivity ratings for each watershed were developed based upon Erosion Hazard Rating, the percent of the watershed in slopes greater than 60%, the percent alluvial stream channels, rain-on-snow or thunderstorm potential and vegetative recovery potential. Watershed condition ratings for each watershed were developed based upon road density, road/stream crossing density, condition of alluvial stream channels and percentage of land disturbed. The sensitivity rating and condition rating for each watershed were multiplied to derive a sensitivity condition rating, which determined a risk of cumulative watershed effects of low, moderate, high or very high.

The condition and sensitivity of these Lassen National Forest watersheds, i.e. the existing condition of these watersheds, has changed little since that 1999 HFQLG FEIS analysis. Data presented in the 2008 HFQLG FRA Pilot Project Monitoring Report to Congress for "Question 17: What is the effect of activities on indicators of watershed condition?" indicate that little change in watershed condition has occurred since 1999 (Table 74). Road density decreased approximately 3.0% across the project area, on the Lassen more than 10 miles of decommissioning has occurred during the life of the Pilot Project. The number of road/stream crossings decreased by 1.8% across the Pilot Project (a total decrease of 57 crossings, 16 on the Lassen), again due primarily to the obliteration of roads. Near-stream road density decreased by 5.5%, a larger percent decrease than the total road density decrease because the road obliteration projects were focused on roads that contributed significant volumes of sediment to stream channels.

Between 1999 and 2008, work has occurred in 80 HFQLG watersheds. The data indicate that the change in ERA for these watersheds, expressed as a percentage of the HFQLG watershed area, ranges from -0.85% to 7.92% with an average increase of 0.94%. The median increase is 0.39%. The reported ERA increases are predominantly due to vegetation management actions (group selection and fuel reduction thinning treatments) that have occurred under the HFQLG FRA Pilot Project. Designs for these vegetation projects are closely controlled to assure that the resulting ERA model outputs for the project watersheds, when expressed as a percentage of total watershed area, do not cause the prescribed Threshold of Concern (TOC) to be exceeded. Predominantly, the TOC for Lassen NF watersheds is prescribed to be 12-14% of the watershed area.

A short-term timeframe is not applicable to this analysis. For existing unauthorized routes that are not proposed for addition to the NFTS, it will be assumed that passive recovery of soil cover and the vegetative productivity of soils, with concurrent reductions in erosion and sedimentation from road surfaces, will occur over a 25 year period on the westside and 30 year period on the eastside. As stated above, effects to soil and water resources due to changes in the vehicle class allowed on existing NFTS facilities are expected to be negligible. The vast majority of soil and water resource effects of the unauthorized routes

and areas that are proposed for addition to the NFTS have already occurred since these routes currently exist on the landscape. It is assumed that all of the reasonably foreseeable actions presented in Appendix C will proceed in the future regardless of which project alternative is selected.

Affected Environment and Environmental Consequences

Affected Environment

The area of effect for the hydrologic analysis centered around major water bodies within the Lassen NF including Eagle Lake, Susan River, Hat Creek, Lake Almanor (reservoir) and the headwaters of the North Fork of the Feather River. Other streams of significance include Battle Creek, Antelope Creek, Deer Creek, Mill Creek and Butte Creek, which flow into the Sacramento River and support anadromous fish. Table 75 summarizes the affected environment for water resources, which includes watershed areas on NFS lands.

Environmental Consequences

The alternative effects are described below for each alternative and summarized in Table 78.

Alternative 1 (No-action)

Direct/indirect Effects of Not Prohibiting Cross-country Motorized Vehicle Travel (Alternative 1)

Indicator Measure 1: Miles of Routes in RCAs

Routes in RCAs

Under Alternative 1, cross-country travel would not be prohibited and 126 miles or 1,419 existing unauthorized routes within RCAs would still be available to motorized traffic, resulting in a very high potential for resource damage. In the short term (considered to be a 1-year timeframe for the purpose of this analysis), the unauthorized routes disturbed by motor-vehicle use would not change because these routes would still be open to motorized traffic. The short term difference in direct and indirect effects would not differ from the action alternatives because the routes would still be on the landscape.

The long-term (considered to be a 25-30 year timeframe for the purposes of this analysis) recovery of vegetation expected as a result of road closures in Alternatives 2, 3, 4, 5 and Mod. 5 would not be realized as long as these routes continued to be driven on. With continued motorized traffic, the increased peak flow effects that have occurred to date as a result of these unauthorized routes will remain over the long term because the road templates will continue to intercept subsurface runoff and concentrate surface runoff. Additionally, without vegetative recovery, unauthorized routes with continued motorized traffic would not experience the decreased amounts of erosion sediment delivery to area stream channels that would be experienced under alternatives 2 through Mod. 5.

Table 75 Hydrologic characteristics of the Motorized Travel Management Analysis Area within Lassen NF

Feature	Characteristics
Landscape	Sierra Nevada Mountains (northern end of range) and Cascade Mountains (southern end of range). Elevation ranges between 2,000 feet (foothills near Tehama State Wildlife Refuge) and 7,800 feet (unnamed butte north of Caribou wilderness).
Climate[a]	Highly variable across Lassen NF due to elevation and rain shadow effect of Lassen Peak and Sierra Nevada Mountain Range. Mediterranean climate, whereby most precipitation occurs between November and April. Winter precipitation below 3,500 feet is primarily rain and above 3,500 feet is primarily snow. Mean annual precipitation ranges between: 24–26 inches at the Sacramento Valley foothills, 80–90 inches at the crest of the Sierra Nevada and Cascade Mountains and 16–32 inches at Eagle Lake.
Aquatic features	558 miles of perennial streams. 1,442 miles of intermittent streams. 1,057 lakes with total acreage of 6,207 acres, ranging between <0.01 acres to 1,407 acres (McCoy Flat Reservoir). 1,086 meadows with total acreage of 32,187 acres, ranging between <0.01 acres to 1,380 acres.
Beneficial Uses[b]	Varies by watershed: municipal water supplies for domestic use, fire protection, hydropower generation, irrigation, contact and non-contact recreation, cold freshwater habitat, spawning habitat, stock watering and wildlife habitat.
Domestic use	Marten Creek, which supplies water to the community of Mineral.
Clean Water Act 303 (d) Water Bodies[c]	Eagle Lake for nitrogen and phosphorous from multiple sources, Susan River for mercury and unknown toxicity (source unknown), North Fork Feather River below Lake Almanor for mercury (unknown source) and temperature (flow regulation and hydromodification) and Pit River for nutrients (agriculture and agriculture grazing).
Watersheds	140 HFQLG watersheds on the Lassen NF within the affected environment, 15 watersheds with <1.0 mi/mi. ^{2} were excluded from this analysis for a total of 124 watersheds HFQLG watersheds in the analysis. Average size of entire watersheds (includes all ownerships): 11,045 acres Average watershed acreage within affected environment: 6,128 acres
Miles of unpaved road	2,728 miles
Existing road density of NFTS roads and trails and unauthorized routes in watersheds	4% of watersheds (5) have a road density of less than 0.5 miles of road per square mile of land (mi. /mi.^{2}). 31% of watersheds (39) have a road density of 0.5 to 2.5 mi./mi. ^{2} 59% of watersheds (73) have a road density of 2.5 to 4.5 mi./mi. ^{2} 6% of watersheds (7) have a road density greater than 4.5 mi./mi. ^{2} Highest: 6.3 mi./mi. ^{2} Johnson Creek 15 watersheds with <1.0 mi/mi. ^{2} were excluded from this analysis.

[a]Source: Young 1998; [b]Source:Cal EPA LRWQCB 2005, Cal EPA CVWQCB 2007; [c]Source: Cal EPA SWRCB 2006.

Routes in Meadows

Under Alternative 1, route proliferation in meadows would continue to occur due to the continuation of cross-country travel across the Forest. Along with the ability to drive cross-country the ability to travel along the existing 1,089 miles of unauthorized routes would

continue. The effects of leaving the unauthorized routes available for travel are discussed below in the “Direct/Indirect Effects of Adding Facilities to the NFTS...”. Cross-country travel could occur across 206 meadows on the Forest. The area of each meadow ranges in size from 4 to 1,447 acres. The potential impact to these meadows could lead to a loss of hydrologic function caused by altering the drainage patterns, soil compaction, gullying, rutting and loss of vegetated cover. In time these effects could lead to lowered water tables and accelerated erosion. The mean length of these 399 unauthorized routes is 0.1 miles and the maximum length is 1.6 miles, with seven routes exceeding 1.0 mile in length.

Routes Crossing Perennial Streams

Similar to the effects described above, under Alternative 1, the major concern regarding the continuation of cross-country travel on the Forest is that vehicle traffic would continue to cross perennial and intermittent streams unrestrained and unimpeded. At this point we know of 1,089 miles of inventoried unauthorized routes cross 22 perennial streams with a total of 31 stream crossings (Table 76). The number of perennial stream crossings would continue to increase without a ban on cross-country travel. Depending on the soil type and sensitivity of the watershed this could cause tremendous resource damage from sediment caused by erosion and concentrated runoff. Unmanaged stream crossings such as these could lead to a decline in beneficial uses for these streams in terms of fishing, swimming and as a water source for drinking, etc. See the Aquatic Biota for a description of the No-action alternatives potential effects to aquatic resources.

Direct/Indirect Effects of Not Adding Facilities (presently unauthorized routes) to the NFTS (Alternative 1)

Indicator Measure 1: Miles of Routes in RCAs

Routes in RCAs

Under Alternative 1, none of the existing unauthorized routes would be added to the NFTS. This equates to 126 miles or 1,419 existing unauthorized routes that would continue to be unmanaged within RCAs, resulting in very high potential for resource damage. In the short term, the unauthorized routes disturbed by motor-vehicle use would not change because these routes would still be open to motorized traffic.

As previously mentioned, the long-term recovery of vegetation expected as a result of road closures in Alternatives 2, 3, 4, 5 and Mod. 5 would not be realized as long as these routes continue to be driven on. With continued motorized traffic, the increased peak flow effects that have occurred to date as a result of these unauthorized routes will remain over the long term because the road templates will continue to intercept subsurface runoff and concentrate surface runoff. Additionally, without vegetative recovery, unauthorized routes with continued motorized traffic would not experience the decreased amounts of erosion sediment delivery to area stream channels that would be experienced under alternatives 2 through Mod. 5.

Table 76 Perennial stream crossings of unauthorized routes under the No-action Alternative

Route	Stream	Sixth field HUC[a]
ULA274B	Antelope Creek	North Fork Antelope Creek
270434UC01	Colby Creek	Butte Creek
ULA399	Dry Creek	Lower Hamilton Branch
ULA094	East Fork Brown Ravine	Upper West Branch Feather River
UFW504	Green Burney Creek	Green Burney Creek
330521UC01	Hat Creek	Upper Hat Creek
UMN051	Lost Creek	Lost Creek
UNC005	Lost Creek	Lower Butte Creek
UNW320	Lost Creek	Lost Creek
280405UC01	Mill Creek	Upper Mill Creek
UBB707C	Mill Creek	Upper Mill Creek
290427UC03	Mill Creek Tributary	Upper Mill Creek
290427UC04B	Mill Creek Tributary	Upper Mill Creek
ULA267	Mill Creek Tributary	Upper Mill Creek
UAP181	Morgan Springs	Upper Mill Creek
UBB424	Mountain Meadows Creek Tributary	Mountain Meadows
UAP192	North Fork Feather River Tributary	Rice Creek
UBB572	North Fork Feather River Tributary	Rice Creek
UBB582	North Fork Feather River Tributary	Rice Creek
UMN904	Philbrook Creek	Upper West Branch Feather River
UNE031	Pine Creek	Upper Pine Creek
ULA405	Robbers Creek	Robbers Creek
ULA396	Robbers Creek Tributary	Lower Goodrich Creek
UNO004	Rock Creek	Screwdriver Creek
UNO017	Rock Creek	Screwdriver Creek
250631UC08	Rock Creek Tributary	North Valley Creek
UNO211	Rock Creek Tributary	Screwdriver Creek
UNO026A	Screwdriver Creek	Screwdriver Creek
UBB805	Susan River	Hog Flat Reservoir
UBB071	Willow Creek	Butte Creek
ULA198	Yellow Creek Tributary	Lower Yellow Creek

[a]Hydrologic Unit Code. Please note that while the GIS analysis showed that UBB860 crossed a perennial stream, this was found to be incorrect based on site specific review.

Routes in Meadows

While the No-action Alternative does not propose any route additions, an analysis of existing unauthorized routes demonstrates that there are at least 58.9 miles of unauthorized routes currently within meadows. The initial finding using a GIS query resulted in 63.6 miles of routes in meadows; however, a closer evaluation of the routes in the action alternatives showed that 4.7 miles of those routes did not actually cross meadows. Therefore, under the No-action Alternative, 58.9 miles composed of 399 routes would continue to go through

meadows. None of these unauthorized routes would be prohibited from motorized use. The area of each meadow ranges in size from 4 to 1,447 acres. The mean length of these 399 unauthorized routes is 0.1 miles and the maximum length is 1.6 miles, with seven routes exceeding 1.0 mile in length. The resource damage associated with these routes would continue to occur; potentially impacting the hydrologic function of the meadows. A primary concern in the No-action alternative is the potential for additional route proliferation, where vehicles could drive unimpeded through the meadows potentially causing additional resource damage.

Routes Crossing Perennial Streams

Under the No-action Alternative, according to a GIS analysis of perennial stream crossings by unauthorized routes, unauthorized routes cross 22 perennial streams 31 times (Table 76). Motorized use would continue on these 31 segments of routes, potentially causing severe resource damage. Stream crossings in a managed condition would be equipped with bridges, culverts or hardened low water crossings to prevent resource damage caused by driving through the stream. Continued unimpeded crossing of these streams could potentially increase surface erosion of routes and sedimentation to stream reaches. In addition, these 31 sites would continue to be points where the route could divert the stream out of the channel and cause more sediment to reach a stream from erosion of the routes and side slopes. Sediment from these routes would reach perennial streams and impair beneficial uses of 22 streams on the Lassen National Forest (Table 76).

Direct/Indirect Effects of Changes to the Existing NFTS, Including Identifying Seasons of Use and Vehicle Class Changes to the Existing NFTS (Alternative 1)

Indicator Measure 2: Miles of NFTS roads and trails prohibited from motorized use during periods of wet weather, qualitative analysis of vehicle class change for a change in objective maintenance level, ML1 to ML2 change is in to the RCAs—meadows, stream crossings and presence in RCAs

Season of Use

Under the No-action Alternative, none of the NFTS roads and trails proposed for seasonal closure for resource protection during wet periods (December 1 to April 30), winter recreation for snowmobile use times (December 26 to March 31) or closures that prohibit motorized vehicle traffic except for hunting restrictions (November 1 to July 31) would be implemented. Consequently, there would continue to be a risk of sedimentation to streams and increased compaction of roads and trails from motorized use of the existing system during wet periods. Without implementation of a wet season closure for resource protection this decision would not be consistent with the LRMP, as the Lassen National Forest would not be implementing BMP 2-24 (Traffic Control during Wet Periods).

Changes in Vehicle Class—Objective Maintenance Level

Under the No-action alternative there would be no change in objective maintenance level, therefore all of the ML3 and ML4 roads proposed for downgrading in Alternatives 2, 5 and Modified 5 would continue to be maintained at their existing level.

Changes in ML1 to ML2

Under the No-action alternative all of the ML1 trails proposed for upgrading to ML2 in Alternative 5 and Modified 5 would continue to be closed to public use.

Cumulative Effects (Alternative 1)

Under the No-action Alternative, there would be no change in watershed cumulative effects as road densities would not be altered. One indicator below summarizes the effects on hydrologic resources.

Indicator Measure 3: The road/route density (miles per square mile) within HFQLG watersheds; the road/route density (miles per square mile) within RCAs of these watersheds; and the number of miles of proposed additions to the NFTS within the 5 watersheds that were considered to have "high" risk of cumulative watershed effects in the 1999 HFQLG FEIS

Currently, within the 125 HFQLG watersheds of the Lassen National Forest, there are 80 HFQLG watersheds that have densities of roads, routes and trails greater than 2.5 miles per square mile. There are 47 HFQLG watersheds that have road densities in RCAs greater than 2.5 miles of roads and trails per square mile, indicating the potential for some degree of resource impacts. Under the No-action Alternative, road densities (total NFTS and unauthorized routes) on the Forest would remain unaffected causing continued potential for severe resource damage in the form of fine-grained sediment from roads and trails that impair water quality by degrading aquatic habitat; by altering the taste and quality of drinking water; or by making lakes, reservoirs and ponds less attractive for swimmers.

In 1999, before the Herger-Feinstein Quincy Library pilot project began, there was an equivalent roaded-acre analysis done for the HFQLG EIS. Five of the 125 HFQLG watersheds on the Lassen were considered to have "high" equivalent roaded-acres. Those HUC6 watershed names were Martin Creek (just east of Eagle Lake), Davis and Harvey (northeast of Martin Creek watershed), and on the westside of the Forest Upper North Fork Battle Creek and Upper South Fork Battle Creek (Table 77). All of these watersheds have densities greater than 2.5 miles per square mile. No-action Alternative would continue to make these unauthorized routes available for use, thus continuing to put them at risk of cumulative watershed effects. Road densities in both the RCA and overall watershed are higher in this alternative than in any of the action alternatives.

Table 77 A comparison of No-action Alternative (Alt. 1) versus the action alternatives (Alt. 2, 3, 4, 5 and Modified 5) road densities for Herger-Feinstein Quincy Library Group watersheds and the associated Riparian Conservation Area that were considered to have a "High" equivalent roaded acreage in 1999 at the time of the HFQLG Environmental Impact Statement

Sixth-field Watershed Name (HFQLG watershed number)	HFQLG Watershed Road Density (Alt.1)	Road Density in RCAs (Alt. 1)	HFQLG Watershed Road Density (Alt. 2, 3, 4, 5 and Mod. 5)	Road Density in RCAs (Alt. 2, 3, 4, 5 and Mod. 5)
South Fork Battle Creek (060111)	4.7	6.3	4.0 (-0.7)	5.7 (-0.6)
North Fork Battle Creek (06118)	3.7	0.7	2.5 (-1.2)	0 (-0.7)
Harvey (060133)	3.8	8.4	3.5 (-.3)	8.4 (0)
Davis (06131)	2.9	0.9	2.9 (0)	0.9 (0)
Martin (060085)	2.5	2.0	2.0 (-.5)	2.0 (0)

Alternative 2—Modified Proposed Action

Direct/indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel (Alternative 2)

Indicator Measure 1: Miles of Routes in RCAs

Routes in RCAs

Under Alternative 2, cross-country travel would be prohibited, additionally travel would be prohibited on any unauthorized routes, effectively stopping travel on 124.7 miles (1,069 routes) or 99% of the miles of existing unauthorized routes within RCAs resulting in a very low potential for resource damage. In the short term, the unauthorized routes disturbed by motor-vehicle use would change because these routes would no longer be open to motorized traffic. The short-term reductions in sediment delivery to stream systems in the vicinity of these routes would occur.

The long-term recovery of vegetation expected as a result of road closures would be realized. Without continued motorized traffic, the increased peak flow effects that have occurred to date as a result of these unauthorized routes would decrease in the long term because the road templates will revegetate and no longer concentrate surface runoff. In addition to vegetative recovery, unauthorized routes would experience decreased amounts of erosion sediment delivery to area stream channels.

Routes in Meadows

Under Alternative 2, route proliferation in meadows would not continue to the prohibition of cross-country travel across the Forest. Cross-country travel would not occur across 206 meadows on the Forest. The area of each meadow ranges in size from 4 to 1,447 acres. The mean length of these 447 unauthorized routes is 0.1 miles and the maximum length is 1.6 miles, with seven routes exceeding 1.0 mile in length. In the short term, there should be a return of some vegetation and further damage caused by vehicle traffic such as rutting and

entrenchment would cease to occur. In the long term, as vegetation begins to become established an increase in hydrologic function should occur. Active restoration or obliteration of unauthorized routes is not a part of any of the project alternatives. Without active restoration drainage patterns, soil compaction, gullying and rutting may continue to exist in these meadows.

Routes Crossing Perennial Streams

Under Alternative 2, the prohibition of cross-country travel on the Forest will prohibit unrestrained and unimpeded crossing of perennial and intermittent streams. At this point we know of 1,089 miles of inventoried unauthorized routes that cross 22 perennial streams with a total of 31 stream crossings (Table 76). All of these stream crossings would no longer be available for crossing and no additional routes would manifest. This should particularly benefit highly erosive soil types and sensitive watershed resources by significantly reducing the potential damage from sediment caused by erosion and concentrated runoff. In the short term, these 31 sites would still be sources of sediment to streams during run-off events. However, within 25 to 30 years, these 31 sites would likely naturally revegetate thus reducing erosion, runoff and stream sedimentation (Grace and Clinton 2006). There would be no decline in beneficial uses from cross-country travel by this action alternative to fishing, swimming and drinking water sources, etc.

Direct/Indirect Effects of Adding Facilities (presently unauthorized routes) to the NFTS (Alternative 2)

Indicator Measure 1: Miles of Routes in RCAs

Routes in RCAs

Alternative 2 proposes additions of 1.3 miles consisting of 29 routes are located within RCAs. The majority of these routes are not causing any visible resource damage and those that are, with proper mitigation should not impair beneficial uses of these RCAs. The basis for these mitigations is documented for each route in Appendix A. The range of mitigations are hardening of the surface, blockades, winter closures, proper drainage in order to prevent further sediment and erosion from causing damage to the aquatic ecosystems. For example, UNW100 is showing entrenching of 2-4”, by hardening this surface sediment and erosion would diminish within the RCA on this route. The routes that will require hardening before they can be added to the MVUM are UBB686, UBB707, UBB707A and UNW100. Proposed addition UBB707 and UBB707A will need additional blockades to assure that the route is not extending into unstable streambanks of Mill Creek. Blockades should also be installed on UBC021 and ULA158 to prevent motorized traffic from driving into the seasonal lake, Dry Lake. Route UNE392 needs a barrier installed to assure route stays out of meadow. Several of the routes should have wet weather seasonal closures in order to avoid rutting and/or protect soil resources, UBB797, UBB798 and UBB799, ULA488, ULA488-1, ULA489A and ULA489B, which all occur near McCoy Flat Reservoir or the Susan River. Lastly, some of

the routes need proper drainage installed because they are showing signs of rutting, gully erosion and sedimentation that could reach a waterbody, ULA190 and ULA254.

Routes in Meadows

According to a GIS analysis of routes a total of 2.3 miles of unauthorized routes currently go through meadows; however, after closer inspection using site-specific data, none of these routes proved to be in an actual meadow. Therefore, when the miles of routes in meadows is corrected against whether the routes are actually in meadows in this alternative, 58.9 miles of unauthorized routes that currently cross meadows would be prohibited from motorized vehicle use. Prohibiting road crossings of meadows or drainage features in meadows would help to restore meadow function by bringing to standstill continued erosion, rutting, rilling and lowering of water tables augmented by roads and trails. With the cessation of traffic, vegetation would be allowed to become reestablished on roads and trails, thus increasing meadow connectivity, increasing ecosystem productivity and soil water holding capacity.

Routes Crossing Perennial Streams

Under Alternative 2, no unauthorized routes would cross perennial streams. In both the short and long term there would be no effects from crossings.

Direct/Indirect Effects of Changes to the Existing NFTS, Including Identifying Seasons of Use and Vehicle Class Changes to the Existing NFTS (Alternative 2)

Indicator Measure 2: Miles of NFTS roads and trails prohibited from motorized use during periods of wet weather, qualitative analysis of vehicle class change for a change in objective maintenance level, ML1 to ML2 change is in to the RCAs—meadows, stream crossings and presence in RCAs

Season of Use

Under the No-action Alternative, none of the NFTS roads and trails proposed for seasonal closure for resource protection during wet periods (December 1 to April 30), winter recreation for snowmobile use times (December 26 to March 31) or closures that prohibit motorized vehicle traffic except for hunting restrictions (November 1 to July 31) would be implemented. Consequently, there would continue to be a risk of sedimentation to streams and increased compaction of roads and trails from motorized use of the existing system during wet periods. Without implementation of a wet season closure for resource protection this decision would not be consistent with the LRMP, as the Lassen National Forest would not be implementing BMP 2-24 (Traffic Control during Wet Periods).

Changes in Vehicle Class—Objective Maintenance Level

Under Alternative 2 there would be a change of 13 miles in objective maintenance level from ML3 and 4 to ML2. It is assumed that this would not result in any ground disturbing activities and that roads would be allowed to weather; additionally, these routes would be maintained in order to prevent resource damage. Therefore, there would be no effect to hydrologic or geomorphic resources from this action.

Changes in ML1 to ML2

Under Alternative 2, all of the ML1 trails proposed for upgrading to ML2 in Alternative 5 and Modified 5 would continue to be closed to public use. Therefore, there would be no effect to hydrologic or geomorphic resources from this action.

Cumulative Effects (Alternative 2)

Indicator Measure 3: Density of miles per square mile (mi/mi^2) of proposed trails and roads open to motorized traffic within Lassen National Forest HFQLG watersheds and RCAs

Under Alternative 2, assuming roads passively recover without public use, out of 125 HFQLG watersheds located on the Lassen National Forest, there are 46 watersheds that have road densities greater than 2.5 miles per square mile of roads and trails. That equates to 34 less watersheds than the No-action Alternative that have road and trail densities greater than 2.5 mile per square mile. In time, these 34 watersheds would have lower resource damage potential related to road density than the No-action alternative. As these roads and trails begin to passively recover from vehicle traffic, 27% of the watersheds on the Forest would see a road density reduction and 63% would have road densities below 2.5 miles per square mile. Passive recovery could take many years depending on the site conditions. These watersheds should see improvement to water quality in the form of a decreased amount of fine-grained sediment from roads and trails. Fine-grained sediment can impair water quality by degrading aquatic habitat; by altering the taste and quality of drinking water; or by making lakes, reservoirs and ponds less attractive for swimmers.

Under Alternative 2, again, assuming roads passively recover without public use, there are 37 watersheds that have road densities in RCAs greater than 2.5 miles per square mile of roads and trails on the Forest. That equates to 10 less watersheds than the No-action Alternative that have road and trail densities greater than 2.5 mile per square mile in RCAs. As these roads and trails begin to passively recover from vehicle traffic, 8% of the watersheds on the Forest would see a road density reduction and 70% (87 watersheds) of the watersheds would have road densities of less than or equal to 2.5 miles per square mile in RCAs.

The effect to road and trail densities of the proposed addition of 21 miles of unauthorized routes results in 4 more watersheds with greater than 2.5 miles per square mile than Alternative 3, where no unauthorized routes are added. Forty-four of the same HFQLG watersheds have route densities greater than or equal to 2.5 miles per square mile. The only watersheds that have greater route densities than the baseline alternative are Hog Flat Reservoir and Logan Lake.

In 1999, before the Herger-Feinstein Quincy Library pilot project began, there was an equivalent roaded-acre analysis done for the HFQLG EIS. Five of the 35 watersheds were considered to have “high” equivalent roaded-acres. The No-action Alternative had 21.4 miles consisting of 112 unauthorized routes in these watersheds. The HUC6 watershed

names and the number of miles and routes in each were Martin Creek (4.75 miles and 18 routes) just east of Eagle Lake, Davis (1.3 miles and 6 routes) and Harvey (5.8 miles and 21 routes), northeast of Martin Creek watershed and on the westside of the Forest Upper North Fork Battle Creek (4.8 miles and 24 routes) and Upper South Fork Battle Creek (4.8 miles and 43 routes). Under Alternative 2, these unauthorized routes would not be added. There is no difference between the baseline alternative (Alt. 3), Alternative 4, Alternative 5 and Modified Alternative 5 and this alternative with regards to road and trail densities and the number of routes in each (Table 77). The conclusion drawn from this analysis is that the "high" rating is actually from the NFTS and past actions in these watersheds all 5 watersheds will improve due to the action alternatives because none of the action alternatives add more than 0.2 miles to the existing system in these watersheds.

Alternative 3

Direct/indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel (Alternative 3)

Indicator Measure 1: Miles of Routes in RCAs

Routes in RCAs

Under Alternative 3, cross-country travel would be prohibited, additionally travel would be prohibited on any unauthorized routes, effectively stopping travel on 126 miles (1,069 routes) or 100% of the existing unauthorized routes within RCAs resulting in a very low potential for resource damage. The beneficial effects are anticipated to be the same as those described in Alternative 2, Direct/Indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel, Indicator Measure 1: Miles of Routes in RCAs, Routes in RCAs.

Routes in Meadows

Under Alternative 3, route proliferation in meadows would not continue due to the prohibition of cross-country travel across the Forest. The beneficial effects are anticipated to be the same as those described in Alternative 2, Direct/Indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel, Indicator Measure 1: Miles of Routes in RCAs,

Routes Crossing Perennial Streams

Under Alternative 3, the prohibition of cross-country travel on the Forest will prohibit unrestrained and unimpeded crossing of perennial and intermittent streams. The beneficial effects are anticipated to be the same as those described in Alternative 2, Direct/Indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel, Indicator Measure 1: Miles of Routes in RCAs, Routes Crossing Perennial Streams.

Direct/Indirect Effects of Adding Facilities (presently unauthorized routes) to the NFTS (Alternative 3)

Indicator Measure 1: Miles of Routes in RCAs

Routes in RCAs

Alternative 3 proposes no additions within RCAs. In both the short and long term there would be no effects of route additions within RCAs. The beneficial effects should be the same as those described above in the Prohibition of Cross-country Travel.

Routes in Meadows

Alternative 3 proposes no additions within meadows. In both the short and long term there would be no effects to meadows. The beneficial effects should be the same as those described above in the Prohibition of Cross-country Travel.

Routes Crossing Perennial Streams

Under Alternative 3, no unauthorized routes would cross perennial streams. In both the short and long term there would be no effects of crossings.

Direct/Indirect Effects of Changes to the Existing NFTS, Including Identifying Seasons of Use and Vehicle Class Changes to the Existing NFTS (Alternative 3)

Indicator Measure 2: Miles of NFTS roads and trails prohibited from motorized use during periods of wet weather, qualitative analysis of vehicle class change for a change in objective maintenance level, ML1 to ML2 change is in to the RCAs—meadows, stream crossings and presence in RCAs

Season of Use

Under the No-action Alternative, none of the NFTS roads and trails proposed for seasonal closure for resource protection during wet periods (December 1 to April 30), winter recreation for snowmobile use times (December 26 to March 31) or closures that prohibit motorized vehicle traffic except for hunting restrictions (November 1 to July 31) would be implemented. See Alternative 2 for the remaining discussion.

Changes in Vehicle Class—Objective Maintenance Level

Under Alternative 3 there would be no changes in objective maintenance level from ML3 and 4 to ML2. Therefore, there would be no effect to hydrologic or geomorphic resources from this action.

Changes in ML1 to ML2

Under Alternative 3, all of the ML1 trails proposed for upgrading to ML2 in Alternative 5 and Modified 5 would continue to be closed to public use, therefore there would be no effect to hydrologic or geomorphic resources from this action.

Cumulative Effects (Alternative 3)

Indicator Measure 3: Density of miles per square mile (mi/mi^2) of proposed trails and roads open to motorized traffic within Lassen National Forest HFQLG watersheds and RCAs

Under Alternative 3, assuming roads passively recover without public use, out of 125 HFQLG watersheds located on the Lassen National Forest, there are 44 watersheds that

have road densities greater than 2.5 miles per square mile of roads and trails, the least of any of the action alternatives. That equates to 36 less watersheds than the No-action Alternative that have road and trail densities greater than 2.5 mile per square mile. In time, these 36 watersheds would have lower resource damage potential related to road density than the No-action alternative. As these roads and trails begin to passively recover from vehicle traffic, 29% of the watersheds on the Forest would see a road density reduction and 65% would have road densities below 2.5 miles per square mile. Passive recovery could take many years depending on the site conditions.

Road densities in Alternative 3 are the same as those in Alternative 2. Assuming roads passively recover without public use, there are 37 watersheds that have road densities in RCAs greater than 2.5 miles per square mile of roads and trails on the Forest. These effects were described in Alternative 2, Cumulative Watershed Effects/

There is no difference between the action alternatives with regards to the five watersheds that were considered to have “High” equivalent roaded-acre values in the 1999 Herger-Feinstein Quincy Library EIS. See Alternative 2 for further explanation of this.

Alternative 4

Direct/indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel (Alternative 4)

Indicator Measure 1: Miles of Routes in RCAs

Routes in RCAs

Under Alternative 4, cross-country travel would be prohibited, additionally travel would be prohibited on any unauthorized routes, effectively stopping travel on 124.3 miles (1,069 routes) or 99% of the miles of existing unauthorized routes within RCAs resulting in a very low potential for resource damage. The beneficial effects are anticipated to be the same as those described in Alternative 2, Direct/Indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel, Indicator Measure 1: Miles of Routes in RCAs, Routes in RCAs.

Routes in Meadows

Under Alternative 4, route proliferation in meadows would not continue to the prohibition of cross-country travel across the Forest. The beneficial effects are anticipated to be the same as those described in Alternative 2, Direct/Indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel, Indicator Measure 1: Miles of Routes in RCAs, Routes in Meadows.

Routes Crossing Perennial Streams

Under Alternative 4, the prohibition of cross-country travel on the Forest will prohibit unrestrained and unimpeded crossing of perennial and intermittent streams. The beneficial effects are anticipated to be the same as those described in Alternative 2, Direct/Indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel, Indicator Measure 1: Miles of Routes in RCAs, Routes Crossing Perennial Streams.

Direct/Indirect Effects of Adding Facilities (presently unauthorized routes) to the NFTS (Alternative 4)

Indicator Measure 1: Miles of Routes in RCAs

Routes in RCAs

Alternative 4 proposes additions of 1.7 miles consisting of 18 routes are located within RCAs. The majority of these routes are not causing any visible resource damage and those that are, with proper mitigation should not impair beneficial uses of these RCAs. The basis for these mitigations is documented for each route in Appendix A. The range of mitigations are signing to keep people on the established routes, blockades, winter closures, proper drainage in order to prevent further sediment and erosion from causing damage to the aquatic ecosystems. One proposed route, 340327UC03, needs barriers repaired or more installed in order to block vehicle traffic from reaching Burney springs in addition to a seasonal closure. The routes that should have wet weather seasonal closures in order to avoid rutting and erosion reaching adjacent water bodies are: 340327UC03, ULA488, ULA488-1 and ULA505. Lastly, one proposed route, 320306UC01, needs proper drainage installed due to documented rilling that could reach the unnamed tributary to Huckleberry Lake.

Routes in Meadows

According to a GIS analysis of routes a total of 1.3 miles of unauthorized routes currently go through meadows; however, after closer inspection using site-specific data, none of these routes proved to be in an actual meadow. See Alternative 2, Direct/Indirect Effects of Adding Facilities (presently unauthorized routes) to the NFTS, Indicator Measure 1: Miles of Routes in RCAs, Routes in Meadows for further discussion of the beneficial effects of not having routes in meadows.

Routes Crossing Perennial Streams

Under Alternative 4, no unauthorized routes would cross perennial streams. In both the short and long term there would be no effects of crossings. See Alternative 2, Direct/Indirect Effects of Adding Facilities (presently unauthorized routes) to the NFTS, Indicator Measure 1: Miles of Routes in RCAs, Routes Crossing Perennial Streams for further discussion of the beneficial effects of not having routes in meadows.

Direct/Indirect Effects of Changes to the Existing NFTS, Including Identifying Seasons of Use and Vehicle Class Changes to the Existing NFTS (Alternative 4)

Indicator Measure 2: Miles of NFTS roads and trails prohibited from motorized use during periods of wet weather, qualitative analysis of vehicle class change for a change in objective maintenance level, ML1 to ML2 change is in to the RCAs—meadows, stream crossings and presence in RCAs

Season of Use

Under Alternative 4, 80 miles of seasonal closure for resource protection during wet periods (December 1 to April 30) would be implemented, along with 275 miles of winter recreation seasonal closures from December 26th to March 31st and 12 miles of closures near

Susanville (with the exception for hunting) from November 1st to July 31st. These seasonal restrictions should afford these routes a tremendous amount of protection from damage attributed to wet weather vehicle traffic, such as rilling, rutting, erosion and sedimentation. Additionally, implementation of these seasonal closures for resource protection would be consistent with the LRMP, as the Lassen National Forest would not be implementing BMP 2-24 (Traffic Control during Wet Periods).

Changes in Vehicle Class—Objective Maintenance Level

Under Alternative 4 there would be 79 miles of routes that would implement objective maintenance level changes from ML3 and 4 to ML2. It is assumed that this would not result in any ground disturbing activities and that roads would be allowed to weather; additionally, these routes would be maintained in order to prevent resource damage. Therefore, there would be no effect to hydrologic or geomorphic resources from this action.

Changes in ML1 to ML2

Under this alternative all of the ML1 trails proposed for upgrading to ML2 in Alternative 5 and Modified 5 would continue to be closed to public use, therefore there would be no effect to hydrologic or geomorphic resources from this action.

Cumulative Effects (Alternative 4)

Indicator Measure 3: Road Density within RCAs and HFQLG Watersheds

Although Alternative 2 adds 11 trail miles more than this alternative, the effects analysis is exactly the same with regards to road densities in HFQLG watersheds and RCAs, for further discussion see Alternative 2, Cumulative Watershed Effects discussion.

Alternative 5 and Modified Alternative 5—Preferred Alternative

Direct/indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel (Alternative 5 and Mod. 5)

Indicator Measure 1: Miles of Routes in RCAs

Routes in RCAs

Under Alternative 5 and Modified 5, cross-country travel would be prohibited, additionally travel would be prohibited on any unauthorized routes, effectively stopping travel on 120 miles (1,069 routes) or 95% of the miles of existing unauthorized routes within RCAs resulting in a low potential for resource damage. The beneficial effects are anticipated to be the same as those described in Alternative 2, Direct/Indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel, Indicator Measure 1: Miles of Routes in RCAs, Routes in RCAs.

Routes in Meadows

Under Alternative 5 and Modified 5, route proliferation in meadows would not continue to the prohibition of cross-country travel across the Forest. The beneficial effects are anticipated to be the same as those described in Alternative 2, Direct/Indirect Effects of the Prohibition of

Cross-country Motorized Vehicle Travel, Indicator Measure 1: Miles of Routes in RCAs, Routes in Meadows.

Routes Crossing Perennial Streams

Under Alternative 5 and Modified 5, the prohibition of cross-country travel on the Forest will prohibit unrestrained and unimpeded crossing of perennial and intermittent streams. The beneficial effects are anticipated to be the same as those described in Alternative 2, Direct/Indirect Effects of the Prohibition of Cross-country Motorized Vehicle Travel, Indicator Measure 1: Miles of Routes in RCAs, Routes Crossing Perennial Streams.

Direct/Indirect Effects of Adding Facilities (presently unauthorized routes) to the NFTS (Alternative 5 and Mod. 5)

Indicator Measure 1: Miles of Routes in RCAs

Routes in RCAs

Alternative 5 and Modified 5 proposes additions of 5.9 and 6 miles consisting of 77 and 78 routes, respectively, within RCAs. The majority of these routes are not causing any visible resource damage and those that are, with proper mitigation should not impair beneficial uses of these RCAs. The basis for these mitigations is documented for each route in Appendix A. The range of mitigations are hardening of the surface, blockades, winter closures, proper drainage in order to prevent further sediment and erosion from causing damage to the aquatic ecosystems. For example, UNW100 is showing entrenching of 2-4", by hardening this surface sediment and erosion would diminish within the RCA on this route. The routes that will require hardening before they can be added to the MVUM are 290522UC02, UBB686, UBB707, UBB707A and UNW100. Proposed addition UBB707 and UBB707A will need additional blockades to assure that the route is not going into the riparian area surrounding Mill Creek. Blockades should also be installed on UBC021 and ULA158 to prevent motorized traffic from driving into the seasonal lake, Dry Lake. Route UNE392 needs a barrier installed to assure route stays out of meadow. Proposed addition 340327UC03 needs to have the fence that blocks the Susan River from being crossed repaired. Several of the routes should have wet weather seasonal closures in order to avoid rutting—340327UC03, UBB797, UBB798, UBB799, ULA059, ULA231, ULA488, ULA488-1, ULA489A, ULA489B, ULA505 and ULA557 several of which occur near McCoy Flat Reservoir. Some of the routes need proper drainage installed, such as waterbars, because they are showing signs of resource damage that could reach the streams, 290606UC01 (rilling), 290606UC04 (rilling), 320306UC01 (rutting and rilling), ULA098 (small gully), ULA190 (rutting and gully erosion), ULA219 (gullies, ruts on 80% of road), ULA557 (rilling, ruts) and ULA254 (rilling). Route UNE643 should be signed to control access to Ashurst Lake. UBB800, UBB865 and ULA174, while not in RCAs should have a seasonal closure applied to facilitate the efficacy of adjacent routes with seasonal closures as well as protect the routes from potential resource damage.

Routes in Meadows

According to a GIS analysis of routes a total of 6.0 miles of unauthorized routes currently go through meadows; however, after closer inspection using site-specific data, 1.3 miles consisting of 4 routes proved to actually be in meadows. These four routes were ULA426, ULA461, UNE714 and UNE787. ULA426 and ULA461 occur on a seasonal Lake known as Norvell Flat. It is completely hardened during the summer. Therefore, as seasonal wet weather closure should adequately prevent resource damage. UNE787 is located along the outer edge of a meadow. This route does not go through in creeks or hydrologic features, it simply skirts the edge of the meadow; therefore, with a seasonal wet weather restriction this should adequately address any resource concerns. And finally, route UNE714 is going across an upland meadow, it does not cross any drainage features. This meadow is an upland meadow with sage and upland *Carex* spp. When the 58.9 miles of routes in meadows is corrected against whether the routes are actually in meadows in this alternative, 57.6 miles of unauthorized routes that currently cross meadows would be prohibited from motorized vehicle use. Prohibiting road crossings of wet meadows or drainage features in meadows would help to restore meadow function by bringing to standstill continued erosion, rutting, rilling and lowering of water tables augmented by roads and trails. With the cessation of traffic, vegetation would be allowed to become reestablished on roads and trails, thus increasing meadow connectivity, increasing ecosystem productivity and soil water holding capacity.

Routes Crossing Perennial Streams

Under Alternative 5 and Modified 5, no unauthorized routes would cross perennial streams. In both the short and long term there would be no effects of crossings.

Direct/Indirect Effects of Changes to the Existing NFTS, Including Identifying Seasons of Use and Vehicle Class Changes to the Existing NFTS (Alternative 5 and Mod. 5)

Indicator Measure 2: Miles of NFTS roads and trails prohibited from motorized use during periods of wet weather, qualitative analysis of vehicle class change for a change in objective maintenance level, ML1 to ML2 change is in to the RCAs—meadows, stream crossings and presence in RCAs

Season of Use

Under Alternative 5 and Modified 5, 88 miles of seasonal closure for resource protection during wet periods (December 1 to April 30) would be implemented, along with 275 miles of winter recreation seasonal closures from December 26th to March 31st and 12 miles of closures near Susanville (with the exception for hunting) from November 1st to July 31st. These seasonal restrictions should afford these routes a tremendous amount of protection from damage attributed to wet weather vehicle traffic, such as rilling, rutting, erosion and sedimentation. Additionally, implementation of these seasonal closures for resource protection would be consistent with the LRMP, as the Lassen National Forest would not be implementing BMP 2-24 (Traffic Control during Wet Periods).

Changes in Vehicle Class—Objective Maintenance Level

Under Alternative 5 and Modified 5 there would be 79 miles of routes that would implement objective maintenance level changes from ML3 and 4 to ML2. It is assumed that this would not result in any ground disturbing activities and that roads would be allowed to weather; additionally, these routes would be maintained in order to prevent resource damage. Therefore, there would be no effect to hydrologic or geomorphic resources from this action.

Changes in ML1 to ML2

Under Alternative 5 and Modified 5, 6 miles of ML1 trails are proposed for upgrading to ML2. None of these ML1 roads occur in RCAs, meadows or cross streams. Therefore no resource damage to RCAs is anticipated with this alternative. Four of the routes require installation of proper drainage before they can be added to the MVUM—28N29H, 29N21Y, 27N11W and 31N17H. 28N29H has rutting in the route. 29N21Y has degraded water bars in addition to rutting in the route. 27N11W has gullies and ruts for 80% of the road.

Cumulative Effects (Alternative 5 and Modified 5)

Indicator Measure 3: Density of miles per square mile (mi/mi^2) of proposed trails and roads open to motorized traffic within Lassen National Forest HFQLG watersheds and RCAs

Under Alternative 5 and Modified 5, assuming roads passively recover without public use, out of 125 HFQLG watersheds located on the Lassen National Forest, there are 48 watersheds that have road densities greater than 2.5 miles per square mile of roads and trails. That equates to 31 less watersheds than the No-action Alternative that have road and trail densities greater than 2.5 mile per square mile. In time, these 31 watersheds would have lower resource damage potential related to road density than the No-action alternative. As these roads and trails begin to passively recover from vehicle traffic, 26% of the watersheds on the Forest would see a road density reduction and 61% would have road densities below 2.5 miles per square mile. Passive recovery could take many years depending on the site conditions.

Under Alternative 5 and Mod. 5, again, assuming roads passively recover without public use, there are 38 watersheds that have road densities in RCAs greater than 2.5 miles per square mile of roads and trails on the Forest. That equates to 9 less watersheds than the No-action Alternative that have road and trail densities greater than 2.5 mile per square mile in RCAs. As these roads and trails begin to passively recover from vehicle traffic, 7% of the watersheds on the Forest would see a road density reduction and 69% (86 watersheds) of the watersheds would have road densities of less than or equal to 2.5 miles per square mile in RCAs.

The effect to road and trail densities of the proposed addition of 53 and 56 miles results in 4 more watersheds with greater than 2.5 miles per square mile than the baseline alternative, Alternative 3. Forty-four of the same HFQLG watersheds have route densities greater than or equal to 2.5 miles per square mile. The only watersheds that have greater

route densities than the baseline alternative are Hog Flat Reservoir, Logan Lake, Lower Pine Creek and Upper Beaver Creek.

There is no difference between the action alternatives with regards to the five watersheds that were considered to have “High” equivalent roaded-acre values in the 1999 Herger-Feinstein Quincy Library EIS. This alternative is the only alternative that adds routes to these 5 watersheds. Martin Creek adds 0.1 miles and South Fork Battle Creek adds an additional 0.1 miles to the NFTS, 0.2 miles total. See Alternative 2 for further explanation of this.

On-Going and Reasonably Foreseeable Future Actions Potentially Contributing to Cumulative Effects

Appendix C lists ongoing and foreseeable projects that could affect water resources. Projects that would directly improve watershed condition by eliminating sources of chronic sediment include the following:

Bailey Restoration projects, which will decommission up to 0.9 miles of roads within riparian areas.

Butte Creek Wildlife and Watershed Enhancement Project (Almanor RD), which includes road decommissioning.

Ebey (Eagle Lake RD), which includes road decommissioning.

Crater Lake Campground Upgrades (Eagle Lake RD), which involves the closure of two lakeside campsites at Crater Lake.

Lotts Aspen, Oak, & Pine Enhancement (AOPE) Project (Almanor RD), which includes road decommissioning.

Murken Lake and Six Mile Hill Grazing Allotments Project, which would re-locate a watering hole out of a vernal pool.

Philbrook Knick point and Spill Channel Restoration (Almanor RD), which would stabilize and restore knick point and spill channel below Philbrook Reservoir and reduce ongoing channel erosion and sedimentation resulting from reservoir operations.

Scotts John Forest Health (Almanor RD), which includes road decommissioning, road maintenance, road improvements/construction for erosion and sediment control and other watershed improvements.

Willard Creek Recreation Site Rehabilitation (Eagle Lake RD), which would rehabilitate resource impacts within riparian areas along Willard Creek caused by dispersed recreationists.

There are multiple range, fuels and vegetation management projects that could affect water resources on Lassen NF, which are summarized in Appendix C. None of these projects should pose a risk to cumulative watershed effects if BMPs are implemented and effective. In 2008 Lassen NF's BMP were rated implemented 92% of the time and effective 90% of the time for 77 site evaluations (Breibart 2008). Projects whose BMP results were not effective were related to roads, developed and dispersed recreation and in one case, water source development. Results are listed below:

66 (86%) were implemented and effective.

3 (4%) were not implemented and effective.

5 (6%) were implemented and not effective.

3 (4%) were not implemented and not effective.

Dispersed recreation within riparian areas is another ongoing activity, but this activity has been poorly managed and neglected. Consequently, impacts have not been properly dealt with and are prolific throughout the Lassen NF. This DEIS identified at least four problem areas where dispersed recreation has impaired watershed function in perennial RCAs. These streams include Deer Creek, Yellow Creek, Lost Creek and Soldier Creek. Problems include sedimentation from bare ground at Yellow, Soldier and Lost Creek; human and animal waste in Soldier creek; human waste in the riparian area of Deer Creek; and modification of natural runoff and sediment regimes from the construction of rock dams in creeks. The Hat Creek Watershed Analysis documented impairment of beneficial uses as sediment from bare ground and human waste reached Lost Creek and Hat Creek (Tangenberg 2007). Problems occurred between Cave and Big Pine campgrounds and between Big Pine campground and Twin Bridges (Tangenberg 2007). In addition, 12 random site evaluations with Best Management Practices Evaluation Program (BMPEP) protocol R30 for dispersed recreation between 1992 and 2007 showed that 25 percent of selected sites failed BMPs.

Wildfires are unforeseeable events that will directly impair water quality until vegetation recovers. While conducting a Burn Area Emergency Response (BAER) assessment of the Petersen Fire on July 9, 2008, the BAER hydrologist observed two old roads not on the forest's inventory, located in the bottom of ephemeral drainages. The vegetation had been completely removed and the road prisms were intact. It is likely that there will be erosion following rain events two to three years following the area naturally revegetates. Sediment from this area will not reach a perennial stream, as the Sheep Head watershed is a closed basin. In 2007, the Moonlight Fire resulted in 210 acres of moderate and high burn severity in the Mountain Meadow Reservoir watershed. Because there are no perennial streams within the burn perimeter on Lassen NF, beneficial uses were not expected to be impaired. The Colby Fire consumed 168 acres on the hill slopes above Deer Creek, an anadromous

fish watershed. Despite the application of rice straw to 40 acres, fish biologists on the Almanor RD measured elevated levels of turbidity downstream of the fire during post-fire precipitation events in 2007. In 2008, lightning caused six fires across the Forest with a size greater than 1,000 acres: Antelope Fire, Mill Fire, Cub Complex, Corral Fire, Peterson Fire and Venture Fire. The former three occurred in anadromous fish watersheds. Water quality in Antelope Creek and Mill Creek are not expected to be impaired by their respective fires, as burn severity was a mosaic of low, moderate and unburned. The Cub complex, which consumed 25,000 acres, has the potential to impair water quality in Deer Creek during precipitation events for the next three years when snow levels are above 6,500 feet. To mitigate water quality impacts to Deer Creek, rice straw was aerially applied to 1,000 acres of Cub Creek, a tributary to Deer Creek. Treatments were done to protect Federally-Listed spring-run Chinook and winter-run Steelhead in Deer Creek downstream of its confluence with Cub Creek. Post-fire runoff and sedimentation of seasonal water bodies within the Corral Fire and Peterson Fire will not impair beneficial uses, as these water bodies have no connectivity with perennial streams. Road treatments to reduce post-fire erosion and sedimentation of Britton Reservoir were implemented as part of Burn Area Emergency Response treatments for the 1,910-acre Venture fire. In addition, the Hat Creek Complex of 2009 consumed 11,212 acres, of which 69% of fire resulted in moderate and high soil burn severity. Fire burned 2.5 miles of the riparian corridor of Hat Creek and ash from the fire is expected to reach the stream during this year's storms. Plugging of culverts and bridges along the creek could result from debris jams as a result of burned trees falling into the creek and the accumulation of debris.

The Eagle Lake Sewage Pond project could have a direct impact on water resources by reducing the risk of groundwater contamination from sewage pond leakage or overflow.

Conclusions

Hydrologic resource results and ratings for each indicator measure are summarized in Table 78 according to the following system: a rating of 5 indicates the alternative has the least impact for the specified resource; a rating of 1 indicates the alternative is the most impact for specified resource, a rating of 3 indicates that the effect is neutral.

Table 78 Summary of watershed ratings by Alternative

	Alt 1	Alt 2	Alt3	Alt 4	Alt 5	Alt. Mod. 5
Direct and Indirect Effects of the Prohibition of Cross Country Travel/ Direct and Indirect Effects of Adding Facilities (presently unauthorized routes) to the NFTS (Indicator #1)						
Miles of routes in RCAs (excluding meadows) (including seasonal closures for wet weather and winter recreation)	126 R1	1.3 R4	0 R1	1.7 R4	5.9 R3	6.0 R3
Miles of routes through meadows	58.9 R1	0 R5	0 R5	0 R5	1.3 R4	1.3 R4
Number of miles of unauthorized routes crossing perennial streams.	31 R1	0 R5	0 R5	0 R5	0 R5	0 R5
Direct/Indirect Effects of Changes to the Existing NFTS (Indicator #2)						
Miles of NFTS roads and trails prohibited from motorized use during periods of wet weather, winter recreation and hunting	0 R1	0 R1	0 R1	367 R5	375 R5	375 R5
Qualitative analysis of vehicle class change for a change in objective maintenance level	0 R5	13 R4	0 R5	79 R3	79 R3	79 R3
ML1 to ML2 change is in to the RCAs—meadows, stream crossings and presence of RCAs.	0 R5	0 R5	0 R5	0 R5	0 R5	6 R4
Cumulative Effects of the Three Action Components as a Whole (Indicator #3)						
Number of HFQLG Watersheds with road densities >2.5 miles per square mile (RCAs)**	80(47) R1	46(37) R5	44(37) R5	46(37) R5	48(38) R4	48(38) R4
Average Rating	R2	R4	R4	R5	R4	R4

**Number of watersheds with RCAs having road densities greater than 2.5.

Note: A rating of 5 indicates the alternative has the least impact for the specified resource; a rating of 1 indicates the alternative is the most impact for specified resource, a rating of 3 indicates that the effect is neutral.

Riparian Conservation Objectives Analysis

The SNFPA FSEIS ROD requires that RCO analysis be conducted during environmental analysis for new proposed management activities within CAR's and RCA's (Standard and Guideline #92). There are no unauthorized routes proposed for addition to the NFTS within CARs in the analysis area. Consequently, consistency with the RCOs is an indicator to ensure that goals of the Aquatic Management Strategy are met (USDA FS PSW Region 2004: 32). The RCO Route Analysis is in Appendix F.

Indicator Measure 1: Consistency with Riparian Conservation Objectives 1, 2, 4 and 5 (Alternative 1)

The riparian conservation objectives apply to all routes that pass through RCAs and meadows. Under the No-action Alternative, according to GIS analysis of RCAs by unauthorized routes, 126 miles and 1,419 routes are located within RCAs of streams, springs, reservoirs and lakes, potentially causing severe resource damage. Additionally, there are 58.9 miles consisting of 399 routes in meadows and 31 perennial stream crossings by unauthorized routes.

- **RCO 1**: Under the No-action Alternative, beneficial uses of water bodies would not be protected. Routes in RCAs and perennial stream crossings would increase sedimentation from routes to perennial streams during storm events or from motorized use. Sedimentation from these routes into perennial streams could potentially negatively affect water quality, biological resources and recreational uses, such as fishing and boating.
- **RCO 2, 4 and 5**: Under the No-action Alternative, the geomorphic and biological characteristics of meadows, perennial streams and RCAs would not be protected due to road crossings. Sedimentation from routes would continue to affect pond, lake and stream water quality. Channel morphology and floodplain function would potentially be altered due to the continued existence of routes through riparian zones.

Indicator Measure 1: Consistency with Riparian Conservation Objectives 1, 2, 4 and 5 (Alternative 2)

- **RCO 1**: Under Alternative 2, beneficial uses of water bodies would be protected and enhanced. Prohibition of unauthorized routes through 124.7 miles of RCAs, 58.9 meadows and 31 stream crossings would significantly reduce sedimentation into streams as well as enhance water holding capacity in soils by increasing vegetative input and hence reducing compaction and runoff. This would potentially result in long-term gains in water storage, seasonal availability and quality.
- **RCO 2, 4 and 5**: Under Alternative 2, the geomorphic and biological characteristics of meadows, streams and RCAs would be protected. The reason for this conclusion

is that no perennial streams or meadows would be crossed and 99% of unauthorized routes would be not be in RCAs. The RCAs that have proposed routes in them would be mitigated to minimize effects. Reduced sedimentation would likely result in higher light penetration through surface waters, thereby increasing aquatic primary productivity. This would have a potentially cascading effect by elevating energy available to higher trophic levels including invertebrates, amphibians and fish. Increased water retention by vegetation due to reduced runoff from road channels would likely benefit ecosystem integrity at locations that are currently impaired by the presence of roads and trails.

Indicator Measure 1: Consistency with Riparian Conservation Objectives 1, 2, 4 and 5 (Alternative 3)

- **RCO 1**: Under Alternative 3, beneficial uses of water bodies would be protected and enhanced. Prohibition of motor vehicle traffic on 100% of the existing unauthorized routes would protect 126 miles of RCAs, 58.9 meadows and 31 stream crossings would significantly reduce sedimentation into streams as well as enhance water holding capacity in soils by increasing vegetative input and hence reducing compaction and runoff. This would potentially result in long-term gains in water storage, seasonal availability and quality.
- **RCO 2, 4 and 5**: Under Alternative 3, the geomorphic and biological characteristics of meadows, streams and RCAs would be protected. The reason for this conclusion is that no perennial streams or meadows would be crossed and 100% of unauthorized routes would be not be in RCAs. None of the unauthorized routes would be added to RCAs on the Forest. Reduced sedimentation would likely result in higher light penetration through surface waters, thereby increasing aquatic primary productivity. This would have a potentially cascading effect by elevating energy available to higher trophic levels including invertebrates, amphibians and fish. Increased water retention by vegetation due to reduced runoff from road channels would likely benefit ecosystem integrity at locations that are currently impaired by the presence of roads and trails.

Indicator Measure 2: Consistency with Riparian Conservation Objectives 1, 2, 4 and 5 (Alternative 4)

- **RCO 1**: Under Alternative 4, beneficial uses of water bodies would be protected and enhanced. Prohibition of unauthorized routes through 124.3 miles of RCAs, 58.9 meadows and 31 stream crossings would significantly reduce sedimentation into streams as well as enhance water holding capacity in soils by increasing vegetative input and hence reducing compaction and runoff. This would potentially result in long-term gains in water storage, seasonal availability and quality.

- **RCO 2, 4 and 5**: Under Alternative 4, the geomorphic and biological characteristics of meadows, streams and RCAs would be protected. The reason for this conclusion is that no perennial streams or meadows would be crossed and 99% of unauthorized routes would be not be in RCAs. The RCAs that have proposed routes in them would be mitigated to minimize effects. Reduced sedimentation would likely result in higher light penetration through surface waters, thereby increasing aquatic primary productivity. This would have a potentially cascading effect by elevating energy available to higher trophic levels including invertebrates, amphibians and fish. Increased water retention by vegetation due to reduced runoff from road channels would likely benefit ecosystem integrity at locations that are currently impaired by the presence of roads and trails.

Indicator Measure 2: Consistency with Riparian Conservation Objectives 1, 2, 4 and 5 (Alternative 5 and Modified 5)

- **RCO 1**: Under Alternative 5 and Modified 5, beneficial uses of water bodies would be protected and enhanced. Prohibition of unauthorized routes through 120 miles of RCAs, 57.6 meadows and 31 stream crossings would significantly reduce sedimentation into streams as well as enhance water holding capacity in soils by increasing vegetative input and hence reducing compaction and runoff. This would potentially result in long-term gains in water storage, seasonal availability and quality.
- **RCO 2, 4 and 5**: Under Alternative 5 and Modified 5, the geomorphic and biological characteristics of meadows, streams and RCAs would be protected. The reason for this conclusion is that no perennial streams or meadows would be crossed and 95% of unauthorized routes would be not be in RCAs. The RCAs that have proposed routes in them would be mitigated to minimize effects. Reduced sedimentation would likely result in higher light penetration through surface waters, thereby increasing aquatic primary productivity. This would have a potentially cascading effect by elevating energy available to higher trophic levels including invertebrates, amphibians and fish. Increased water retention by vegetation due to reduced runoff from road channels would likely benefit ecosystem integrity at locations that are currently impaired by the presence of roads and trails.

Compliance with the Forest Plan and Other Direction

Alternative 1 (No-action Alternative)

The No-action Alternative has severe resource damage potential. It would be inconsistent with the Clean Water Act and Porter Cologne Water Act as water quality would be impaired from fine-grained sediment and beneficial uses would not be protected. Additionally, it would be inconsistent with all applicable RCOs in the SNFPA FSEIS ROD. Beneficial uses would

not be protected. Both physical and biological properties of RCAs would continue to be impaired. Cross-country travel would occur in meadows and there is a potential for impairment of hydrologic function of meadows.

Alternative 2 (Modified Alternative)

Alternative 2 has a very low potential for water resources damage. With mitigation, Alternative 2 would be consistent with the Clean Water Act and Porter Cologne Water Act as water quality and beneficial uses would be protected. It would be consistent with all applicable RCOs in the SNFPA FSEIS ROD once mitigation measures have been implemented. Beneficial uses of water bodies are protected under this alternative, as routes that directly and indirectly impair beneficial uses would be added to the NFTS but have seasonal restrictions, monitoring with fail-safes to prevent damages. Physical and biological properties of RCAs would be protected under Alternative 2, as wet weather restrictions would reduce impacts to water resources. Water quality would be somewhat protected as wet weather restrictions are being applied to unauthorized routes added to the NFTS but not to existing roads and trails on the NFTS.

Alternative 3

Alternative 3 has a very low potential for water resources damage. No unauthorized routes would be added to the system and meadows would be best protected with this alternative. It would be consistent with the Clean Water Act and Porter Cologne Water Act as water quality would not be impaired and beneficial uses would be protected.

It would be consistent with all of the applicable RCOs in the SNFPA FSEIS ROD, as no unauthorized routes currently located within RCAs of streams, springs, reservoirs and lakes would be added to the NFTS. Hydrologic and geomorphic processes of RCAs would be protected under Alternative 4.

Alternative 4

Alternative 4 has a very low potential for water resources damage. It would be consistent with the Clean Water Act and Porter Cologne Water Act as water quality and beneficial uses would be protected. No unauthorized routes that cross perennial streams would be added to the NFTS. None of the proposed route additions would be in meadows. Water quality would be protected due to wet weather restrictions and other mitigations that would reduce resource damage to water bodies. Additionally, 80 miles of roads and trails currently on the NFTS would have wet weather restrictions.

It would be consistent with all RCOs in the SNFPA FSEIS ROD once mitigation measures have been implemented. Beneficial uses of water bodies are protected under this alternative, as routes that directly and indirectly impair beneficial uses would be added to the NFTS but have seasonal restrictions to prevent damages. Hydrologic and geomorphic processes of RCAs would be protected under Alternative 4.

Alternative 5 and Modified 5 (Preferred Alternative)

Alternative 5 and Modified 5 have a low potential for water resource damage. It would be consistent with the Clean Water Act and Porter Cologne Water Act as water quality and beneficial uses would be protected with mitigation. No unauthorized routes that cross perennial streams would be added to the NFTS. Within meadows, 1.3 miles of unauthorized routes would be added to the NFTS. These alternatives would be the fourth best at protecting meadows. Water quality would be protected due to wet weather restrictions and other mitigations that would reduce resource damage to water bodies. Eighty-eight miles of roads and trails currently on the NFTS would have new wet weather restrictions.

They would be consistent with all RCOs in the SNFPA FSEIS ROD once mitigation measures have been implemented. Beneficial uses of water bodies are fourth best protected under this alternative, as routes that directly and indirectly impair beneficial uses would be added to the NFTS but have seasonal restrictions to prevent damages. Physical and biological properties of RCAs would be fourth best protected under Alternative 5 and Modified 5, as they have the most proposed route additions added to the NFTS within RCAs.

3.10 Aquatic Biota

Changes between the DEIS and FEIS

Clarified designated critical habitat statement for Shasta crayfish (no critical habitat has been designated for this species). Added miscellaneous clarifying language or text to enhance discussion (e.g. added applicable routes, clarified data source(s) used, further refined analysis based on supplemental information). Corrected numerical errors (e.g. miles under No-action for the Cascades frog, miles of existing unauthorized routes for sensitive amphibian species in Tables), citations (e.g. dates) or added additional citations.

Additionally, the potential effects of the actions under the new Modified Alternative 5 are included in conjunction with Alternative 5. This was done because the effective change of the actions, between Alternative 5 and Modified 5, 1) have no bearing on aquatic resources (e.g. changes in miles available for motor vehicle mixed use), 2) are not measurably different (e.g. for one aquatic habitat indicator potentially affected, there is only a slight increase (0.11 miles) of an unauthorized route proposed for addition) and 3) the action of adding additional miles of unauthorized routes to the NFTS has, at the site specific level, been determined to have no direct or indirect effect on the aquatic resource indicator potentially affected (refer to route card ULA 415 in Appendix A).

Introduction

Aquatic features found on the Lassen National Forest for which aquatic biota are associated with, include both lotic (flowing) and lentic (still) water habitat types. These aquatic features can be perennial (containing water year-round), or seasonal (containing water only for a portion of the year). Aquatic biota associated with the various aquatic features is diverse and can include vertebrate species (animals with backbones such as fish and amphibians) as well as invertebrates (animals without backbones such as insects, mollusks, and crustaceans).

Biota associated with aquatic features is completely or partially dependent on the aquatic environment to fulfill their life history requirements. Examples of species completely dependent on water include fish and mollusks. Examples of species partially dependent on the aquatic environment but need it to complete its life history requirements, include some amphibians and invertebrates. Some amphibians and invertebrates are dependent upon seasonal wetlands (those that are wet in the spring and dry later during the summer).

Aquatic biota considered in the analysis includes ‘general aquatics’, Management Indicator Species (**MIS**) habitat, and federally listed Threatened, Endangered and Forest Service Sensitive (**S**) species (**TES**). The general aquatic biota category considered in this analysis is an all-inclusive category, intended to (programmatically) represent vertebrates and invertebrates. Included are those species that may have special status, such as federally listed species, as well as common and endemic species with no special status. For

purposes of this discussion, the term 'aquatic biota' is used to include species as well as habitat for aquatic species, unless specifically addressed otherwise (e.g., MIS habitat).

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

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 is not 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 with the United States Fish and Wildlife Service (**USFWS**) and the National Marine Fisheries Service concerning TE species under their jurisdiction when an assessment determines there is a potential for an effect of a proposed action on a listed species or designated critical habitat. This assessment is documented in a Biological Assessment (BA) and is summarized or referenced in this Chapter.

Forest Service Manual 2670 (FSM 2005a): 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 cause a 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.

Lassen National Forest Land and Resources Management Plan (LRMP): Current management direction for aquatic and riparian areas is provided in the 1992 Lassen National Forest Land and Resource Management Plan (LRMP) Record of Decision 1993, as amended by the Northwest Forest Plan (**NWFP**) Record of Decision (1994, as amended) and Sierra Nevada Forest Plan Amendment (SNFPA) Record of Decision 2004. Specific to the LNF, the SNFPA ROD (USDA FS PSW Region 2004: 33, 67) also identified application of the long-term strategy for the anadromous watersheds, inclusive of its standards and guidelines. Aquatic Conservation Strategies are found in their entirety in each of the aforementioned amendments to the LRMP; however Table 79 identifies key standards and guidelines applicable to motor vehicle travel management and aquatic resources.

Table 79 Summary of applicable standards and guidelines, by general geographic area, to the Lassen National Forest, Motorized Travel Management Project

General geographic unit (denoted by fourth field sub-basins)	Standards and Guidelines
Lower Pit (portion of), Honey-Eagle Lakes, North Fork Feather River	LRMP Chapter 4, Section F, p. 4-50, D, FC #1, #2, #3; pg 4-51, D FC #6: p. 4-52, D, RC#3; p. 4-53, D, WL #6
	SNFPA Standards and Guidelines (ROD Appendix A, Part D, pg 59 and pgs 62-66) #70; #92, #100, #101, # 102, #103, #116, #118, #122.
Cow, Battle, Butte, Sacramento-Thomes-Elder-Mill, Sacramento-Deer	SNFPA, Long Term Strategy for Anadromous Fish-producing Watersheds in Lassen National Forest Standards and Guidelines (FEIS January 2001 Appendix I, Part 4, pgs 105-107); RF-2, RF-3, RF-4, RF-5 RM-1, RM-2 SNFPA Standards and Guidelines (ROD Appendix A, Part D, pg 62, 65, 66) #92, #118, #122.
	LRMP Chapter 4, Section G, p 4-192, B, FI #3 and #4; Section F, p. 4-52, D, RC#3.
Lower Pit (portion of)	NWFP (ROD Attachment A, Section C pages C32-34); RF-2, RF-3, RF-4, RF-5, RM-1, RM-2

Area of Effect

Effects of the actions are considered at two scales: 1) on-site at the scale of aquatic features and riparian 'management' areas, and 2) at the scale of watersheds. These are described further below.

Geographic Unit

A manageable perspective of the aquatic biota on Lassen NF is presented in terms of geographic units, or 'watersheds' according to the National Hydrography Dataset (**NHD**). Watersheds are areas of land that drain rainfall and snowmelt into a common stream, stream network, or body of water. A system of describing watersheds in terms of scale was developed by the U. S. Geological Survey, dividing them into progressively smaller nested watersheds with the first level being the largest land area relative to watersheds of successive levels. Each level is identified systematically by a hydrologic unit code (**HUC**). The terms HUC, level, and field often are used interchangeably. However, fourth-field watersheds are often called sub-basins, fifth-field refers to watersheds, sixth-field is known as subwatersheds, and seventh-field is called a catchment. One or more of these fields will be used for purposes of aquatic biota analysis, but the field will vary depending on a particular species and/or specific analysis needs.

Analysis Indicators

Riparian Conservation Areas have been selected as a key indicator for assessing potential effects (e.g., direct and/or indirect) to aquatic biota. RCAs are land allocations adjacent to aquatic features (e.g. 300 feet on both sides of a perennial stream) that serve the purpose of

maintaining, protecting, and/or restoring riparian processes important to aquatic and riparian communities, through active and/or passive management of functional processes important to the communities associated with them. RCAs are important because they include the habitat aquatic biota need and utilize in whole or in part. For simplicity, the RCA land allocation widths applied to this analysis (because the widths vary slightly by LRMP amendments) represent an application of the Sierra Nevada Forest Plan Amendment (SNFPA) standards listed in the Record of Decision (USDA FS PSW Region 2004: 42) for Riparian Conservation Areas (RCAs).

Effects Analysis Methodology

Introduction

The project area under analysis is defined in Chapter 1.

Assumptions and other relevant information specific to aquatic biota analysis

Where lands are currently open to cross-country travel, the 'unregulated' use of motor vehicles that cause damage to aquatic biota is not an authorized or permitted action.

Prohibition of cross-country motorized travel would end traffic on existing unauthorized routes and areas beyond the authorized NFTS.

Motor vehicle traffic is the physical, on-the-ground action that could result in an incremental direct and/or indirect effect on aquatic biota.

Indirect effects to aquatic habitat are also occurring from the presence of existing unauthorized routes located in RCAs.

The majority of aquatic species on Lassen NF spend all or significant portions of their life cycles either in water and/or moving through nearby terrestrial/riparian habitats, such as RCAs.

Aquatic biota in stream systems is highly associated with perennials and the closer a road is to a stream, the greater the potential for effects on the streams and the organisms inhabiting it.

RCA widths used in the indicators provide a conservative approach for analyzing the potential risks on aquatic biota.

In RCAs that are physically accessible to vehicles, but not yet traveled on, aquatic biota will benefit from the prohibition of cross-country motorized travel, by eliminating the potential risk for direct and indirect effects; these benefits, however, can only be generalized due to the large scale of the project area.

Effects on aquatic biota from motor vehicles, results in the same effect regardless of motor vehicle type.

There is no difference in potential indirect effects between the existing condition, defined by the No Action alternative, and the short-term (1-year) timeframe, under the action alternatives.

In the long-term (20-year) timeframe, aquatic habitat adjacent to unauthorized routes that are added to the NFTS will remain the same, but for RCAs adjacent to unauthorized routes **not** added to the NFTS, aquatic habitat will improve to some degree as those routes are subsequently actively restored through other NEPA decisions or passively restored.

Habitat connectivity (for stream/riparian areas) will be maintained at current levels in the short term (1 year), but improve in the long term (20 years) as travel ways fade from the landscape.

For all aquatic TES species under all action alternatives, indirect beneficial effects are anticipated over the long term (20 years) from the prohibition of cross-country travel as the risk of causing direct/indirect impacts to the habitat would be reduced.

For all aquatic TES, the area of consideration for each species is based on their distribution and/or potential suitable habitats within their currently known range on Lassen NF as described by the fourth-field sub-basins.

With some of the assumptions and limitations described above, the general analysis provides a relative risk assessment of the action alternatives compared to the No Action alternative.

Data Sources

GIS layers of the following information: aquatic features, riparian/aquatic management areas (e.g., RCAs and CARs), and unauthorized routes.

Federally listed Threatened or Endangered or Forest Service Sensitive Species occurrences (historic or current) by fourth, fifth or sixth-field HUCs: museum records, consultations with researchers, literature, external reports (e.g., Federal Energy Regulatory Commission (**FERC**) studies, California Department of Fish and Game reports), and forest-level and site-specific surveys/assessments.

Indicators

The following measures related to motorized routes were used to assess the risk of potential effects of the alternatives on the RCA indicator for aquatic biota. Because the unauthorized routes fall within the open cross-country travel area and are known features on the landscape under the existing condition, they are used as the measure for the two primary

actions being analyzed: 1) prohibition of cross-country motor vehicle travel and 2) additions to the NFTS. Other actions involving proposed changes to the existing NFTS, permitting motorized mixed use on select NFS roads, and wet weather seasonal restrictions are not addressed further in this analysis by measures. This is because the proposed changes have a neutral and/or slightly beneficial effect (e.g. from wet weather restrictions) on aquatic biota under consideration. The degree of potential beneficial effects from wet weather restrictions on aquatic biota, in general, can be inferred from the soils and/or hydrology input.

Methodology by Action

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

Measures for general aquatics and MIS habitat:

- Miles of existing unauthorized routes in RCAs (general aquatics).
- Number of perennial-stream crossings by existing unauthorized routes (general aquatics and MIS: macroinvertebrate habitat).
- Miles of existing unauthorized routes within RCAs of perennial streams (general aquatics and MIS: macroinvertebrate habitat).
- Miles of existing unauthorized routes within RCAs of perennial lakes (MIS: macroinvertebrate habitat).
- Miles of existing unauthorized routes directly within wet meadow habitat (MIS: pacific treefrog habitat).
- Miles of existing unauthorized routes within RCAs of wet meadow habitat (MIS: pacific treefrog habitat).

Measures for "Focal" Listed Species (Forest Service Sensitive amphibians and ESA listed anadromous fish):

- Miles of existing unauthorized routes in RCAs of sixth-field subwatersheds that contain aquatic features potentially used by FS Sensitive amphibian species (currently and/or historically) and may contain potential suitable habitat.
- Miles of existing unauthorized routes within Critical Aquatic Refuges (applicable to the Cascades frog only).
- Miles of existing unauthorized routes in RCAs in fourth-field sub-basins occupied by federally listed anadromous fish.
- Miles of existing unauthorized routes in RCAs adjacent to Designated Critical Habitat in fourth-field sub-basins occupied by federally listed anadromous fish within the project area.

Direct/Indirect Effects of adding unauthorized routes to the NFTS

Measures for general aquatics and MIS habitat:

- Miles of existing unauthorized routes available to motor vehicle travel in RCAs and proposed for addition to the NFTS (general aquatics).
- Number of perennial-stream crossings by existing unauthorized routes proposed for addition to the NFTS (general aquatics and MIS: macroinvertebrate habitat).
- Miles of existing unauthorized routes available to motor vehicle travel within perennial stream RCAs and proposed for addition to the NFTS (general aquatics and MIS: macroinvertebrate habitat).
- Miles of existing unauthorized routes available to motor vehicle travel in perennial lake RCAs and proposed for addition to the NFTS (MIS: macroinvertebrate habitat).
- Miles of existing unauthorized routes available to motor vehicle travel directly within wet meadow habitat and proposed for addition to the NFTS (MIS: pacific treefrog habitat).
- Miles of existing unauthorized routes available to motor vehicle travel within RCAs of wet meadow habitat and proposed for addition to the NFTS (MIS: pacific treefrog habitat).

Measures for "Focal" Listed Species (Forest Service Sensitive amphibians and ESA listed anadromous fish):

- Miles of existing unauthorized routes proposed for addition to the NFTS in RCAs of sixth-field watersheds that contain aquatic features potentially used by FS sensitive amphibian species (currently and/or historically) and may contain potential suitable habitat.
- Miles of existing unauthorized routes proposed for addition to the NFTS in Critical Aquatic Refuges (applicable to the Cascades frog only).
- Miles of existing unauthorized routes in RCAs and proposed for addition to the NFTS in fourth-field sub-basins occupied by federally listed anadromous fish.
- Miles of existing unauthorized routes proposed for addition to the NFTS in RCAs adjacent to Designated Critical Habitat in fourth-field sub-basins occupied by federally listed anadromous fish within the project area.

Affected Environment and Environmental Consequences – General

Affected Environment – General

Three different geomorphic provinces meet within Lassen NF and contribute to its great diversity in aquatic biota: the Sierra Nevada Mountains, the Southern Cascade Mountains, and the Modoc Plateau. Elevations range from 900 feet to 8,677 feet. Topography varies from deep river canyons to vast sagebrush flats (interspersed with wet and dry meadows) to sharp rocky peaks. Annual precipitation ranges from 16 to 90 inches. Summers are hot and dry, while winters are cool and wet with rain in the foothills and snow at higher elevations.

Lakes and streams on Lassen NF are equally diverse. Eagle Lake, the second largest natural lake entirely within California, is a closed basin that lies near the junction of the three provinces. Lakes Almanor and Britton are two large reservoirs in the Feather River and Pit River watersheds, respectively. In addition, there are numerous small alpine and pothole lakes that dot the landscape, although many are located in the Caribou and Thousand Lakes Wildernesses.

Lands east of the Cascades are relatively dry and drain eastward through two main streams, Pine Creek (to Eagle Lake) and the Susan River (to Honey Lake). The dry lands of the Modoc Plateau to the north drain westward through the Pit River, a tributary of the Sacramento River. In these drier areas, there are natural seasonal flowing streams and ponds as well as developed stock ponds, wildlife ponds, and small reservoirs designed to capture limited stream flow and snow runoff. Many of these ponds and reservoirs dry up each season as water slowly evaporates or percolates down through the porous substrate. The west side of Lassen NF is much wetter and has many streams which flow to the Sacramento River. These include Battle Creek, Antelope Creek, Mill Creek, Deer Creek, Butte Creek, and the North Fork of the Feather River.

The Lassen National Forest includes portions of eight fourth-field sub-basins (Map 20) that drain to the Sacramento River: Lower Pit, Cow, Battle, Sacramento-Red Bank, Sacramento-Thomes-Elder-Mill, Sacramento-Deer, Butte, and the North Fork Feather. A portion of one other sub-basin drains into the interior Lahonton region: Honey-Eagle Lakes.

General Aquatic Resources, Management Indicator Species, and Federally listed Threatened, Endangered, and Forest Service (FS) Sensitive species at the Forest Scale

General aquatic biota.

This category represents the following major groupings: fish, amphibians, and invertebrates (this group includes mollusks as well as crustaceans and insects). On Lassen NF, there are approximately 33 fish species, 13 amphibians (Koo et. al.2004) and more than 31 species of mollusks (Brim Box 2002, Frest and Johannes 2007). All aquatic species of special status listing (e.g. TES) on Lassen NF fall within these three groupings.

The general aquatic biota category is used in this analysis as a 'programmatic measure' to better evaluate, spatially, the potential effects of the proposed actions across the larger project area. This measure was selected because the range of TES species (which require individual species level analysis) are more narrowly distributed. This all-inclusive category provides a useful (but not necessarily accurate) comparison of the differences between the alternatives.

Management Indicator Species (MIS).

The aquatic-associated MIS include the pacific treefrog and aquatic macroinvertebrates. Habitat for these species/assemblages is analyzed because of presence of their habitat across the forest ("wet meadow" and perennial lacustrine (lakes)/streams, respectively).

Federally listed Threatened (FT), Endangered (FE), and FS Sensitive species (TES)

A total of 16 aquatic TES species are considered in this analysis. Six of the sixteen TES species are analyzed in more detail because there is a higher likelihood of potential effects (to them and/or their habitat) from the actions proposed. For example, for the six species, their distribution is known on the forest (historically and/or currently) and/or potential suitable habitat exists in proximity to unauthorized routes proposed for addition to the NFTS. The remaining 10 TES species are also addressed towards the end of this section (see Table 94) but in less detail because there is no likelihood for potential direct or indirect effects from the actions proposed.

The aquatic biota considered initially for this analysis and their relative distributions/associations within the nine sub-basins (where applicable) is shown in Table 80 and Table 81.

Table 80 Existing environment: account of general aquatic resources and Management Indicator Species on Lassen National Forest

Aquatic Biota	Species/Taxa Distribution at Lassen NF Scale	Focal Habitat Associations
General Aquatics	Forestwide	Lentic and lotic aquatic features including perennial and seasonal flow regimes
MIS macroinvertebrates (Habitat)	Forestwide but predominately on wetter 'westside'	Perennial lacustrine (lake) and stream habitat
MIS pacific treefrog (Habitat)	Forestwide	Wet meadow habitat

Six "focal" TES species addressed in greater detail in this section are indicated as such in Table 81.

Table 81 Existing Environment: Account of aquatic TES species known to occur, currently and/or historically, within fourth-field sub-basins that encompass (partially) the Lassen NF and, a general account of their habitat

(The six species analyzed in greater detail are identified by the shaded rows).

Aquatic TES Species	Species Account: Known occurrence (or range) currently/historically within fourth-level sub-basins[a]	General Habitat Account and Special Habitat Considerations
Central Valley (C.V.) spring-run Chinook Salmon (FT) *(Oncorhynchus tshawytscha)*	Cow[b] Battle[b] Butte[b] Sacramento-Thomes-Elder-Mill Sacramento-Deer	Moderately deep streams with cool summer 'holding' pools and coarse gravel and rubble. There is Designated Critical Habitat (DCH) for this species and Essential Fish Habitat (EFH) designated for Chinook salmon on Lassen NF.
C.V. Steelhead (FT) (*Oncorhynchus mykiss)*	Sacramento-Thomes-Elder-Mill Sacramento-Deer Buttb Battleb Cowb	Moderately deep streams with coarse gravel and rubble. There is Designated Critical Habitat for this species on Lassen NF.
Shasta Crayfish (FE) (*Pacifastacus fortis*)	Lower Pitb	Cold, clear, spring-fed headwaters characterized by clean volcanic cobbles and boulders on top of gravel or sand (USDI FWS 1998). No critical habitat has been designated for this species. (USDI FWS 2009)
California Red-legged frog (FT) (*Rana aurora draytonii*)	Sacramento-Red Bankb	Western foothill drainages of Sierra Nevada (Shasta, Tehama, Butte, and Plumas Counties) with ponds, stock ponds, pools, and backwater areas associated with streams (USDI FWS 2002). Known up to 5,000 feet elevation but, range-wide, records of this species are primarily at lower elevations (< 3,500 feet). There is no Designated Critical Habitat for this species on Lassen NF.
Fall-run Chinook salmon (S) (*Oncorhynchus tshawytscha*)	Sacramento-Thomes-Elder-Millc Sacramento-Deerc	Low-elevation streams with coarse gravel and rubble.
Cascades frog (S) (*Rana cascadae*)	Lower Pit Battle Sacramento-Thomes-Elder-Mill Sacramento-Deer Butte N.F. Feather Cowc	Primarily higher-elevation (> 4,500 feet) species. Common in small pools adjacent to streams flowing through subalpine meadows. Also inhabits fens, seasonally-flooded, forested swamps, small lakes, ponds, and marshy areas adjacent to streams (Leonard et al. 1993).
Sierra Nevada yellow-legged frog (S) (*Rana sierrae)*	Butte North Fork Feather	Primarily higher-elevation (>4,500 feet) species. Lakes, ponds, and streams. In some areas of Lassen NF, species known historically to be sympatric with the Cascades frog (Zweifel 1955).

Aquatic TES Species	Species Account: Known occurrence (or range) currently/historically within fourth-level sub-basins[a]	General Habitat Account and Special Habitat Considerations
Foothill yellow-legged frog (S) (*Rana boylii*)	Lower Pit Battlec Sacramento-Thomes-Elder-Mill Sacramento-Deer Buttec North Fork Featherc	Primarily at low–mid elevation (< 4,500 feet) in low to moderate gradient, cobble-bottomed open streams and rivers in the western foothills.
Hardhead (S) (*Mylopharodon conocephalus*)	Lower Pit Sacramento-Thomes-Elder-Mill Sacramento-Deer	Large low- to mid-elevation drainages to the Sacramento River (Moyle 2002).
Eagle Lake Rainbow trout (S) (*Oncorhynchus mykiss aquilarum*)	Honey-Eagle Lakes	Species endemic to the Eagle Lake watershed (Moyle 2002). Habitat includes lentic (Eagle Lake) and lotic systems (primarily Pine Creek).
California Floater (S) (*Anodonta californiensis*)	Lower Pit c Honey-Eagle Lakesc	Slow, perennial rivers and large lakes with mud–sand substrate, at low elevation (Taylor 1981, Frest and Johannes 1995a).
Great Basin Ramshorn (S) (*Helisoma newberryi newberryi*)	Lower Pit Honey-Eagle Lakes	Large lakes and rivers, large spring sources, and spring-fed creeks with cold, well-oxygenated water, mud substrate, and slow water velocities (Frest and Johannes 1993, 1995a).
Montane Peaclam (S) (*Pisidium ultramontanum*)	Lower Pit Honey-Eagle Lakes	Large perennial water bodies (slow, spring-influenced rivers, streams, lakes, and spring pools) with sand or gravel substrate (Frest and Johannes 1993, 1995a).
Scalloped Juga (S) (*Juga occata*)	Lower Pit	Large rivers at low elevations, with swift, unpolluted, cold, well-oxygenated waters with cobble/boulder substrates (Frest and Johannes 1993, 1995b).
Topaz Juga (S) (*Juga acutifilosa*)	Lower Pit Honey-Eagle Lakes	Perennial springs and outflows with unpolluted, cold, well-oxygenated water and stable gravel/boulder substrate (Frest and Johannes 1993, 1995b).
Nugget pebblesnail (S) (*Fluminicola seminalis*)	Lower Pit	Rivers at low elevations with cool, clear, flowing water and gravel–cobble substrate (Furnish and Monthey 1998).

[a]Sub-basins defined by National Hydrography Dataset; [b]Species distribution is off Lassen NF lands in the sub-basin but is noted due its Federal status and presence (currently or historically) 'downstream' of Lassen NF lands; [c]Species is in the sub-basin, but its distribution is not on NFS lands administered by the Lassen. Note: FT = Federally listed under the Endangered Species Act as Threatened, FE = Federally listed under the Endangered Species Act as Endangered, and S = Pacific Southwest Region Forest Service Sensitive Species.

Environmental Consequences – General

General Direct and Indirect Effects by Action 1 and Action 2:

The following serves as a general overview of the potential risks (or kinds of effects) that can occur to aquatic biota from the two primary discreet actions proposed and analyzed under each of the alternatives.

Action 1: Prohibition of Cross-country Motor Vehicle Travel:

The action of prohibiting cross-country travel will not, in and of itself, result in any direct or indirect effects to the aquatic biota because it is not an action that results in ground-disturbing activities. It is an action, however, that when implemented and followed, would be beneficial to aquatic biota by eliminating their susceptibility to the potential risks of direct and/or indirect effects caused by motor vehicles. Examples of the kinds of potential effects that can be eliminated by the action are briefly described below.

Direct Effects:

Use of motor vehicles (once or repeatedly) in the aquatic environment (e.g., streams, lakes, wetlands, vernal pools, and springs) can cause mortality and/or injury to aquatic organisms through direct contact of the vehicle with the organism. Organisms that are not mobile (e.g., mollusks) are more susceptible to direct impacts than are more mobile organisms (e.g., fish or amphibians). Susceptibility to direct effects, however, is also dependent on life history stage of a particular organism and its habitat association. For example, egg masses of a frog are more susceptible to direct impacts because they cannot move, whereas the adult stage of a frog can move, both in water and on land (but generally very near water).

Existing unauthorized routes that cross streams or intersect water bodies (e.g., traverse through seasonal wetlands), have the potential to provide a direct linkage between a motor vehicle and aquatic organisms residing in or near the water. At these locations, aquatic organisms are more susceptible on a recurring basis because the routes exist on the landscape and are therefore readily available for travel.

Indirect Effects:

Indirect effects are caused by the action and are later in time, or further removed in distance, but are still reasonably foreseeable. Changes to riparian vegetation, channel morphology and/or microhabitat conditions are examples of effects that can occur from motor vehicle use in the aquatic environment. These effects can indirectly affect aquatic organism distribution and abundance due to alterations of the habitat. The degree of potential effects differs and depends on frequency of motor vehicle travel use (e.g., occurs one time or is recurring). The degree of potential effects is also influenced by the type of water body the motor vehicle comes in contact with. For example, wet riparian areas are more susceptible to damage than an area or channel armoured with rocks that is dry.

In general, aquatic habitat can be negatively affected if there is damage to and/or direct loss of riparian vegetation. Riparian vegetation is important for bank stability (channel

morphology), providing shade, regulating water temperatures, and providing hiding cover for organisms. Aquatic habitat can also be negatively affected by increased sediment loading from accelerated erosion induced by motor vehicles. Increased sediment loading can reduce habitat available for aquatic organisms by filling in pools. Shallow pools provide less cover than deep pools and limit the available space during low flow or drought conditions. Increased sediment can also reduce the available space around gravels (embeddedness). When finer material increases in a stream-type water body and 'embeds' around larger material such as gravel, space is reduced thereby decreasing the quantity and quality of habitat for aquatic taxa such as macroinvertebrates and fish.

Action 2: Adding unauthorized roads or trails to the NFTS:

Direct and Indirect Effects

The addition of unauthorized roads or trails (hereafter referred to as routes) to the NFTS will not, in and of itself, result in any direct or indirect effects to the aquatic resources because it is not an action that results in a ground-disturbing activity. Routes that are added to the NFTS, however, can have negative indirect effects on aquatic biota by their mere existence. Potential effects of routes will vary based on: 1) watershed characteristics and geomorphology (e.g., slope and soil type, land use, etc.), 2) proximity to a stream, and 3) stream characteristics (ability of the stream to transport sediment from the system) (McCaffery et al. 2007). Thus, the following serves as a generalized discussion of effects of routes on aquatic biota.

A synthesis of road impact information can be found in Forest Roads: A Synthesis of Scientific Information (Gucinski et al. 2001). Some of the key findings from this document that relate to travel management include both physical and biological effects and are quoted below.

Physical effects include:

> "Roads affect geomorphic process by four primary mechanisms: accelerating erosion from the road surface and prism itself by both mass and surface erosion processes; directly affecting channel structure and geometry; altering surface flowpaths, leading to diversion or extension of channels onto previously unchannelized portions of the landscape; and causing interactions among water, sediment, and woody debris at engineered road–stream crossings."

> "Roads have three primary effects on water: they intercept rainfall directly on the road surface and road cutbanks and intercept subsurface water moving down the hillslope; they concentrate flow, either on the surface or in an adjacent ditch or channel; and they divert or reroute water from flowpaths that it would otherwise take if the road were not present."

These physical effects lead to the following biological effects:

"Increased fine-sediment composition in stream gravel has been linked to decreased fry emergence, decreased juvenile densities, loss of winter carrying capacity, and increased predation of fishes."

"The effects of roads are not limited to those associated with increases in fine-sediment delivery to streams; they can include barriers to migration, water temperature changes, and alterations to streamflow regimes."

"Road–stream crossings have been shown to have effects on stream invertebrates. Hawkins et al. (2000) found that the aquatic invertebrate species assemblages (observed versus expected based on reference sites) were related to the number of stream crossings above a site."

"Several studies at broad scales document aquatic habitat or fish density changes associated with road density or indices of road density."

Cumulative Effects:

According to the Council on Environmental Quality 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). As explained in Chapter 3.1, Cumulative Effects, the analysis of past actions is based on current environmental conditions. Current environment conditions are, in part, defined by the existing road density. A cumulative watershed effects (**CWE**) analysis using road density has been conducted for sixth field sub-watersheds and perennial stream RCAs within the project area, as a proxy for the risk of cumulative watershed effects under each alternative. The results of this evaluation are available in the Hydrology Report section. Ongoing and reasonably foreseeable future actions, for consideration of potential contributions to cumulative effects, are listed in Appendix C.

As mentioned previously, accelerated erosion and sediment deposition are of particular concern to the aquatic environment and both have been associated with roads in past research (USDA FS and US DOT 2005). Federal or non-Federal activities that collectively may contribute excessive fine sediment or otherwise alter water quality into water bodies include, but are not limited to, timber harvest, road construction, skid trails, recreation, livestock grazing, prescribed fire, and watershed restoration (road decommissioning). All ongoing actions that have been analyzed under NEPA and all future actions that require analysis under NEPA have standards (*e.g.*, Best Management Practices) and project-specific integrated design features that help minimize the potential effects on aquatic biota on a project-by-project basis.

Alternative 1 – No Action

Direct/Indirect Effects (General Aquatic Biota):

Under the No Action Alternative, aquatic biota is at a higher risk for direct/indirect effects from motorized travel when compared to the action alternatives (Table 82). This is because aquatic biota would be more vulnerable to potential impacts from motor vehicles traveling cross-country and/or using existing unauthorized routes that are poorly located. Potential impacts to aquatic biota are most likely to occur in aquatic features and/or in the RCAs on lands currently open and accessible to motorized travel. Accessible lands considered here include existing unauthorized routes as well as lands not yet traveled on but physically available to motorized use. The potential risk to aquatic biota in open, accessible (but not yet traveled on) areas is difficult to quantify, therefore, the risk of effects from existing unauthorized routes are used as the primary indicator of risk for each of the aquatic groupings (general aquatics, MIS habitat, and focal TES) addressed further below.

There is some risk of direct effects on aquatic biota highly associated with water with an estimated 31 crossings of perennial channels by unauthorized routes. The risk for potential indirect effects is reflected in Table 82 (under No Action) where motor vehicle use is expected to continue on the existing estimated miles of unauthorized routes in RCAs as shown individually for all aquatic biota groupings.

Long-term time frame: 20 years. With a projected increased use of motor vehicles (especially OHVs) on NFS lands, the risk of direct and indirect effects to aquatic biota would likely increase with continued use on lands open to cross-country motor vehicle travel.

Cumulative Effects (General Aquatic Biota):

Road density and motorized use of existing unauthorized routes would remain unchanged. Continuation of cross-country travel by motor vehicles would continue. With continuation of cross-country travel, new routes would be expected to expand within the project area. With this potential increase in routes, there is an increased risk for negative direct and indirect effects to occur to aquatic biota, including TES species.

Action Alternatives 2, 3, 4, 5 and Modified 5:

Effects under all action alternatives are essentially the same when aquatic biota are considered as a whole.

This is because a) there is only a slight difference in the total acres proposed to be prohibited from cross-country travel (Action 1) and b) there is only a slight increase of 0.06 % in the total miles of unauthorized routes in RCAs proposed for addition to the NFTS (Action 2) under the highest risk action alternatives (Alternatives 5/Modified 5) vs. the no risk action alternative (Alternative 3) when total miles of unauthorized routes in RCAs are considered overall.

Direct/Indirect Effects (General Aquatic Biota):

Under the action alternatives, the prohibition of cross-country travel by motor vehicles would be beneficial to aquatic biota by eliminating their susceptibility to the potential risks of direct and/or indirect effects that can be caused by motor vehicles. Using the miles of unauthorized routes in RCAs as an indicator of the potential benefits to aquatic biota from prohibiting motorized travel on unauthorized routes, there would be a net reduction of approximately 188, 192, 189 and 181 miles available to motor vehicles under Alternatives 2, 3, 4, and 5/Modified 5, respectively (see Table 83 and Table 84).The risk of direct and indirect effects to aquatic biota is greatest under Alternatives 5/Modified 5 with the addition of approximately 11.18 miles (Alt 5)/11.29 miles (Modified 5) of unauthorized routes in RCAs proposed to be added to the NFTS followed by Alternative 2 with the addition of approximately 3.70 miles. Under these alternatives, however, the risk for potential adverse effects is considered low. In terms of direct effects, the risk is low because there are no unauthorized routes proposed for addition that cross any perennial drainages; without crossings, there is no potential to have direct effects on aquatic biota that reside in perennial water bodies. Some unauthorized routes proposed for addition to the NFTS are, however, located in RCAs. Thus, there is the potential for direct interface between motor vehicles and aquatic biota, such as frogs, toads and/or newts that can move in and out of water. Because these organisms are mobile and most aquatic species on the Lassen are more closely tied to the near-stream riparian area during the time motor vehicle use would be highest (*i.e.*, in the summer season), the risk is considered low.

In terms of indirect effects, there is some risk of indirect effects occurring to aquatic biota from motorized travel on routes that currently exist in RCAs. The risk is also considered low because most routes selected for addition to the NFTS system are, by their existing condition or management action, low risk to aquatic biota. Examples of the kinds of routes that are low risk to aquatic biota include: designations that are limited to the outer edges (non-riparian areas) of RCAs, routes that have minimal or no erosion, and/or routes in RCAs that are associated with flat, intermittent water features.

All action alternatives would lead to an improvement over the current condition in the long term (20 years) by reducing the likelihood of route proliferation into aquatic areas and prohibiting motor vehicle use on unauthorized roads in the RCAs that currently exist. In the years following the decision, actions would occur to reduce any adverse impacts (if present) from these routes. Possible treatments range from allowing a road to revegetate naturally, to implementing possible future NEPA decisions which include active treatments (such as decommissioning and recontouring) to correct existing problems (like sedimentation). Routes may also be added to the NFTS through subsequent project area planning, but additional environmental analysis would be conducted at that time.

Cumulative Effects:

Overall, all action alternatives are expected to eliminate the risk of additional impacts to aquatic biota into the future and provide the opportunity to improve conditions forestwide by reducing and/or eliminating, over the long term, ongoing impacts that may be occurring from existing unauthorized routes and use of these routes (Table 84). When the action alternatives are compared to the No Action alternative, the risk of additional impacts from motorized travel on aquatic biota is reduced under the action alternatives because motorized use would be restricted to designated NFS roads and NFS trails. When considering the action of not adding unauthorized routes to the NFTS, the magnitude of potential improvement differs little between action alternatives. However, based on the projected net change in the indicator values of the action alternatives when compared to the No Action alternative, Alternative 3 provides the greatest opportunity for improvement (Table 84).

Table 82 Comparison of *Action 1*, prohibiting cross-country motor vehicle travel, between Alternatives 1, 2, 3, 4, 5 and Modified 5

Indicators – Aquatic Biota. Action 1. Direct/indirect effects of the prohibition of cross-country motor vehicle travel.	Indicator values for each Alternative (values are approximations)	
	Alternative 1 (No Action) (= current condition)	Alternatives 2, 3, 4, 5 and Modified 5 (Action Alternatives)
Miles of existing unauthorized routes available to motor vehicle travel in RCAs (measure for general aquatics)	191.91[a]	0
Number of perennial-stream crossings by existing unauthorized routes available for motor vehicle travel (measure for general aquatics and MIS: macroinvertebrate habitat)	31 [a]	0
Miles of existing unauthorized routes available to motor vehicle travel within perennial stream RCAs (measure for general aquatics and MIS: macroinvertebrate habitat)	37.54	0
Miles of existing unauthorized routes available to motor vehicle travel in RCAs of perennial lakes (measure for MIS: macroinvertebrate habitat)	20.95 [a]	0
Miles of existing unauthorized routes available to motor vehicle travel directly within wet meadow habitat (measure for MIS: pacific treefrog)	12.95	0
Miles of existing unauthorized routes available to motor vehicle travel within RCAs of wet meadow habitat (measure for MIS: pacific treefrog)	29.92	0
Miles of existing unauthorized routes available to motor vehicle travel in RCAs of sixth-field subwatersheds that contain aquatic features potentially used by FS Sensitive amphibian species (currently and/or historically) and may contain potential suitable habitat.	30.99[b]	0
Miles of existing unauthorized routes available to motor vehicle travel within Critical Aquatic Refuges	4.42	0
Miles of existing unauthorized routes available to motor vehicle travel in RCAs in fourth-field sub-basins occupied by federally listed anadromous fish	14.32	0
Miles of existing unauthorized routes available to motor vehicle travel in RCAs adjacent to Designated Critical Habitat in fourth-field sub-basins occupied by federally listed anadromous fish within the project area	1.89	0

[a]Unauthorized route miles and numbers of crossings presented are not totally accurate and may be overestimated because of mapping accuracy levels in GIS data layers. For example, stream crossings indicated in the table might not all be true stream crossings, because any route segment that comes close enough to the stream for it to be considered a crossing by the computer will be counted. These numbers do, however, indicate the potential for a road impact (because of proximity), though not necessarily a direct impact. While absolute route mileages and number of stream crossings in this analysis are not necessarily accurate (for the reasons just described) the relative values within the alternatives are comparable because the same data were used for each alternative. Under the action alternatives, however, site specific knowledge was available in some cases and used to validate and further refine numbers under the alternatives (i.e., some stream crossing identified as such from the GIS query are known to not be crossings, such as UBB860, and some lakes identified as perennial are actually intermittent lakes and/or reservoirs); [b]Total miles consider all three FS sensitive amphibian species but miles do not represent a cumulative total because in some subwatersheds, species overlapped (e.g. both Cascades frog and Sierra Nevada yellow-legged frog co-occurred historically in Upper West Branch Feather River) and thus, miles were only counted once in the total; Source: GIS query, March 2009 and updated for Modified 5 October 2009).

Table 83 Comparison of *Action 2*, adding unauthorized roads or trails to the NFTS, between all action Alternatives: 2, 3, 4, 5 and Modified 5

Indicators – Aquatic Biota Action 2. Direct/Indirect Effects of adding unauthorized routes to the NFTS.	Indicator values for each action Alternative (values are approximations)			
	Alt. 2	Alt 3	Alt. 4	Alts. 5/Mod 5 [a]
Miles of existing unauthorized routes in RCAs proposed for addition to the NFTS (measure for general aquatics)	3.70	0	2.51	11.18 /11.29
Number of perennial-stream crossings by existing unauthorized routes proposed for addition to the NFTS. (measure for general aquatics and MIS: macroinvertebrate habitat)	0	0	0	0
Miles of existing unauthorized routes within perennial stream RCAs and proposed for addition to the NFTS (measure for general aquatics and MIS: macroinvertebrate habitat)	0.37	0	0.87	2.33
Miles of existing unauthorized routes within RCAs of perennial lakes proposed for addition to the NFTS (measure for MIS: macroinvertebrate habitat)	0.19	0	0.12	0.98/1.09
Miles of existing unauthorized routes directly within wet meadow habitat proposed for addition to the NFTS (measure for MIS: pacific treefrog)	0	0	0.02	0.86
Miles of existing unauthorized routes within RCAs of wet meadow habitat proposed for addition to the NFTS (measure for MIS: pacific treefrog)	0.12	0	0.35	1.66
Miles of existing unauthorized routes proposed for addition to the NFTS in RCAs of sixth-field watersheds that contain aquatic features potentially used by FS sensitive amphibian species (currently and/or historically) and may contain potential suitable habitat	0.66	0	0.89	2.84
Miles of existing unauthorized routes proposed for addition to the NFTS in Critical Aquatic Refuges	0	0	0	0
Miles of existing unauthorized routes proposed for addition to the NFTS in RCAs in fourth-field sub-basins occupied by federally listed anadromous fish	0.72	0	0.23	0.85
Miles of existing unauthorized routes proposed for addition to the NFTS in RCAs adjacent to Designated Critical Habitat in fourth-field sub-basins occupied by federally listed anadromous fish within the project area	<0.01	0	0.48	0.48

[a] Only two indicators values differ between Alternative 5 and Modified 5 and these are shown as separate values in the column; the remaining indicator values are the same under both Alternatives and therefore only one value is shown. Source: GIS query, March 2009 and updated for Modified 5 October 2009.

Table 84 Projected net change of indicator values under the action alternatives (2, 3, 4, 5 and Modified 5) from current condition (No Action) for both Action 1 (prohibiting cross-country travel) and Action 2 (adding unauthorized routes to the NFTS)

Indicators – Aquatic Biota Actions 1 and 2 combined	Projected net change of each indicator value from the current condition/Alt. 1			
	Alt. 2	Alt. 3	Alt. 4	Alts. 5/Modified 5 [a]
Net change in miles of existing routes in RCAs available for motorized use (measure for general aquatics)	- 188.21	- 191.91	- 189.40	- 180.73/-180.62
Net change in number of perennial-stream crossings by unauthorized routes (measure for general aquatics and MIS; macroinvertebrate habitat))	- 31	- 31	- 31	- 31
Net change in miles of routes available for motorized use within perennial stream RCAs (measure for measure for general aquatics and MIS; macroinvertebrate habitat)	- 37.17	- 37.54	- 36.67	- 35.21
Net change in miles of routes available for motorized use in RCAs of perennial lakes (measure for MIS; macroinvertebrate habitat)	- 20.76	- 20.95	- 20.83	- 19.97/-19.86
Net change in miles available for motorized use directly within wet meadow habitat (measure for MIS; pacific treefrog)	- 12.95	- 12.95	-12.93	- 12.09
Net change in miles of routes available for motorized use within RCAs of wet meadow habitat (measure for MIS; pacific treefrog)	- 29.80	- 29.92	- 29.57	- 28.26
Net change in miles of routes available for motorized use in RCAs of sixth-field watersheds that contain aquatic features potentially used by FS sensitive amphibian species (currently and/or historically) and may contain potential suitable habitat	- 30.33	- 30.99	-30.10	- 28.15
Net change in miles of routes available for motorized use in Critical Aquatic Refuge	- 4.42	- 4.42	- 4.42	- 4.42
Net change in miles of routes available for motorized use in RCAs in fourth-field watersheds occupied by federally listed anadromous fish	- 13.60	- 14.32	- 14.09	- 13.47
Net change in miles of routes available for motorized use adjacent to Designated Critical Habitat in fourth-field watersheds occupied by federally listed anadromous fish within the project area	- 1.89	- 1.89	- 1.41	- 1.41

[a] Only two indicators values differ between Alternative 5 and Modified 5 and these are shown as separate values in the column; the remaining indicator values are the same under both Alternatives and therefore only one value is shown. Source: Table 82 and Table 83

Affected Environment and Environmental Consequences – MIS

Aquatic Macroinvertebrate Habitat

Affected Environment

Using the NHD waterbody layer for perennial lakes and streams, there are approximately 31 crossings of perennial streams from existing unauthorized routes and approximately 37 miles of unauthorized routes within perennial stream RCAs. Additionally, there are approximately 21 miles of unauthorized routes within 39 perennial lake RCAs.

Environmental Consequences

Habitat factors for macroinvertebrate analysis include flow, sedimentation, and water surface shade (USDA FS PSW Region 2008b).

Effects from the actions on three processes were considered:

- Reduced flows – As a result of changes in flow regime, lower flows could result in a permanent or temporal drying of existing habitat.
- Increased sedimentation – An increase in delivery of sediment to channels could eliminate sensitive taxa and reduce taxonomic richness.
- Changes in temperature regime – Temperature changes resulting from canopy removal or changes in flow regime could affect timing of life history activities, such as breeding and migration, or affect abundance and distribution of sensitive taxa.

For Action 2 (unauthorized route additions to the NFTS), there would be no new ground disturbance or vegetation proposed for removal, therefore, the primary concern of potential effects discussed is related to risk of increases in sediment.

Alternative 1 – No Action

Direct/Indirect Effects (Aquatic macroinvertebrate habitat):

Because unauthorized routes are generally not engineered facilities, all routes identified as stream crossings are assumed to pass directly through the streambed and thus provide the opportunity for direct impacts to macroinvertebrate habitat from motorized travel. It is assumed that there would be no direct impact to perennial lake habitat because perennial lakes are not likely to have routes directly associated with these (deeper) water features (any routes associated with perennial lake RCAs, however, would be captured under indirect effects).

Unauthorized routes, as well as continued motorized travel on these routes, in and/or in close proximity to water features (e.g., streams), could be contributing to possible indirect effects, with the risk primarily from increases in sediment to aquatic macroinvertebrate habitat. Where sedimentation is occurring, indirect effects to habitat would persist under the No Action alternative over the short and long term. Potential influences of the existing routes on flow regimes or temperature would remain unchanged.

Cumulative Effects (Aquatic macroinvertebrate habitat):

Road density and motorized use of existing unauthorized routes would remain unchanged. Continuation of cross-country travel by motor vehicles would continue. With continuation of cross-country travel, new routes would be expected to expand within the project area. New stream crossings (and direct effects to macroinvertebrate habitat) would be expected to increase. With the potential increase in routes, there is an increased risk for additional negative direct and indirect effects to MIS (aquatic macroinvertebrate) habitat.

Alternative 2

Direct/Indirect Effects (Aquatic macroinvertebrate habitat):

There are approximately 31 crossings of perennials streams by unauthorized routes that would be prohibited from motorized travel; no unauthorized routes are proposed for addition to the NFTS that cross perennial streams. Because there would be no stream crossings, there would be no direct effects to macroinvertebrate habitat.

Under this alternative, approximately 20.76 miles of unauthorized routes within 36 perennial lake RCAs, as well as approximately 37.17 miles of unauthorized routes within perennial stream RCAs, would be prohibited from motorized travel. Because no motorized travel would be permitted, beneficial effects on macroinvertebrate habitat (e.g., decrease in sediment to stream channels) would be likely because sites where indirect effects are occurring would be improved from current conditions over the long term.

A total of approximately 0.37 miles of unauthorized routes in perennial stream RCAs and 0.19 miles in perennial lake RCAs are proposed for addition to the NFTS (total miles in lake RCAs is actually lower, however (at 0.04 miles) because 0.15 miles identified as routes associated with perennial lakes per GIS, are actually associated with a pool (and not a lake) located within the intermittent stream reaches of the Susan River below McCoy Flat reservoir). The primary potential risk of indirect effects to perennial macroinvertebrate habitat is from increases in sediment. The risk would be very low, however, because, under this alternative: 1) there are no routes with segments proposed for addition within perennial stream and lake RCAs that currently exhibit signs of erosion that contribute sediment to perennial water features, 2) where erosion is occurring in association with a proposed route, mitigation is planned to correct it (e.g. ULA 254) 3) there are very few miles of routes in total proposed for addition to the NFTS within perennial RCAs and, 4) individual routes are dispersed across Lassen NF in at least seven sixth-field subwatersheds, thereby limiting possible contributions of cumulative effects in any one subwatershed.

Cumulative Effects (Aquatic macroinvertebrate habitat):

As with indirect effects, the greatest potential for cumulative effects would be from increased delivery of sediment, in addition to sedimentation from ongoing, or future land-disturbance activities that could cause an adverse cumulative change to benthic macroinvertebrate habitat within the project area. The risk of adverse cumulative effects from sediment delivery

is extremely low. This is because the actions would not result in any direct effects to habitat, they would have low potential for additional incremental negative indirect effects at the site and subwatershed scales, and overall, there would be a net decrease (from Alternative 1) of approximately 57.93 miles of unauthorized routes available for motorized travel within perennial stream and lake RCAs (Table 84), providing potential opportunities for improvement over the existing condition.

Alternative 3

Direct/Indirect (Aquatic macroinvertebrate habitat):

There are approximately 31 crossings of perennials streams by unauthorized routes that would be prohibited from motorized travel; no unauthorized routes that cross perennial streams are proposed for addition to the NFTS. Because there would be no stream crossings, there would be no direct effects to macroinvertebrate habitat.

Under Alternative 3, all of the approximately 58.49 miles of unauthorized routes within perennial RCAs would be prohibited from motorized travel (37.54 miles in stream RCAs and 20.95 in lake RCAs) (Table 84). Because no motorized travel would be permitted, beneficial effects on macroinvertebrate habitat (e.g., decrease in sediment in stream channels) would be likely because sites where indirect effects are occurring would be improved from current conditions over the long term.

Cumulative Effects (Aquatic macroinvertebrate habitat):

There is no risk of adverse cumulative effects from sediment delivery. This is because no unauthorized routes would be added to the NFTS and used by motor vehicles so there would be no negative direct or indirect effects to habitat. There would be a net decrease (from Alternative 1) of 58.49 miles of unauthorized routes available for motorized travel in perennial RCAs (Table 84), providing potential opportunities for improvement over the existing condition.

Alternative 4

Direct/Indirect/Cumulative Effects (Aquatic macroinvertebrate habitat):

There are approximately 31 crossings of perennials streams by unauthorized routes that would be prohibited from motorized travel; no unauthorized routes that cross perennial streams are proposed for addition to the NFTS. Because there would be no stream crossings, there would be no direct effects to macroinvertebrate habitat.

Under Alternative 4, there would be a total of approximately 0.87 miles of unauthorized routes proposed for addition to the NFTS in perennial stream RCAs and 0.12 miles in perennial lake RCAs (Table 83) (total miles in perennial lake RCAs is actually lower, however (at 0.02 miles) because 0.10 miles identified as routes associated with perennial lakes per GIS, are actually associated with a pool (and not a lake) located within the intermittent stream reaches of the Susan River below McCoy Flat reservoir). The only

difference between Alternative 4 and Alternative 2 is that, under Alternative 4, there is a slight increase (0.50 more miles) of unauthorized routes proposed for addition. Under Alternative 4, this would mean slightly fewer miles (for a total of approximately 57.50 miles vs. 57.93 in Alternative 2) would be prohibited from motorized travel in perennial RCAs (Table 84). Because there is only a slight difference between these two action alternatives for this indicator, and none of the proposed routes currently exhibit signs of erosion that are contributing sediment to perennial water features, the direct, indirect, and cumulative effects are the same, with only a slightly higher risk of effects on macroinvertebrate habitat with more miles of routes proposed for addition to the NFTS in the perennial RCAs.

Alternatives 5/Modified 5

Direct/Indirect/Cumulative Effects (Aquatic macroinvertebrate habitat):
There are approximately 31 crossings of perennials streams by unauthorized routes that would be prohibited from motorized travel; no unauthorized routes that cross perennial streams are proposed for addition to the NFTS. Because there would be no stream crossings, there would be no direct effects to macroinvertebrate habitat.

Under Alternatives 5/Modified 5, there would be approximately 55.18 miles of unauthorized routes prohibited from motorized travel in perennial RCAs (Table 84). Because no motorized travel would be permitted, beneficial effects on macroinvertebrate habitat (e.g., decrease in sediment to stream channels) would be likely because sites where indirect effects are occurring would be improved from current conditions over the long term.

There would be approximately 2.33 miles of unauthorized routes proposed for addition to the NFTS in perennial stream RCAs and 0.98 miles (Alt 5)/1.09 miles (Modified 5) in perennial lake RCAs (Table 83) (total miles in perennial lake RCAs is actually lower, however, at 0.68 miles (Alt. 5)/0.79 miles (Modified 5) because 0.20 miles identified as routes associated with perennial lakes per GIS are associated with intermittent waterbodies and/or represent stream “pools”). The primary potential risk of indirect effects to perennial macroinvertebrate habitat is from increases in sediment. This risk is highest on routes proposed for designation that are in close proximity to a stream channel (e.g. 290522UC02; ULA098). The risk overall is still low, however, because: 1) there are few routes with segments proposed for addition within perennial stream and lake RCAs that currently exhibit signs of erosion and contribute sediment to perennial water features, 2) where erosion is occurring in association with proposed route, mitigation is planned to correct it and/or minimize this impact and 3) individual routes are dispersed across Lassen NF in at least 25 sixth-field subwatersheds, thereby reducing possible contributions of cumulative effects in any one subwatershed.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Aquatic Macroinvertebrates Habitat Trend – Alternative 2, 3, 4, 5 and Modified 5

Given the scope and scale of the proposed project, and lack of site specificity on all routes being prohibited from motorized travel in the RCAs, it is not possible to reasonably qualify or quantify (beyond total miles displayed) any potential benefits in changes overall to sediment (and a much lesser degree to flows and shade). While there is likely to be positive changes at the site scale (especially decreasing sediment to stream channels), positive changes are not expected to be measurable at the subwatershed scale because: 1) the distribution of routes across the landscape is wide (approximately 104 subwatersheds in total) and 2) at the individual subwatershed level, any change in flow, sediment, and shade would be too small to be measured at that scale; therefore the action alternatives would not be expected to alter the current stable Sierra Nevada-wide habitat trend (USDA FS PSW Region 2008a) for benthic macroinvertebrates.

Pacific Treefrog (*Pseudacris regilla*) wet meadow habitat

Affected Environment

There are approximately 12.95 miles of unauthorized routes available to motor vehicle travel within “wet meadow” habitat using CWHR/CAL VEG data. With an assumed average route width of 12 feet, the estimated impact area within wet meadow habitat is approximately 18.84 acres. Additionally, there are approximately 29.8 miles of unauthorized routes available to motor vehicle travel within the RCAs (300 feet) around wet meadow habitat.

Environmental Consequences

Habitat factors for pacific treefrog analysis (adapted from USDA FS PSW Region 2008a) include: 1) wet meadow habitat (California Wildlife Habitat Relationship/California Vegetation **CWHR/CAL VEG)** type 2) changes within wet meadow habitat (miles/acres of unauthorized routes), and 3) changes in wet meadow hydrology (miles of unauthorized routes within wet meadow RCAs).

Alternative 1 – No Action

Direct/Indirect Effects (Pacific treefrog wet meadow habitat):

Direct effects to wet meadow habitat would continue to occur on approximately 18.84 acres with approximately 12.95 miles of unauthorized routes present within wet meadow habitat. Indirect effects to wet meadow habitat could also be occurring along 29.8 miles of unauthorized routes that are located within the RCA of wet meadows.

Cumulative Effects (Pacific treefrog wet meadow habitat):

Road density and motorized use of existing unauthorized routes would remain unchanged. Continuation of cross-country travel by motor vehicles would continue. With continuation of cross-country travel, new routes would be expected to expand within the project area. With

a potential increase in routes, there is an increased risk for additional negative direct and indirect effects to MIS (treefrog) wet meadow habitat.

Alternative 2

Direct/Indirect Effects (Pacific treefrog wet meadow habitat):

There are approximately 12.95 miles of unauthorized routes within wet meadow habitat (or 18.84 acres of impact) and 29.8 miles of unauthorized routes within the RCAs of wet meadow habitat that would be prohibited from motor vehicle travel in Alternative 2. Because no motorized travel would be permitted along these routes, beneficial effects to wet meadow habitat would be possible. This is because, where direct and indirect effects could be occurring, conditions could be improved over the long term as routes re-vegetate. With no miles of unauthorized routes proposed for addition to the NFTS within wet meadow habitat (per GIS analysis), there would be no direct effects. Potential indirect effects (e.g. changes in hydrology) could occur to wet meadow habitat from a total of approximately 0.12 miles of unauthorized routes (UBC021 and ULA158) being added to the NFTS that are located within the RCA. The two routes that comprise the 0.12 miles, however, are on flat topography (so hydrology is not affected) and mitigation is proposed to block route to prevent access into the seasonal waterbody (Dry Lake).

Cumulative Effects (Pacific treefrog wet meadow habitat)

The risk of adverse cumulative effects from Alternative 2 is very low. This is because the actions would not result in any direct effects or additional incremental indirect negative effects to habitat at the site and subwatershed scales. Overall, there would be a net decrease of approximately 42.75 miles of unauthorized routes available for motor vehicle travel within wet meadow habitat and wet meadow RCAs (Table 84), providing potential opportunities for improvement over the existing condition.

Alternative 3

Direct/Indirect Effects (Pacific treefrog wet meadow habitat):

Under Alternative 3, all of the approximately 12.95 miles of unauthorized routes within wet meadow habitat (or 18.84 acres of impact) and 29.92 miles of unauthorized routes within the RCAs of wet meadow habitat would be prohibited from motorized travel. Because no motorized travel would be permitted, beneficial effects to wet meadow habitat would be possible. This is because, where direct and indirect effects could be occurring now, conditions could be improved over the long term as routes re-vegetated.

Cumulative Effects (Pacific treefrog wet meadow habitat):

There is no risk of adverse cumulative effect from Alternative 3. This is because no unauthorized routes would be added to the NFTS and used by motor vehicles so there would be no negative direct or indirect effects to habitat. There would be a net decrease (from Alternative 1) of 42.87 miles of unauthorized routes available for motorized travel in

wet meadow/wet meadow RCAs (Table 84), providing potential opportunities for improvement over the existing condition.

Alternative 4

Direct/Indirect Effects (Pacific treefrog wet meadow habitat):

There are approximately 12.93 miles of unauthorized routes within wet meadow habitat (or 18.81 acres of existing impact) and 29.57 miles of unauthorized routes within the RCAs of wet meadow habitat that would be prohibited from motorized travel (Table 84). Because no motorized travel would be permitted, beneficial effects to wet meadow habitat would be possible. This is because, where direct and indirect effects could be occurring now, conditions could be improved over the long term as routes re-vegetated. Approximately 0.02 miles of one unauthorized route (UBB499) is proposed for addition to the NFTS within wet meadow habitat according to the GIS query (Table 83). Based on site specific field information, however, there is no wet meadow habitat associated with this route. Therefore, there would be no direct effects to wet meadow habitat under Alternative 4. Potential indirect effects could occur to wet meadow habitat from a total of 0.35 miles being added to the NFTS that are located within the RCA (Table 83). The risk of indirect effects (e.g. changes in hydrology), however, is very low as routes are mostly located on flat topography and all but one route (ULA230) are on the dry eastside with RCAs associated with little (or no) true wet meadow habitat.

Cumulative Effects (Pacific treefrog wet meadow habitat):

The risk of adverse cumulative effects from Alternative 4 is very low. This is because the actions would not result in any direct effects or additional incremental indirect negative effects to habitat at the site and subwatershed scales. Overall, there would be a net decrease of approximately 42.5 miles of unauthorized routes available for motor vehicle travel within wet meadow habitat and wet meadow RCAs (Table 84), providing potential opportunities for improvement over the existing condition.

Alternatives 5/Modified 5

Direct/Indirect Effects (Pacific treefrog wet meadow habitat):

Under Alternatives 5/Modified 5, there are approximately 12.09 miles of unauthorized routes within wet meadow habitat (or 17.58 acres of impact) and 28.26 miles of unauthorized routes within the RCAs of wet meadow habitat that would be prohibited from motorized travel (Table 84). Because no motorized travel would be permitted, beneficial effects to wet meadow habitat would be possible. This is because, where direct and indirect effects could be occurring now, conditions would be improved over the long term as routes re-vegetated. Under Alternatives 5/Modified 5, approximately 0.86 total miles (or 1.25 acres) of unauthorized routes are proposed for addition to the NFTS within wet meadow habitat per GIS (Table 83).Based on review of route photos and/or site specific field information

available, the miles/acres are actually less (at 0.42 miles/0.61 acres) as only two unauthorized routes (ULA 426 and UNE787) proposed for designation are potentially within Pacific treefrog wet meadows. Therefore, direct effects would be expected to continue to occur in some Pacific treefrog wet meadow habitat under Alternatives 5/Modified 5.

Potential indirect effects could also occur to wet meadow habitat from a total of 1.66 miles being added to the NFTS that are located within the RCA (Table 84). The risk of indirect effects (e.g. changes in hydrology), however, is very low as all routes are mostly located on flat topography and all but one route (ULA230) are on the dry eastside with RCAs associated with little (or no) true wet meadow habitat.

Cumulative Effects (Pacific treefrog wet meadow habitat):

The risk of adverse cumulative effects from Alternatives 5/Modified 5 is very low. This is because the actions would not result in any additional incremental direct or indirect negative effects to habitat at the site and subwatershed scales. Overall, there would be a net decrease of approximately 40.35 miles of unauthorized routes available for motor vehicle travel within wet meadow habitat and wet meadow RCAs (Table 84), providing potential opportunities for improvement over the existing condition.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Pacific Treefrog Habitat Trends - Alternative 2, 3, 4, 5 and Modified 5

Given the scope and scale of the proposed project, and lack of site specificity on routes **not** being added to the NFTS within wet meadows and wet meadow RCAs, it is not possible to reasonably qualify or quantify (beyond total miles displayed) any potential benefits in changes to wet meadow habitat. While it would be expected that positive changes at the site scale would occur (especially from passive restoration of vegetation), changes are not expected to be measurable at the subwatershed scale because of the wide distribution of the routes across the landscape (~ 55 sixth-field subwatersheds in total). At the subwatershed level, any positive change in wet meadow habitat available would be too small to be measured and therefore the action alternatives would not be expected to alter the existing stable trend in habitat, nor would it lead to a change in the distribution, for the Pacific treefrog across the Sierra Nevada bioregion (USDA FS PSW Region 2008a).

Affected Environment and Environmental Consequences – TES species

For the location of the various sub-basin (HUC4), watershed (HUC5) and subwatershed (HUC 6) boundaries referenced in the section below, refer to Map 25 (Sub-basin), Map 20 (Sacramento River), Map 21 (Lower Pit) or Map 22 (Honey-Eagle Lakes).

Forest Service Sensitive Amphibian Species (Cascades, Sierra Nevada and Foothill Yellow-legged frogs)

Table 85 is an overview of various herpetological visual encounter surveys (**VES**) conducted on the Lassen National Forest, and/or vicinity of, and provides some of the source information on the current status (e.g. distribution) of special status amphibians (e.g., FS sensitive).

Cascades frog (*Rana cascadae*) (S)

Affected Environment

The Cascades frog, hereafter referred to as *R. cascadae*, is known (historically and/or currently) to utilize habitat above approximately 4,500 feet in elevation in the following sixth-field subwatersheds that encompass, in whole or in part, Lassen NF: Headwaters of Hat Creek, Upper Old Cow Creek, Upper SF Battle Creek, Bailey Creek (within Battle Creek system), Upper NF Battle Creek, Upper Mill Creek, Sacramento-Deer, Butte Creek, Bailey Creek (within Feather River system), Louse Creek, Rice Creek, Butt Valley Reservoir, Juniper Lake, Big Kimshew Creek, Upper West Branch Feather River, and Lower Yellow Creek (refer to Map 20 for general location of all these subwatersheds).

For subwatersheds where historic information is available (*e.g*. via voucher specimens), almost all collections have enough information to indicate which 6th field subwatershed the specimens were associated with. In only one or two subwatersheds is there some uncertainty of the specific collection location; in these circumstances, nearby subwatersheds with potential suitable habitat were included in the analysis (e.g. Coyote Flat). In the Upper Yellow Creek subwatershed, 4250' is presumed to be the approximate lower elevation for this species, based on existing habitat conditions. In the Screwdriver Creek subwatershed, *R. cascadae* is known (presently) above approximately 2,500 feet in elevation.

Present occupancy (defined here as more than one individual observed at one time since the 1990s and, with one or more individuals still present) is only known within five sixth-field subwatersheds: Upper Old Cow Creek, Sacramento-Deer, Butte Creek, Juniper Lake, and Screwdriver Creek. Only two incidental observations of individual *R. cascadae* have been made outside known breeding populations; one adult frog was observed in the Sacramento-Deer subwatershed in Alder Creek in 2002 (Roby 2002) and one adult was observed in the Shanghai Creek subwatershed on Butt Creek in 1996 (Brown 2000). Within the Rice Creek subwatershed, two *R. cascadae* were also found in Crumbaugh Creek (in Lassen Volcanic

National Park) in the early 1990's but this species has not been found there since 1994 (Fellers et. al. 2008).

Table 85 Overview of various source information available on amphibian surveys conducted on the Lassen National Forest and/or vicinity, 1991 to present

Year of survey	General geographic area of survey	General Level of Survey Effort (approx. number of sites)	Citation
1991	Lassen Volcanic National Park (LVNP)	50	Fellers and Drost 1993
1993	Forestwide	106	USDA FS LNF1993
1993-1994	Deer and Mill Creeks	40	Fellers 1995
1995	Forestwide	60	Fellers 1996
1995	Deer and Mill Creek tributaries	120	EA Engineering 1996
1996-1997	Forestwide, including Caribou and Thousand Lakes Wilderness areas	112	Fellers 1998
2002	Almanor Ranger District	33	Vindum and Koo 2003
2002	Caribou and Thousand Lakes Wilderness	527	Welsh and Pope 2004, Stead et al. 2005
2003	Forestwide	80	Koo et al. 2004
2001 +	Plumas County	249	CDFG 2009
2004	Lassen VNP	365	Stead et al. 2005
2006	Resurvey of Grinnell transect (Lassen region)	13	Perrine et al. 2007a
1999-2001	Eastern Lassen NF; General vicinity of Eagle Lake	42	Manier 2002

Three sixth-field subwatersheds (Shanghai, Coyote Flat and Upper Yellow Creek) are not known historically to have contained the Cascades frog but, for purposes of this analysis, are considered as having potential suitable habitat based on existing habitat, their proximity to adjacent subwatersheds with historical occupancy and/or an incidental observation.

From extensive amphibian surveys conducted on Lassen NF (Fellers et al. 2008) it is probable that this species is no longer present in the remaining 10 subwatersheds where it historically occurred (e.g., pre-1970s), as documented from available sources of historical accounts including, but not limited to, Zweifel (1955), Grinnell et al. (1930), various museums (e.g., California State University Chico, Museum of Vertebrate Zoology), Fellers and Drost (1993) and Koo et al. (2004). According to Fellers et al. (2008), there could be a few populations that went undetected in the surveys conducted, but "it is unlikely that any large *R. cascadae* populations exist in the Lassen area" (the Lassen area referred to is defined as lands within a 50-kilometer radius of Lassen Peak so this excludes the northern area with existing populations within Screwdriver Creek subwatershed). Fellers (ibid) concluded "the small size of, and lack of connectivity between, the current populations of *R. cascadae* in the Lassen area greatly reduces their long-term viability, potentially leading to a genetic bottleneck". The existing Cow Creek population (represented by a minimum of two breeding sites) on private lands off Lassen NF, however, "…may represent the largest extant population of *R. cascadae* in the Lassen region…" (Stead and Pope 2007).

The area of effect for *R. cascadae* conservatively considers all of the following aquatic features; springs, perennial streams, lakes, ponds, wetlands and fens, and their associated RCAs on Lassen NF lands above the elevation range for all 18 subwatersheds listed previously within the project area. Additionally, within the Sacramento-Deer and Butte Creek sixth-field subwatersheds, Carter and Colby/Willow Critical Aquatic Refuges (**CARs**) are designated for *R. cascadae* (USDA FS PSW Region 2004). Populations are present in both the Carter and Colby/Willow CARs.

Environmental Consequences

Alternative 1 – No Action

Currently, there are a total of approximately 24.61 miles of unauthorized routes available for motorized travel within the RCAs associated with *R. cascadae* habitat as defined. Approximately 7.4 miles exist in subwatersheds with current occupancy, 15.08 miles exist in 10 historically occupied subwatersheds, and 2.13 miles exist in two subwatersheds with potential suitable habitat (e.g. there are no known historical and/or current populations).

Within the CARs, there at total of 4.42 miles of unauthorized routes.

Direct/Indirect Effects (Rana cascadae)

With continued motor vehicle use on approximately 24.61 miles of unauthorized routes in RCAs associated with known or potential *R. cascadae* habitat, and continuation of cross-country travel, there is a risk for additional direct and indirect effects to this species and/or its habitat. In at least two separate years (1993 photos and 2007 personal observations), motor vehicle tracks (independent of unauthorized routes presently mapped) were observed in a wet meadow/fen complex known to be occupied by a population of *R. cascadae*. Despite the decommissioning of one route that lead to the outer edge of the wet meadow, alternate 'cross-country' travel into the wet meadow/fen complex has occurred (personal observation).

Cumulative Effects (Rana cascadae)

Road density and motorized use of existing unauthorized routes would remain unchanged. Continuation of cross-country travel by motor vehicles would continue. With continuation of cross-country travel, new routes could expand within the range of the species. With the potential increase in routes, there is an increased risk for additional negative direct and indirect effects to *R. cascadae* habitat.

Alternative 2

Approximately 0.66 total miles of unauthorized routes in RCAs associated with known or potential *R. cascadae* habitat are proposed for addition to the NFTS. Estimated miles of additions by subwatershed are shown below in Table 86.

Table 86 Total miles of unauthorized routes proposed for addition to the NFTS in RCAs associated with known or potential Cascades frog (*R. cascadae*) habitat, by sixth-field subwatershed, under Alternative 2

Total Miles	Subwatershed Name
0.09	Headwaters Hat Creek
0.39	Upper Mill Creek
0.18	Upper South Fork Battle Creek

Source: GIS query, March 2009 and updated for Modified 5 October 2009.

Approximately 23.95 miles of unauthorized routes in RCAs associated with known or potential *R. cascadae* habitat would be prohibited from motorized travel in this alternative. Additionally, all 4.42 miles of unauthorized routes in the CARs would be prohibited from motorized travel.

Direct/Indirect Effects (Rana cascadae)

No direct effects to *R. cascadae* are expected from the addition of 0.66 total miles of unauthorized routes proposed for addition to the NFTS in RCAs within the three subwatersheds, as portions of the three subwatersheds have been surveyed (Table 87) and, to date, the species has not been detected. Additionally, no routes in RCAs are proposed for addition to the NFTS in the five subwatersheds with current known occupancy; therefore, there is little risk for potential direct effects.

Table 87 Amphibian survey references in three sixth-field subwatershed with unauthorized routes proposed for addition to the NFTS in RCAs associated with known or potential Cascades frog (*R. cascadae*) habitat; Alternative 2

Subwatershed Name	Survey Reference Document(s)
Headwaters Hat Creek	Fellers and Drost 1993, Koo et al. 2004, Stead et al. 2005
Upper Mill Creek	USDA FS 1993 Fellers 1995, EA Engineering 1995
Upper South Fork Battle Creek	Fellers 1998, Perrine et al. 2007a

Because a total of approximately 0.66 miles of unauthorized routes would be added to the NFTS in RCAs associated with known, historic, and/or potential suitable habitat, there is some potential for indirect effects to occur to the habitat from the addition of the routes and, continued motorized travel. Of nine individual routes proposed to be added, only one route (ULA 252 in the Upper Mill Creek subwatershed) currently exhibits signs of erosion. Under current conditions and/or with proposed mitigation to improve drainage, there is a slight risk of sedimentation to the fringes of riparian vegetation associated with a meadow. No sedimentation currently reaches any water feature, however, and the general habitat area is considered to be low in terms of habitat suitability for *R. cascadae* due, primarily, to the lack of breeding type habitat (personal observation). The risk for adverse effects is considered very low. This is because the routes are limited to three subwatersheds, the area of influence at the site level is relatively small, and there are no known populations within the three subwatersheds.

There are potential benefits over time from prohibiting motorized use on 23.95 miles of unauthorized routes in RCAs associated with known or potential *R. cascadae* habitat, but due to the scope of the project, lack of site specificity on all existing unauthorized routes and, incomplete understanding of the potential effects (positive or negative) from routes on *R. cascadae* habitat, it is not possible to reasonably qualify or quantify them beyond using the total miles as an indicator of potential risk/benefits. Given there is past evidence of motor vehicle travel into habitats known to be utilized by the *R. cascadae* for breeding, prohibition of cross-country travel is likely to be beneficial by reducing the risk of additional negative effects from motor vehicle use into occupied and/or potential habitat for this species. It is also reasonable to assume that where erosion is presently occurring (with sediment being a primary concern to aquatic habitat in general), there would be a decrease in sediment production; benefits, however, would likely only be realized over the long term as routes heal naturally and/or active means are taken (through future projects and their associated NEPA decisions) to remove them from the landscape.

Cumulative Effects (Rana cascadae)

As with indirect effects, the greatest potential for cumulative effects would be from increased delivery of sediment, in addition to sediment from ongoing or future land-disturbance activities that could cause an adverse cumulative change to *R. cascadae* habitat within the project area. The risk of adverse cumulative effects from sediment delivery is very low. This is because the actions would have low potential for additional incremental negative indirect effects at the site and subwatershed scales, and overall, there would be a net decrease of 23.95 miles of unauthorized routes available for motorized travel within known, historic, and/or potential suitable habitat, providing potential opportunities for improvement over the existing condition.

Alternative 3

There are no miles of unauthorized routes proposed for addition to the NFTS within RCAs associated with known, historic and/or potential *R. cascadae* habitat.

All 24.61 miles of unauthorized routes in RCAs associated with *R. cascadae* habitat would be prohibited from motorized cross-country travel under this alternative.

Direct/Indirect Effects (Rana cascadae)

Under Alternative 3, all 24.61 miles of unauthorized routes within RCAs associated with known, historic, and/or potential suitable habitat for the *R. cascadae* would be prohibited from motorized travel. Because no motorized travel would be permitted, there would be no risk for negative direct or indirect effects. Beneficial effects on Cascade frog habitat would be possible at sites where indirect effects may be occurring, with a projected improvement of riparian conditions over the long-term.

Cumulative Effects (Rana cascadae)

There is no risk of adverse cumulative effect from Alternative 3. This is because no unauthorized routes would be added to the NFTS and used by motor vehicles so there would be no negative direct or indirect effects to habitat. There would be a net decrease (from Alternative 1) of 24.61 miles of unauthorized routes available for motorized travel, providing potential opportunities for improvement over the existing condition.

Alternative 4

Approximately 0.42 miles total of unauthorized routes in RCAs associated with known or potential *R. cascadae* habitat are proposed for addition to the NFTS. Estimated miles of additions by subwatershed are shown below in Table 90.

Table 88 Total miles of unauthorized routes proposed for addition to the NFTS in RCAs associated with known or potential Cascades frog (*R. cascadae*) habitat, by sixth-field subwatershed, under Alternative 4

Total Miles	Subwatershed Name
0.03	Rice Creek
0.26	Upper Old Cow Creek
0.13	Upper Yellow Creek

Source: GIS query March 2009 and updated for Modified 5 October 2009

Approximately 24.2 miles of unauthorized routes in RCAs associated with known or potential *R. cascadae* habitat would be prohibited from motorized travel in this alternative. Additionally, all 4.42 miles of unauthorized routes in the CARs would be prohibited from motorized travel.

Of the subwatersheds with unauthorized routes proposed to be added, only the Upper Old Cow Creek subwatershed is known to be currently occupied by *R. cascadae*. Surveys in the subwatershed in 2005, 2008, and 2009 have not established the species presence in aquatic habitat on Lassen NF, but because the population is in close proximity to Lassen NF, the potential for their occurrence on Lassen NF exists.

Direct/Indirect Effects (Rana cascadae)

One sixth-field subwatershed contains populations of *R. cascadae*; therefore, continued motorized travel on unauthorized routes proposed for addition to the NFTS poses some risk of having direct effects on frogs *if* they migrated across the routes when utilized by motor vehicles. In the Old Cow Creek subwatershed, one route (320306UC01) is located outside the riparian area of a perennial drainage on the outer edge of the RCA and is near (less than one stream mile) from a known existing (breeding) population on private land. Thus, there is some potential risk of having direct effects at this location. The risk at this location, however, is considered very low for the following reasons: 1) one study in the Trinity Alps found that, of the few *R. cascadae* that dispersed overland outside of riparian areas, it was during the spring when the ground was still moist and generally at the time of snowmelt recession (Garwood 2008); 2) motorized access to the area of the route is limited by snow in

the spring, and in most years, not likely available for travel until after the migration to the breeding site on private land has already occurred, and 3) traversing of this route by this species seems highly unlikely given the position of the route relative to their breeding habitat and availability of the existing dispersal corridor upstream and/or downstream of the known occupied site.

In summary, where the species is known to occur presently, the possibility exists for direct effects in the Old Cow Creek subwatershed, but the likelihood is considered very low for the reasons stated above. In other subwatersheds, where the species is known historically, the risk for direct effects is also low because surveys conducted to date for this species have not detected its presence (Table 89). Additionally, there is little likelihood of overlap between frog dispersal timing and motor vehicle use timing on the routes in these subwatersheds, because spring conditions would likely prohibit access due to snow.

Table 89 Amphibian survey references in sixth-field subwatershed with unauthorized routes proposed for addition to the NFTS in RCAs associated with known or potential Cascades frog (*R. cascadae*) habitat; Alternative 4

Subwatershed Name	Survey Reference(s) and/or Document(s)
Rice Creek	USDA FS 1993, Fellers and Drost 1993, Vindum and Koo 2003, Stead et al. 2005
Upper Old Cow Creek	Stead and Pope 2007, Fellers et al. 2008, Pope 2008
Upper Yellow Creek	Fellers 1998

With a total of 0.42 miles of unauthorized routes added to the NFTS in RCAs associated with known, historic, and/or potential suitable habitat, there is some potential for indirect effects to occur to habitat from the addition of routes and continued motorized travel on the routes. The risk for adverse effects, however, is considered very low. This is because the total miles of routes proposed for addition is small, the area of influence at the site level is also relatively small, only one proposed route (320306UC01) is in close proximity to a known population and finally, none of the routes are known to have erosion problems that are contributing sediment to an aquatic feature.

Cumulative Effects (Rana cascadae)

As with indirect effects, the greatest potential for cumulative effects would be from increased delivery of sediment, in addition to sediment from ongoing or future ground-disturbance activities that could cause an adverse cumulative change to *R. cascadae* habitat within the project area. The risk of adverse cumulative effects from sediment delivery is very low. This is because the actions would have low potential for additional incremental negative indirect effects at the site and subwatershed scales, and overall, there would be a net decrease of 24.2 miles of unauthorized routes available for motorized travel within known, historic, and/or potential suitable habitat, providing potential opportunities for improvement over the existing condition.

Alternatives 5/Modified 5

Approximately 2.28 miles total of unauthorized routes in RCAs associated with known or potential *R. cascadae* habitat are proposed for addition to the NFTS. Estimated miles of additions by subwatershed are shown below in Table 90.

Table 90 Total miles of unauthorized routes proposed for addition to the NFTS in RCAs associated with known or potential Cascades frog (*R. cascadae*) habitat, by sixth-field subwatershed, under Alternatives 5/Modified 5.

Total Miles	Unauthorized Route numbers	Subwatershed Name
0.04	UBB898	Bailey (within Feather River system)
0.09	UNW100, ULA190, ULA252, ULA254	Headwaters Hat Creek
0.36	ULA136, UBC021, ULA158, ULA174	Upper Mill Creek
0.26	UBB865	Upper South Fork Battle Creek
0.20	260608UC01, 260608UC04	Lower Yellow Creek
0.33	290522UC01, -02,-03, 290606UC01, 290606UC04	Rice Creek
0.26	320306UC01	Upper Old Cow Creek
0.08	280512UC01-02	Sacramento-Deer
0.21	ULA095, ULA098, ULA219	Upper West Branch Feather River
0.44	ULA059, ULA230, ULA231	Upper Yellow Creek
0.01	280608UC01	Coyote Flat

Source: GIS query March 2009 and updated for Modified 5 October 2009

Approximately 22.33 miles of unauthorized routes in RCAs associated with known or potential *R. cascadae* habitat would be prohibited from motorized travel in this alternative. Additionally, all 4.42 miles of unauthorized routes in the CARs would be prohibited from motorized travel.

Of the subwatersheds with unauthorized routes proposed to be added, only the Sacramento-Deer and Upper Old Cow Creek subwatersheds are known to be currently occupied by *R. cascadae*.

Direct/Indirect Effects (Rana cascadae)

There is little to no risk of direct effects to *R. cascadae* with the addition of two routes (280512UC01 and 280512UC02) in the Sacramento-Deer subwatershed as they are more than five air miles from the only known existing population and surveys have not detected populations outside their limited known distribution in this subwatershed (Table 85and Table 91). The potential for direct and indirect effects to this species from the addition of route 320306UC01 in the Old Cow Creek subwatershed is addressed under Alternative 4.

In other subwatersheds, where the species is known historically, the risk for direct effects is also low because surveys for this species to date have not detected its presence (Table 91). Additionally, there is little likelihood of overlap between frog dispersal timing and motor vehicle use timing on the routes in these subwatersheds, because spring conditions would likely prohibit access due to snow, and the destination via the proposed routes is primarily for dispersed camping during the summer or fall season.

Table 91 Amphibian survey references by sixth-field subwatershed, with unauthorized routes proposed for addition to the NFTS in RCAs associated with known or potential Cascades frog (*R. cascadae*) habitat; Alternatives 5/Modified 5

Subwatershed Name	Survey Reference(s) and/or Document(s)
Bailey Creek (within Feather River system)	Fellers 1998, Stead et al. 2005
Headwaters Hat Creek	Fellers and Drost 1993, Koo et al. 2004, Stead et al. 2005
Upper Mill Creek	USDA FS 1993, Fellers 1995, EA Engineering 1996
Upper South Fork Battle Creek	Fellers 1998, Perrine et al. 2007a
Lower Yellow Creek	Fellers 1995
Rice Creek	USDA FS 1993, Fellers and Drost 1993, Vindum and Koo 2003, Stead et al. 2005
Sacramento-Deer	Stead and Pope 2007, Fellers et al. 2008, Perrine et al. 2007a, Pope 2008
Upper Old Cow Creek	Stead and Pope 2007, Fellers et al. 2008, Pope 2008
Upper West Branch Feather River	USDA FS 1993, Fellers 1998, Vindum and Koo 2003, Koo et al. 2004
Upper Yellow Creek	Fellers 1998
Coyote Flat	Fellers 1995

Note: This table does not include additional survey information available from CDFG as it wasn't readily obtainable by the subwatersheds used in this analysis. CDFG survey efforts, however, are reflected in Table 85.

Because a total of 2.28 miles of unauthorized routes would be added to the NFTS in RCAs associated with known, historic, and/or potential suitable habitat, there is some potential for indirect effects occurring to the habitat from the addition of the routes and continued motorized travel on the routes. The risk for adverse effects, however, is considered low. This is because the routes are widely distributed across the area of effect (11 subwatersheds), the area of influence at the site level is relatively small, only one proposed route is in close proximity to a known population and finally, of the 27 individual routes proposed to be added, only two routes (290522UC02, ULA098) exhibit signs of erosion that have or have the potential to contribute sediment to an aquatic feature. For these sites, mitigation is planned to correct and/or minimize this impact (Refer to mitigation measures in Appendix E).

Cumulative Effects (Rana cascadae)

As with indirect effects, the greatest potential for cumulative effects would be from increased delivery of sediment, in addition to sediment from past, ongoing, or future land-disturbance activities that could cause an adverse cumulative change to *R. cascadae* habitat within the project area. The risk of adverse cumulative effects from sediment delivery is very low. This is because the actions would have low potential for additional incremental negative indirect effects at the site and subwatershed scales, and overall, there would be a net decrease of 22.33 miles of unauthorized routes available for motorized travel within known, historic, and/or potential suitable habitat, providing potential opportunities for improvement over the existing condition.

Sierra Nevada yellow-legged frog (*Rana sierrae*) (S)

Affected Environment

The Sierra Nevada yellow-legged frog, hereafter referred to as *R. sierrae,* is known (historically and/or currently) to utilize habitat above approximately 4,500 feet in elevation in the following sixth-field subwatersheds that encompass, in whole or in part, Lassen NF: Butte Creek, Butt Valley Reservoir, Upper West Branch Feather River, and Dogwood Creek. (refer to Map 20 for general locations of all subwatersheds).

Present and confirmed occupancy (defined here as more than one individual observed at one time since the 1990's and, with one or more individuals still present) is only known within one subwatershed, Dogwood Creek.

Four sixth-field subwatersheds (Shanghai, Coyote Flat, Rock Creek Reservoir and North Valley Creek) are not known historically or currently to contain *R. sierrae* but, for purposes of this analysis, are considered as having potential suitable habitat based on existing habitat and their proximity to adjacent subwatersheds with historic and/or current occupancy.

For purposes of this analysis, the area of effect for *R. sierrae* is considered the same as *R. cascadae*; springs, perennial streams, lakes, ponds, wetlands and fens, and their associated RCAs on Lassen NF lands above 4,500 feet in elevation. The subwatersheds under consideration, however, are more limited in scope than *R. cascadae* and only include the above eight subwatersheds within the project area. The same *R. cascadae* aquatic features (e.g. streams, lakes, fens, etc) were conservatively selected for *R. sierrae* because in the three 'historic' subwatersheds (Butte, Butt Valley and Upper West Branch Feather), this species is known within the range of the Cascades frog and at one collection site, Zweifel (1955) noted "….there was no evident habitat separation between the species".

Given extensive amphibian surveys conducted on the Lassen NF (Fellers et al. 2008) and considering the overlap (historically) of this species with the range of *R. cascadae*, it is probable that this species (like *R. cascadae*) is no longer present in the three subwatersheds where it historically occurred (e.g. pre-1970s), as documented from available sources of historical accounts including, but not limited to, Zweifel (1955), California State University Chico (museum), and Koo et al. (2004).

Environmental Consequences

Alternative 1 – No Action

Currently, there are a total of approximately 8.27 miles of unauthorized routes available for motorized travel within the RCAs associated with *R. sierrae* habitat and all these miles are within the Butte, Coyote, Shanghai, Upper West Branch Feather River, North Valley Creek, and Rock Creek Reservoir subwatersheds.

Direct/Indirect Effects (Rana sierrae)

With continued motor vehicle use on approximately 8.27 miles of unauthorized routes in RCAs associated with known or potential *R. sierrae* frog habitat, and continuation of cross-

country travel, there is a risk for indirect effects to the species habitat. Direct effects to the species is less of a risk, however, due to the lack of detections in the three subwatersheds (Butte Creek, Butt Valley Reservoir and Upper West Branch Feather River) where they are known to have historically occurred and in Dogwood Creek (the only subwatershed with current occupancy), there are no unauthorized routes present within any RCAs.

Cumulative Effects (Rana sierrae)

Road density and motorized use of existing unauthorized routes would remain unchanged. Continuation of cross-country travel by motor vehicles would continue. With continuation of cross-country travel, new routes could expand within the range of the species. With the potential increase in routes, there is an increased risk for negative direct and indirect effects to historic and/or potential *R. sierrae* habitat.

Alternative 2

There are no miles of unauthorized routes proposed for addition to the NFTS within the RCAs associated with known or potential *R. sierrae* habitat.

All 8.27 miles of unauthorized routes in RCAs associated with *R. sierrae* habitat would be prohibited from motorized cross-country travel under this alternative.

Direct/Indirect Effects (Rana sierrae)

Under Alternative 2, all 8.27 miles of unauthorized routes within RCAs associated with known, historic, and/or potential suitable habitat for *R*. *sierrae* would be prohibited from motorized travel. Because no motorized travel would be permitted, there would be no risk for negative direct or indirect effects. Beneficial effects on *R*. *sierrae* habitat would be possible at sites where indirect effects may be occurring, with a projected improvement of riparian conditions over the long-term.

Cumulative Effects (Rana sierrae)

There is no risk of adverse cumulative effect from Alternative 2. This is because no unauthorized routes would be added to the NFTS and used by motor vehicles so there would be no potential negative direct or indirect effects to habitat. There would be a net decrease (from Alternative 1) of 8.27 miles of unauthorized routes available for motorized travel, providing potential opportunities for improvement over the existing condition.

Alternative 3

There are no miles of unauthorized routes proposed for addition to the NFTS within the RCAs associated with known or potential *R. sierrae* habitat.

All 8.27 miles of unauthorized routes in RCAs associated with *R. sierrae* habitat would be prohibited from motorized cross-country travel under this alternative.

Direct/Indirect Effects (Rana sierrae)

Under Alternative 3, all 8.27 miles of unauthorized routes within RCAs associated with known, historic, and/or potential suitable habitat for *R*. *sierrae* would be prohibited from motorized travel. Because no motorized travel would be permitted, there would be no risk for

negative direct or indirect effects. Beneficial effects on *R*. *sierrae* habitat would be possible at sites where indirect effects may be occurring, with a projected improvement of riparian conditions over the long-term.

Cumulative Effects (Rana sierrae)

There is no risk of adverse cumulative effect from Alternative 3. This is because no unauthorized routes would be added to the NFTS and used by motor vehicles so there would be no potential negative direct or indirect effects to habitat. There would be a net decrease (from Alternative 1) of 8.27 miles of unauthorized routes available for motorized travel, providing potential opportunities for improvement over the existing condition.

Alternative 4

There are no miles of unauthorized routes proposed for addition to the NFTS within the RCAs associated with known or potential *R. sierrae* habitat.

All 8.27 miles of unauthorized routes in RCAs associated with *R. sierrae* habitat would be prohibited from motorized cross-country travel under this alternative.

Direct/Indirect Effects (Rana sierrae)

Under Alternative 4, all 8.27 miles of unauthorized routes within RCAs associated with known, historic, and/or potential suitable habitat for *R*. *sierrae* would be prohibited from motorized travel. Because no motorized travel would be permitted, there would be no risk for negative direct or indirect effects. Beneficial effects on *R*. *sierrae* habitat would be possible at sites where indirect effects may be occurring, with a projected improvement of riparian conditions over the long-term.

Cumulative Effects (Rana sierrae)

There is no risk of adverse cumulative effect from Alternative 4. This is because no unauthorized routes would be added to the NFTS and used by motor vehicles so there would be no potential negative direct or indirect effects to habitat. There would be a net decrease (from Alternative 1) of 8.27 miles of unauthorized routes available for motorized travel, providing potential opportunities for improvement over the existing condition.

Alternatives 5/Modified 5

There are approximately 0.29 miles of unauthorized routes (Routes ULA098, ULA095, ULA219, 280608UC01 and 250510UC01) proposed for addition to the NFTS within the RCAs associated with known or potential *R. sierrae* habitat (Table 92).

Table 92 Total miles of unauthorized routes proposed for addition to the NFTS in RCAs associated with known or potential Sierra Nevada yellow-legged frog (*R. sierrae)* habitat, by sixth-field subwatershed, under Alternatives 5/Modified 5

Total miles	Subwatershed Name
0.21	Upper West Branch Feather River
<0.01	Coyote
.07	Rock Creek Reservoir

Source: GIS query March 2009 and updated for Modified 5 October 2009

Direct/Indirect Effects (Rana sierrae)

There would be no direct effects to *R*. *sierrae* from this alternative because there are no routes proposed for addition to the NFTS within the RCAs of the one subwatershed (Dogwood Creek) that is currently occupied and no direct effects are expected in the other three subwatersheds as surveys to date (Table 93) have not detected the species. There could be indirect effects to potential *R*. *sierrae* habitat, however, with 0.29 miles being proposed for addition to the NFTS. The risk for adverse effects is considered low because the area of influence at the site level is relatively small and, of the five routes proposed to be added, only one route (ULA098) exhibits signs of erosion that has the potential to contribute sediment to a water feature. For this site, mitigation is planned to correct and/or minimize this impact (Refer to mitigation measures in Appendix E).

Table 93 Amphibian survey references by sixth-field subwatershed, with unauthorized routes proposed for addition to the NFTS in RCAs associated with known or potential Sierra Nevada yellow-legged frog (*R. sierrae*) habitat; Alternatives 5/Modified 5

Subwatershed Name	Survey Reference(s) and/or Document(s)
Upper West Branch Feather River	USDA FS 1993, Fellers 1998, Vindum and Koo 2003, Koo et al. 2004
Coyote Flat	Fellers 1995
Rock Creek Reservoir	CDFG 2009

Cumulative Effects (Rana sierrae)

As with indirect effects, the greatest potential for cumulative effects would be from increased delivery of sediment, in addition to sediment from ongoing or future ground-disturbing activities that could cause an adverse cumulative change to *R*. *sierrae* habitat within the project area. The risk of adverse cumulative effects from sediment delivery is very low. This is because the actions would have low potential for additional incremental negative indirect effects at the site and subwatershed scales, and overall, there would be a net decrease of 7.98 miles of unauthorized routes available for motorized travel within historic and/or potential suitable habitat, providing potential opportunities for improvement over the existing condition.

Foothill yellow-legged frog (*Rana boylii*) (S)

Affected Environment

The range of the foothill yellow-legged frog, hereafter referred to as *R. boylii*, is considered below approximately 4,500 feet in elevation in the following sixth-field subwatersheds that encompass, in whole or in part, Lassen NF: Screwdriver Creek, Oak Creek, NF Antelope Creek, SF Antelope Creek, Sacramento River-Antelope Creek, Sacramento River-Thomes Creek, Upper Mill Creek, Lower Mill Creek, Sacramento-Deer, and Butte Creek, and Lower Yellow Creek. Additionally, in Upper Yellow Creek, the potential range of this species is being considered below approximately 4250’. The range for this species is based on current occupancy and/or the potential for suitable habitat to exist for this species within these

subwatersheds. Unlike the other two montane native Rana species, where historical records exist, but there are few current populations, few historic records of the foothill yellow-legged frog are available for Lassen NF lands, yet populations do currently exist in suitable habitat areas (e.g. lower "foothill" elevations of Deer, Mill and Antelope Creeks).

There are six subwatersheds currently occupied by *R. boylii*: North Fork Antelope Creek, South Fork Antelope Creek, Sacramento River-Antelope Creek, Sacramento River-Thomes Creek, Lower Mill Creek, and Sacramento-Deer. Review of museum records found only three historical sites of this species within the extreme southern fragmented section of Lassen NF in Butte County, all below 2,600 feet in elevation (Koo et al. 2004). Where *R. boylii* is known to occur in the above subwatersheds, available habitat for this species, which is in mostly remote inaccessible areas, is exceptional and populations appear to be doing well (Fellers 1995, 1998; Koo et al. 2004; personal observations).

The area of effect for *R. boylii* considers all perennial streams and their associated RCAs on Lassen NF lands below 4,500 feet in the 11 subwatersheds listed above, as well as below approximately 4250' in the Upper Yellow Creek subwatershed within the project area.

Environmental Consequences

Alternative 1 – No Action

Currently, there are a total of approximately 3.74 miles of unauthorized routes available for motorized travel within the RCAs associated with *R. boylii* habitat (or potential suitable habitat), as defined by the range above. Approximately 1.84 miles exist in subwatersheds with current occupancy (Sacramento-Deer, Lower Mill, and N.F. and S.F. Antelope Creeks) and approximately 1.91 miles exist in five subwatersheds containing possible potential suitable habitat (Screwdriver Creek, Upper Mill, Butte, Lower and Upper Yellow Creek). Although amphibian surveys have been conducted in all five of these subwatersheds with no detections of *R. boylii* to date within the area of effect, these subwatersheds are included in this analysis because of potential (although limited) suitable habitat within portions of these subwatersheds.

Direct/Indirect Effects (Rana boylii)

With continued motor vehicle use on approximately 3.74 miles of unauthorized routes in RCAs associated with known or potential *R. boylii* frog habitat, and continuation of cross-country travel, there is some risk (although low) for direct and indirect effects to this species and its habitat.

Cumulative Effects (Rana boylii)

Road density and motorized use of existing unauthorized routes would remain unchanged. Continuation of cross-country travel by motor vehicles would continue. With continuation of cross-country travel, new routes could expand within the range of the species. With the potential increase in routes, there is an increased risk for negative direct and indirect effects to *R. boylii* and its habitat.

Alternative 2

There are no miles of unauthorized routes proposed for addition to the NFTS within the RCAs associated with known or potential *R. boylii* habitat.

All miles (approximately 3.74) of unauthorized routes in RCAs associated with *R. boylii* habitat would be prohibited from motorized cross-country travel under this alternative.

Direct/Indirect Effects (Rana boylii)

Under Alternative 2, all 3.74 miles of unauthorized routes within RCAs associated with known and/or potential suitable habitat for *R*. *boylii* would be prohibited from motorized travel. Because no motorized travel would be permitted, there would be no risk for negative direct or indirect effects. Beneficial effects on *R. boylii* habitat would be possible at sites where indirect effects may be occurring, with a projected improvement of riparian conditions over the long-term.

Cumulative Effects (Rana boylii)

There is no risk of adverse cumulative effect from Alternative 2. This is because no unauthorized routes would be added to the NFTS and used by motor vehicles so there would be no negative direct or indirect effects to habitat. There would be a net decrease (from Alternative 1) of 3.74 miles of unauthorized routes available for motorized travel, providing potential opportunities for improvement over the existing condition.

Alternative 3

There are no miles of unauthorized routes proposed for addition to the NFTS within the RCAs associated with known or potential *R. boylii* habitat.

All 3.74 miles of unauthorized routes in RCAs associated with *R. boylii* habitat would be prohibited from motorized cross-country travel under this alternative.

Direct/Indirect Effects (Rana boylii)

Under Alternative 3, all 3.74 miles of unauthorized routes within RCAs associated with known and/or potential suitable habitat for R. boylii would be prohibited from motorized travel. Because no motorized travel would be permitted, there would be no risk for negative direct or indirect effects. Beneficial effects on *R. boylii* habitat would be possible at sites where indirect effects may be occurring, with a projected improvement of riparian conditions over the long-term.

Cumulative Effects (Rana boylii)

There is no risk of adverse cumulative effect from Alternative 3. This is because no unauthorized routes would be added to the NFTS and used by motor vehicles so there would be no negative direct or indirect effects to habitat. There would be a net decrease (from Alternative 1) of approximately 3.74 miles of unauthorized routes available for motorized travel, providing potential opportunities for improvement over the existing condition.

Alternative 4 and Alternatives 5/Modified 5

Only one sixth-field subwatershed (Sacramento-Deer) has unauthorized routes proposed for addition to the NFTS in RCAs associated with any *R. boyii* habitat (all known and potential habitat) under these two Alternatives. These routes are 260225UC21 (0.25 miles) and 270326UC14 (0.23 miles), and both are within the 300 foot RCA adjacent to a stream (Deer Creek) that is occupied by this species. Spatially, these two routes are separated by more than 15 miles of Deer Creek where no NFTS routes exist within the perennial Deer Creek RCA.

Approximately 3.26 miles of unauthorized routes in RCAs associated with *R. boylii* habitat would be prohibited from motorized cross-country travel under these alternatives.

Direct/Indirect Effects (Rana boylii)

There would be no direct effects to *R*. *boylii* because these two routes do not cross a stream channel occupied by this species. Additionally, this species is not likely to be susceptible to direct mortality from motor vehicles that would utilize these two routes because the routes are currently away from the stream margin and this species rarely moves more than 5 meters (16.4 feet) from stream channels (Bourque 2005). Also, according to Zweifel (1955), “these frogs are so closely restricted to streams that it is unusual to find one at a greater distance from the water than it could cover in one or two leaps”. Zweifel (ibid) also notes that this species does not leave streams in the rainy season and is not found on roads at night during rains, even though the species may be present in nearby streams.

No potential indirect effects are anticipated from the existence of either of these two routes. Although the potential indirect effects of routes on *R*. *boylii* habitat are uncertain, in general, one primary potential effect of routes near streams, in general, is the associated increase in sedimentation. However, neither of the routes contribute sediment to Deer Creek with existing current motor vehicle use, because the portion of the routes nearest the stream are flat and/or a suitable distance from habitat utilized by this species.

Cumulative Effects (Rana boylii)

No negative direct or indirect effects to *R*. *boylii* are anticipated, therefore, there would be no cumulative effects to this species. There would be a net decrease (from Alternative 1) of 3.26 miles of unauthorized routes available for motorized travel, providing potential opportunities for improvement over the existing condition.

Federally listed Anadromous Fish Species - Central Valley (C.V.) steelhead (*Oncorhynchus mykiss*) and C.V. spring-run Chinook salmon (*Oncorhynchus tshawytscha*)

Affected Environment

Of five fourth-field sub-basins occupied by these two federally listed species, only two are occupied by the species within the Lassen NF boundary: Sacramento-Thomes-Elder-Mill (containing Mill and Antelope Creeks) and Sacramento-Deer (containing Deer Creek).

Designated Critical Habitat for both species is within the Lassen NF boundary in Antelope, Mill, and Deer Creeks. In the Panther Creek drainage (Upper South Fork Battle Creek subwatershed), critical habitat has also been designated for steelhead. The latter DCH within the project area, however, is associated with a small, headwater stream/shallow intermittent lake (Panther Creek/Dry Lake) which lacks suitable habitat for steelhead. Specifically, and 'Dry Lake' in particular, there is no stream habitat that provides any of the following three primary constituent elements of DCH: spawning, rearing, or migration habitat. Additionally, the species is not in close proximity to the Lassen NF boundary; the upper extent of habitat known to be currently occupied by steelhead is more than 10 miles downstream of the Lassen NF boundary in the South Fork of Battle Creek.

The primary area of effect for the two listed anadromous fish considers the aquatic features (perennial streams) designated as critical habitat that are occupied by the species and, their associated RCAs on Lassen NF lands within the project area. Currently, there are approximately 0.57 miles of unauthorized routes within the RCA associated with occupied and DCH in the Sacramento-Thomes-Elder-Mill sub-basin and 1.32 miles in the Sacramento-Deer Creek sub-basin.

Environmental Consequences

Alternative 1 – No Action

A total of approximately 1.89 miles of unauthorized routes are located within the RCA of Mill, Deer and Antelope Creeks and are associated with habitat occupied by anadromous fish and their DCH.

Direct/Indirect Effects (Anadromous Fish)

None of the unauthorized routes within the RCA of Mill, Deer Creek and Antelope Creeks and/or associated with occupied habitat and DCH would be prohibited from motor vehicle use. Therefore, direct and indirect effects to anadromous fish and their DCH habitat is likely from continued motor vehicle use, and continuation of cross-country travel, particularly along flat alluvial stream reaches (e.g. Upper Mill Creek) currently and/or readily accessible to motor vehicles.

Cumulative Effects (Anadromous Fish)

Road density and motorized use of existing unauthorized routes would remain unchanged. Continuation of cross-country travel by motor vehicles would continue. With continuation of cross-country travel, new routes could expand within the range of the species. With the potential increase in routes, there is an increased risk for additional negative direct and indirect effects to federally listed anadromous fish and their Designated Critical Habitat.

Alternative 2

A total of two unauthorized routes (UBB707, UBB707A) are proposed for addition to the NFTS in the RCA of Mill Creek (for a total of <.01 miles); these routes are in a flat area of the RCA associated with occupied habitat and DCH. The portion of these routes proposed

for designation would be approximately 100 feet from the bank of Mill Creek and would not extend to the bank as they presently do. There are no unauthorized routes in RCAs adjacent to occupied/DCH in Antelope Creek that are proposed for addition to the NFTS within the project area.

Direct/Indirect Effects (Anadromous Fish)

There would be no direct effects to the two listed anadromous fish because none of the routes proposed for designation for motor vehicle use cross anadromous fish-bearing streams.

No indirect effects are expected from adding the portion of the existing routes proposed for designation. A primary concern in adding routes in general is associated with sedimentation. The portion of the routes proposed for addition do not contribute sediment to occupied/DCH habitat with existing current motor vehicle use because the route sections proposed are flat and an adequate distance from anadromous habitat (personal observations 2008).

There would be approximately 1.88 miles of unauthorized routes in RCAs associated with habitat occupied by anadromous fish and their DCH that would be prohibited from motorized travel.

Indirect beneficial effects are anticipated over the long term (20 years) from the prohibition of cross-country travel by reducing the risk of direct/indirect impacts to the listed anadromous fish and/or their DCH habitat from cross-country travel by motor vehicles. Beneficial effects of not adding unauthorized routes that are within RCAs to the NFTS would also be generally realized over the long term (20 years), following natural revegetation of the route(s) and/or potential implementation of active treatments to rehabilitate the routes through future NEPA decisions. With respect to the beneficial effects realized from not adding unauthorized routes to the NFTS, the effect is smaller now compared to conditions that existed several years ago. This is because in Antelope, Mill, and Deer Creek watersheds, the worst unauthorized routes, in terms of contributing erosion, have been decommissioned through an active watershed restoration program initiated in 1998 (Roby 2008).

Cumulative Effects (Anadromous Fish)

No direct or indirect effects are anticipated, therefore there would be no cumulative effects. There would be a net decrease (from Alternative 1) of 1.88 miles of unauthorized routes available for motorized travel, providing potential opportunities for improvement over the existing condition.

Alternative 3

There are no miles of unauthorized routes proposed for addition to the NFTS within the RCAs associated with habitat occupied by anadromous fish and their DCH.

All 1.89 miles of unauthorized routes in RCAs associated with habitat occupied by anadromous fish and/or their DCH would be prohibited from motorized cross-country travel under this alternative.

Direct/Indirect Effects (Anadromous Fish)

Under Alternative 3, no motorized travel would be permitted on approximately 1.89 miles of unauthorized routes within RCAs, therefore there would be no risk for negative direct or indirect effects. Beneficial effects to anadromous habitat, however, would be possible at sites where indirect effects may be occurring (e.g. in Upper Mill Creek) with a projected improvement of riparian conditions over the long-term.

Indirect beneficial effects are anticipated over the long term (20 years) from the prohibition of cross-country travel by reducing the risk of direct/indirect impacts to the listed anadromous fish and/or their habitat from cross-country travel by motor vehicles. Beneficial effects of not adding unauthorized routes that are within RCAs to the NFTS would also be generally realized over the long term (20 years), following natural revegetation of the route(s) and/or potential implementation of active treatments to rehabilitate the routes through future NEPA decisions. With respect to the beneficial effects realized from not adding unauthorized routes to the NFTS, the effect is smaller now compared to conditions that existed several years ago. This is because in Antelope, Mill, and Deer Creek watersheds, the worst unauthorized routes, in terms of contributing erosion, have been decommissioned through an active watershed restoration program initiated in 1998 (Roby 2008).

Cumulative Effects (Anadromous Fish)

There is no risk of adverse cumulative effect from Alternative 3. This is because no unauthorized routes would be added to the NFTS and used by motor vehicles so there would be no negative direct or indirect effects to habitat. There would be a net decrease (from Alternative 1) of 1.89 miles of unauthorized routes available for motorized travel, providing potential opportunities for improvement over the existing condition.

Alternative 4 and Alternatives 5/Modified 5

Two unauthorized routes (260225UC21 and 270326UC14) are proposed for addition to the NFTS in the RCA of Deer Creek for a total of approximately 0.48 miles. These routes are in RCAs adjacent to occupied habitat and DCH. There are no unauthorized routes in RCAs adjacent to occupied/DCH in Antelope or Mill Creek that are proposed for addition to the NFTS within the project area.

Direct/Indirect Effects (Anadromous Fish)

There would be no direct effects to the two listed anadromous fish because none of the routes proposed for designation for motor vehicle use cross anadromous fish-bearing streams.

No indirect effects are expected from the designation of the existing proposed routes. A primary concern in adding existing routes, in general, is associated with sedimentation. Neither of the two routes, however, contribute sediment to occupied/DCH habitat with existing current motor vehicle use, because the routes are flat and/or an adequate distance from anadromous habitat (personal observations 2008).

There would be approximately 1.41 miles of unauthorized routes in RCAs associated with habitat occupied by anadromous fish and their DCH that would be prohibited from motorized travel.

Indirect beneficial effects are anticipated over the long term (20 years) from the prohibition of cross-country travel by reducing the risk of direct/indirect impacts to the listed anadromous fish and/or their habitat from cross-country travel by motor vehicles. Beneficial effects of not adding unauthorized routes that are within RCAs to the NFTS would also be generally realized over the long term (20 years), following natural revegetation of the route(s) and/or potential implementation of active treatments to rehabilitate the routes through future NEPA decisions. With respect to the beneficial effects realized from not adding unauthorized routes to the NFTS, the effect is smaller now compared to conditions that existed several years ago. This is because in Antelope, Mill, and Deer Creek watersheds, the worst unauthorized routes, in terms of contributing erosion, have been decommissioned through an active watershed restoration program initiated in 1998 (Roby 2008).

Cumulative Effects (Anadromous Fish)

No adverse direct or indirect effects are anticipated, therefore there would be no additional incremental negative cumulative effect. There would be a net decrease (from Alternative 1) of 1.41 miles of unauthorized routes available for motorized travel, providing potential opportunities for improvement over the existing condition.

Forest Service Sensitive Fish Species - Eagle Lake rainbow trout (Oncorhynchus mykiss aquilarum)

Affected Environment

Eagle Lake rainbow trout inhabit Eagle Lake via a propagation/stocking program administered by the California Department of Fish and Game (**CDFG**). Historic and available habitat for this species is limited to primarily Pine Creek, the main tributary to Eagle Lake. Within the Pine Creek drainage, the only perennial stream miles available for year-round utilization for this species is located within one sixth-field subwatershed (Headwaters of Pine Creek). Within this subwatershed, there are approximately 10 miles of perennial waters (Pine and Bogard Creeks combined). The lowest (approximately) 20 miles of Pine Creek is intermittent, and is presumed to have historically served as a corridor for the migration of Eagle Lake rainbow trout from the lake to the perennial headwaters. With the exception of a few fish tagged some years for a migration study at the Pine Creek Fish Trap located near

Eagle Lake at the mouth of Pine Creek, Eagle Lake trout do not migrate upstream of a barrier weir associated with the Pine Creek fish trap. Thus, the Eagle Lake trout residing in upper Pine Creek are mostly entirely managed (i.e., hatchery stocked) by CDFG.

The area of effect for the Eagle Lake rainbow trout considered in this analysis is the perennial streams and their associated RCAs within the Headwaters of Pine Creek subwatershed. Currently, there are a total of 1.14 miles of unauthorized routes available for motorized travel within the perennial stream RCAs.

Environmental Consequences

Alternative 1 – No Action

Direct/Indirect Effects (Eagle Lake rainbow trout)

None of the 1.14 miles of unauthorized routes within the perennial RCA of Pine Creek would be prohibited from motor vehicle use. Therefore, the potential for direct and indirect effects to Eagle Lake rainbow trout habitat exists. The risk for direct and indirect effects is greatest in the perennial reaches of Pine Creek and along Bogard Springs Creek where Eagle Lake trout are known to currently reside and/or are stocked and are accessible by motor vehicles due to gentle topography.

Cumulative Effects (Eagle Lake rainbow trout)

Road density and motorized use of existing unauthorized routes would remain unchanged. Continuation of cross-country travel by motor vehicles would continue. With continuation of cross-country travel, new routes would be expected to expand within the RCAs associated with perennial waters of Pine Creek. With the potential increase in routes, there is an increased risk for negative direct and indirect effects to Eagle Lake rainbow trout and its habitat.

Alternative 2

There are approximately 0.15 miles of unauthorized routes proposed for addition to the NFTS within the perennial RCAs associated with Eagle Lake rainbow trout habitat.

Approximately 0.99 miles of unauthorized routes in the perennial RCAs would be prohibited from motorized cross-country travel under this alternative.

Direct/Indirect Effects (Eagle Lake rainbow trout)

No direct effects to the Eagle Lake rainbow trout are possible as there are no routes in RCAs proposed for addition to the NFTS that cross Pine Creek. There would be no indirect effect (with sedimentation being the primary risk factor), as none of the portions of the existing routes proposed for addition (i.e.UBB860 and UNE080) have evidence of erosion.

Cumulative Effects (Eagle Lake rainbow trout)

No adverse direct or indirect effects to Eagle Lake rainbow trout or its habitat are anticipated, therefore there would be no cumulative effects to this species.

Alternative 3 and Alternative 4

There are no miles of unauthorized routes proposed for addition to the NFTS within the RCAs associated with perennial Eagle Lake rainbow trout habitat.

All 1.14 miles of unauthorized routes in RCAs associated with perennial Eagle Lake rainbow trout habitat would be prohibited from motorized cross-country travel under this alternative.

Direct/Indirect Effects (Eagle Lake rainbow trout)

Under Alternative 3 and 4, no motorized travel would be permitted on 1.14 miles of unauthorized routes within RCAs therefore, there would be no risk for negative indirect effects. No direct effects to the Eagle Lake rainbow trout are anticipated as there are no routes in RCAs proposed for addition to the NFTS that cross Pine Creek. Beneficial effects to Eagle Lake trout habitat, however, would be possible at sites where indirect effects may be occurring with a projected improvement of riparian conditions over the long-term.

Cumulative Effects (Eagle Lake rainbow trout)

There is no risk of adverse cumulative effects because the action of not adding any unauthorized routes to the NFTS (including ensuing motorized travel) would not result in any negative direct or indirect effects to habitat. There would be a net decrease (from Alternative 1) of 1.14 miles of unauthorized routes available for motorized travel, providing potential opportunities for improvement over the existing condition.

Alternatives 5/Modified 5

There are approximately 0.11 miles of unauthorized routes proposed for addition to the NFTS within the perennial RCAs associated with Eagle Lake rainbow trout habitat.

Approximately 1.03 miles of unauthorized routes in the perennial RCAs would be prohibited from motorized cross-country travel under this alternative.

Direct/Indirect Effects (Eagle Lake rainbow trout)

No direct effects to the Eagle Lake rainbow trout are anticipated as there are no routes in RCAs proposed for addition to the NFTS that cross Pine Creek. There would be no indirect effect (with sedimentation being the primary risk factor), as the portion of the existing routes proposed for addition (UBB860, UNE080, and UBB858) do not have evidence of erosion.

Cumulative Effects (Eagle Lake rainbow trout)

No adverse direct or indirect effects to Eagle Lake rainbow trout or its habitat are anticipated, therefore there would be no cumulative effects to this species. There would be a net decrease (from the current condition) of 1.03 miles of unauthorized routes available for motorized travel, providing potential opportunities for improvement over the existing condition.

Environmental Consequences for Other TES species:

Table 94 below summarizes the rationale for no direct and indirect effect findings for all action Alternatives, for the remaining TES species listed in Table 81, as well as for Federally designated Essential Fish Habitat. For more details and supporting references in the

analysis of these species below, refer to Appendix C in the Aquatics BE/BA. For EFH, refer to the anadromous BA.

Table 94 Affected environment and summary of the rationale for no direct and indirect effect findings, under all action Alternatives, for certain TES species and, for Federally designated Essential Fish Habitat

Species (Listing Status)	Affected Environment	Rationale for no potential direct and indirect effects to the species
California red-legged frog (*Rana aurora draytonii*) (FT)	The Sacramento-Paynes fifth-field watershed is the only watershed that partially encompasses Lassen NF and is known to have contained this species historically (Grinnell et al. 1930); the one location where the species was found is outside the project area and approximately 7 air miles west of the Forest boundary. Potential range (and thus, evaluation of suitable habitat within the range) is considered on Lassen NF at less than 3,500 feet in elevation in the following sixth-field subwatersheds: Sacramento-Paynes, Sacramento-Antelope, Lower Mill, Sacramento-Thomes, and Sacramento-Deer.	There are no current populations of the species known on Lassen NF. Only one route (260225UC21) within the elevation range considered for this species is proposed for addition to the NFTS within a 300-foot RCA. This route is adjacent to Deer Creek, a moderately sized, fast-flowing, steep-gradient stream that does not provide suitable habitat for this species.
Shasta crayfish (*Pacifastacus fortis*) (FE)	There are six sixth-field subwatersheds that are occupied by this species, and partially encompass Lassen NF lands: Sand Flat Well, Fall River, Wiley Ranch, Chalk Reservoir, Bald Mountain Reservoir and Lower Hat Creek. This species is not located on Lassen N.F. lands within the project area in these subwatersheds.	There are no occurrences of this species within the project area, and only one of the six subwatersheds (Wiley Ranch) has an unauthorized route (UNH528) proposed for addition to the NFTS in an RCA associated with a perennial water feature. The perennial water feature (small perennial stream) does not provide potential suitable habitat for this species.
Central Valley fall-run Chinook salmon (*Oncorhynchus tshawytscha*) (S)	This species is distributed primarily downstream of the project area. The upper extent of its distribution nearest to the Lassen NF boundary is limited to Deer Creek, where it extends (at most) approximately one mile onto Lassen NF in a remote area located within the Ishi Wilderness.	The species distribution is limited to within a congressionally designated non-motorized area (Ishi Wilderness) where no routes are proposed for addition to the NFTS.

Species (Listing Status)	Affected Environment	Rationale for no potential direct and indirect effects to the species
Hardhead (*Mylopharodon conocephalus*) (S)	Approximately three miles of the Pit River (within the Screwdriver Creek sixth-field watershed) is known to provide habitat for this species on Lassen NF. This species is also known to occur in the foothill portions of Deer and Mill Creeks, but primarily downstream of the forest boundary. At most, the upper extent of its distribution on the Lassen N.F. is within a remote area located within the Ishi Wilderness.	The species distribution is limited to within a congressionally designated non-motorized area (Ishi Wilderness) where no routes are proposed for addition to the NFTS. Additionally, there are no unauthorized routes proposed for addition to the NFTS within the distribution of this species within the Screwdriver Creek subwatershed.
California floater (*Anodonta californiensis*) (S)	Four sixth-field subwatersheds are known to contain this species and are partially located within the project area: Lower Hat, Chalk Reservoir, Fall River, Bald Mountain Reservoir but the distribution of this species is off Lassen NF lands. In one additional subwatershed (Screwdriver Creek and more specifically the Pit River reach downstream of Lake Britton), this species may have occurred historically in the area, though recent surveys have determined that the species is not currently present. In the Susan River drainage, this species is known to have occurred historically, approximately 10 miles downstream of the project area (presumably in the Cheney Creek subwatershed).	This species is not known to occur within the project area. Additionally, in areas considered most probable as potential suitable habitat (lower Susan River) there have been no detections of this species from six stream sites surveyed in 2001 and nine stream miles surveyed in 2007.
Great Basin ramshorn (*Helisoma newberryi newberryi*) (S)	Five sixth-field subwatersheds are known to contain this species and are partially located within the project area: Screwdriver Creek, Lower Hat Creek, Chalk Reservoir, Fall River, and Eagle Lake, but the species distribution is off Lassen NF lands. Only two subwatersheds (Screwdriver Creek and Eagle Lake) are known to contain this species on Lassen N.F. lands or near the project area.	There are no unauthorized routes proposed for addition to the NFTS in any RCAs associated with perennial water features within the five subwatersheds nor in the one subwatershed with a known detection on Lassen NF lands (Screwdriver Creek). Additionally, there are no unauthorized routes proposed for addition to the NFTS near habitat occupied by this species (i.e., in Eagle Lake proper, in water deeper than 10 feet).
Montane peaclam (*Pisidium ultramontanum*) (S)	Four sixth-field subwatersheds are known to contain this species and are partially located within or near the project area. The locations of this species in three subwatersheds (Lower Hat Creek, Chalk Reservoir, and Bald Mountain Reservoir) is outside of the project area and not on Lassen NF lands. Only one subwatershed (Eagle Lake) is known to contain this species (in Eagle Lake proper) near the project area.	This species is not known to occur within the project area, and there are no unauthorized routes proposed for addition to the NFTS near habitat occupied by this species (e.g., Eagle Lake).

Species (Listing Status)	Affected Environment	Rationale for no potential direct and indirect effects to the species
Scalloped juga (*Juga occata*) (S)	Three sixth-field subwatersheds are known to contain this species in the Pit River, and are partially located within the project area: Bald Mountain Reservoir, Chalk Reservoir, and Screwdriver Creek. Only the Screwdriver Creek subwatershed, however, contains this species within the project area.	There are no unauthorized routes proposed for addition to the NFTS near habitat occupied by this species (i.e., no routes are proposed in RCAs associated with a perennial water feature within the Screwdriver Creek subwatershed).
Topaz juga (*Juga acutifilosa*) (S)	Five sixth-field subwatersheds are known to contain this species and are partially located within the project area. The locations of this species in three subwatersheds (Lower Hat Creek, Chalk Reservoir, and Fall River) is outside of the project area and not on Lassen NF lands. Only the Davis Creek and Big Jack Lake subwatersheds are known to contain this species within the project area, specifically in the Davis and Russell Dairy Creeks and Davis Spring.	There are no unauthorized routes proposed for addition to the NFTS within any RCAs of the Davis Creek subwatershed, and in the Big Jack Lake subwatershed, only one route (UNE643) is proposed for addition to the NFTS within an RCA. This RCA is associated with Ashurst Lake (a mostly intermittent waterbody) whose habitat is unsuitable for this species.
Nugget pebblesnail (*Fluminicola seminalis*) S)	Three sixth-field subwatersheds are known to contain this species and are partially located within the project area (Lower Hat Creek, Chalk Reservoir, and Fall River). The known locations of the species is these subwatersheds, however, is outside of the project area and not on Lassen NF lands. One subwatershed (Screwdriver Creek) is known to have locations of this species on LNF lands within the project area.	There are no unauthorized routes proposed for addition to the NFTS near habitat occupied by this species (i.e., no routes are proposed in RCAs associated with a perennial water feature within the Screwdriver Creek subwatershed).
Essential Fish Habitat (*Chinook salmon*)	Essential Fish Habitat (EFH) is defined as those waters and substrate necessary to fish (in this case, salmon) for spawning, breeding, feeding, and growth to maturity. EFH was designated (U.S. Department of Commerce NOAA NMFS 2002) for Pacific Salmon in Amendment 14 to the Pacific Salmon Fishery Management Plan under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended by the Sustainable Fisheries Act of 1996 (P.L. 104-297). EFH also includes the areas designated as critical habitat for the listed C.V. spring-run Chinook salmon.	See Aquatic Resources effects discussions for C.V. spring-run Chinook salmon, since EFH is the same area as DCH for Chinook salmon.

Note: For more details and supporting references refer to the Aquatic Biological Assessment and Biological Evaluation, which is hereby incorporated by reference. Note: FT = Federally listed under the Endangered Species Act as Threatened, FE = Federally listed under the Endangered Species Act as Endangered, and S = Pacific Southwest Region Forest Service Sensitive Species

Summary of Determinations for the four Action Alternatives

Determinations for TES aquatic species are summarized in Table 95 for all action Alternatives 2-5/Modified 5. Under Alternative 4 and Alternatives 5/Modified 5, the “may affect” for *R*. *cascadae* has been made because there is a possibility, albeit a highly unlikely one, of a direct effect on an individual from motorized travel. For *R. sierrae* (Alternatives 5/Modified 5 only), as well as *R*. *cascadae* (Alternative 4 and Alteratives 5/Modified 5), the “may affect” determination is also made because the action of adding unauthorized routes to the NFTS in their current condition and with continuing motor vehicle use on these routes, could potentially indirectly affect known or potential habitat for these species within their known range. For both species, the ‘not likely to trend towards Federal listing or loss of viability’ determination is made because 1) the scope of adding the proposed unauthorized routes is limited in area 2) routes proposed overall pose little risk for contributing negative indirect effects, 3) the species’ presence in site-specific areas where routes would be added is highly unlikely, 4) the risk of additional direct or indirect effects to habitat is reduced by prohibiting cross-country travel and, 5) the opportunity for improvement to the species’ habitat is higher, when compared to Alternative 1, given the possibility that more miles of unauthorized routes would be restored over the long term.

Table 95 Determinations for TES aquatic species and EFH for Chinook salmon, under all action alternatives for the Lassen National Forest Motorized Travel Management Project

Species (Listing Status)	Determinations for All Action Alternatives
Cascades frog (*Rana cascadae*) (S)	No effect (Alternatives 2 and 3) May affect individuals, but is not likely to trend towards Federal listing or a loss of viability (Alternative 4 and Alternatives 5/Modified 5)
Sierra Nevada yellow-legged frog (*Rana sierrae*) (S)	No effect (Alternatives 2, 3 and 4) May affect individuals, but is not likely to trend towards Federal listing or a loss of viability (Alternatives 5/Modified 5)
Central Valley steelhead (*Oncorhynchus mykiss*) (FT) **Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*) (FT)**	No effect on these species or their DCH (Action Alternatives 2-5/Modified 5)
Essential Fish Habitat (*Chinook salmon*)	No adverse effect (Action Alternatives 2-5/Modified 5)
California red-legged frog (*Rana aurora draytonii*) (FT)	No effect on this species or its DCH (Action Alternatives 2-5/Modified 5)
Shasta crayfish (*Pacifastacus fortis*) (FE)	No effect on this species or its habitat (Action Alternatives 2-5/Modified 5)
Foothill yellow-legged frog (*Rana boylii*) (S)	No effect (Action Alternatives 2-5/Modified 5)
Central Valley fall-run Chinook salmon (*Oncorhynchus tshawytscha*) (S)	No effect (Action Alternatives 2-5/Modified 5)
Eagle Lake Rainbow trout (*Oncorhynchus mykiss aquilarum*) (S)	No effect (Action Alternatives 2-5/Modified 5)
Hardhead (*Mylopharodon conocephalus*) (S)	No effect (Action Alternatives 2-5/Modified 5)
California floater (*Anodonta californiensis*) (S)	No effect (Action Alternatives 2-5/Modified 5)
Great Basin ramshorn (*Helisoma newberryi newberryi*) (S)	No effect (Action Alternatives 2-5/Modified 5)
Montane peaclam (*Pisidium ultramontanum*) (S)	No effect (Action Alternatives 2-5/Modified 5)
Scalloped juga (*Juga occata*) (S)	No effect (Action Alternatives 2-5/Modified 5)
Topaz juga (*Juga acutifilosa*) (S)	No effect (Action Alternatives 2-5/Modified 5)
Nugget pebblesnail (*Fluminicola seminalis*) (S)	No effect (Action Alternatives 2-5/Modified 5)

Note: FT = Federally listed under the Endangered Species Act as Threatened, FE = Federally listed under the Endangered Species Act as Endangered, and S = Pacific Southwest Region Forest Service Sensitive Species

Summary of Effects Analysis across All Alternatives

Table 96 presents an overview of the average ranking of effects for each Alternative. Alternative 1 has the greatest negative effect on aquatic biota, primarily due to the continued use of existing unauthorized routes and cross-country travel. Alternative 3, which does not add any unauthorized roads to the NFTS, impacts aquatic biota the least as no routes would be proposed to be added to the NFTS in any RCAs. Of the Action Alternatives that propose the addition of unauthorized routes to the NFTS, Alternative 4 has the lowest risk of impacts to aquatic biota.

Table 96 Ranking of Alternatives for the indicator: unauthorized routes currently available (Alt 1) or proposed (Alt 2-5/Modified 5) for motor vehicle use

Indicator	Rankings of Alternatives for Each Indicator				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alts 5 and Mod 5
Miles of unauthorized routes in RCAs available for motor vehicle use (measure for general aquatics)	1	4	5	4	4
Miles of unauthorized routes within perennial stream RCAs available for motor vehicle use (measure for MIS: macroinvertebrate habitat)	1	5	5	5	5
Miles of unauthorized routes within RCAs of perennial lakes available for motor vehicle use (measure for MIS: macroinvertebrate habitat)	1	4	5	4	4
Miles of unauthorized routes directly within wet meadow habitat available for motor vehicle use (measure for MIS: pacific treefrog)	1	4	5	4	4
Miles of unauthorized routes within RCAs of wet meadow habitat available for motor vehicle use (measure for MIS: pacific treefrog)	1	5	5	4	4
Miles of unauthorized routes available for motor vehicle use in RCAs of sixth-field watersheds that contain aquatic features potentially used by FS sensitive amphibian species (currently and/or historically) and may contain potential suitable habitat	1	4	5	4	4
Miles of unauthorized routes available for motor vehicle use in Critical Aquatic Refuges	1	5	5	5	5
Miles of unauthorized routes available for motor vehicle use in RCAs in fourth-field sub-basins occupied by federally listed anadromous fish	1	4	5	4	4
Miles of unauthorized routes available for motor vehicle use in RCAs adjacent to Designated Critical Habitat in fourth-field sub-basins occupied by federally listed anadromous fish within the project area.	1	4	5	4	4
Average for Aquatic Resources	**1**	**4**	**5**	**4**	**4**

[a] A score of 5 indicates the alternative is the best for aquatic biota as related to the projected net change in indictor values; a score of 1 indicates the alternative is the worst for aquatic biota.

3.11 Botanical Resources

Changes Between the DEIS and the FEIS

Changes between DEIS and FEIS: Changes made to the Botanical Resources section between the DEIS and the FEIS include: updating the analysis based on the response to comments, adding additional references, and text for cumulative effects, reorganizing for better readability and understanding, and adding a tables showing the indicators used by alternative. Additional changes include minor editing for readability, and correcting formatting errors that occurred when this section was merged to compile the DIES, as well as adding analysis for the Modified Alternative 5.

Introduction

This section describes the affected environment for federally-listed threatened and endangered plant species, Forest Service Sensitive, as well as Special Interest plant species. It will describe the area potentially affected by the alternatives and existing resource conditions within that area. Measurement indicators are used to describe the existing conditions for Lassen NF, and in the analysis to quantify and describe how well the alternatives meet the project objectives and address resource concerns.

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 NFS lands. This is due to topography, geography, geology, 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 FS lands and no where else in the world (Powell 2001).

Management of plant and fungi species and habitat, and maintenance of a diversity of plant communities are important parts of the mission of the Forest Service (Resource Planning Act of 1974, National Forest Management Act of 1976). Management activities on National Forest System 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 national forest's LRMP. Key parts include: developing and implementing management practices to ensure that species do not become threatened or endangered because of 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 management of these species is accomplished through the creation of a

Regional Sensitive plant list. Currently, the Pacific Southwest Region manages over 425 Sensitive plan species, within the 18 national forests in California.

In addition to the Regional Forester's Sensitive plant list, Lassen National Forest maintains a list of plants that are of Special Interest, also called Watch List species, and species that are federally-listed as threatened and endangered by the U.S. Fish and Wildlife Service. Special Interest plants are species that do not currently meet the criteria to be included on the Regional Forester's Sensitive plant list, but are of sufficient concern that they should be considered in the planning process (USDA FS PSW Region 2006a). The Special Interest plant species list may include species that are locally rare, are of special interest, are widely disjunct from the main distribution of the species, and/or species for which very little, if any, information is available but existing information may indicate some cause for concern. Special Interest plant species are typically represented by more individuals, more occurrences, and/or a wider overall distribution than most Sensitive species; however, in general, there is less information on specific locations of occurrences and on habitat requirements for Special Interest plant species than for Sensitive plant species.

Management decisions related to motorized travel can affect plant and fungi species, their habitats, and natural communities. Effects include, but are not limited to, death or injury to plants; habitat modification; habitat fragmentation; habitat degradation 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 (Trombulek and Frissell 2000). The FS provides a process and standard through which rare plants 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 motorized public use on NFS lands (FSM 2006a: 2). Therefore, management decisions related to motorized travel on NFS lands must consider effects to plant species, fungi species, and their habitats.

Analysis Framework: Statute, Regulation, Forest Plan, 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 Federal Register (FR) 6183 (Office of the President 1999) - to prevent and control the introduction and spread of invasive species.

Forest Service Manual 2670 (FSM 2005a) - Forest Service Sensitive (FSS) species are plant 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.

Sierra Nevada Forest Plan Amendment (SNFPA). The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment identified the following direction applicable to motorized travel management and botanical resources:

Noxious weeds management (Management Standard & Guidelines 36-49).

Wetland and Meadow Habitat (Management Standard & Guideline 70): See Water Resources section.

Riparian Habitat (Management Standard & Guideline 92): See Water Resources section.

Bog and Fen Habitat (SNFPA ROD page 65, S&G #118): Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and wheeled vehicles.

Riparian Conservation Areas (RCA) (RCA widths 42): Special Aquatic Features include lakes, wet meadows, fens, wetlands, vernal pools, and springs. RCA widths extend 300 feet from the edge of feature or riparian vegetation, whichever is greater.

TESP Plant Survey Standard and Guideline (Corrected Errata, April 19, 2005): Conduct field surveys for TEPS plant species early enough in project planning process that the project can be designed to conserve or enhance TEPS plants and their habitat. Conduct surveys according to procedures outline in the Forest Service Handbook 2609.25 chapter 1.11 (FSH 1990b). If additional field surveys are to be conducted as

part of project implementation, survey results must be documented in the project file. (Management Standard & Guideline 125). The standards and guidelines provide direction for conducting field surveys, minimizing or eliminating direct and indirect impacts from management activities, and adherence to the Regional Native Plant Policy (USDA FS PSW Region 2004).

Lassen National Forest Land and Resource Management Plan (USDA FS PSW Region 1993): The Lassen National Forest LRMP contains the following management direction applicable to motorized travel management and botanical resources:

Sensitive Plants (chapter 4: 26-27)

Maintain habitat and viable populations to contribute to eventual de-listing of Sensitive plants that are found on the forest. a) Identify, preserve, or enhance Sensitive plant populations. b) Restrict vegetative or soil disturbance in areas occupied by Sensitive plants, unless manipulation is needed to perpetuate the species.

Manage Sensitive plants to insure that species do not become Threatened or Endangered because of Forest Service actions. a) Evaluate all proposed projects for potential Sensitive plant habitat. b) If Sensitive plants are found in a proposed project, modify the project or take mitigative action as necessary to protect the habitat.

Special Areas (chapter 4: 27)

Protect areas of outstanding scientific, scenic, botanic or geologic values as Research Natural Areas (**RNA**'s), or Special Interest Areas (**SIA**'s). 1) Prior to formal classification (or designation), protect the identified values of all the recommended areas.

Lassen National Forest Species Management Guides, Conservation Strategies, etc. The following management direction applicable to motorized travel management is outlines in species specific signed documents:

***Rorippa columbiae* Species Management Guide (USDI BLM et al. 1996):** 1) Conduct additional inventory for potential habitat and undiscovered populations, mostly as part of project surveys. 2) Evaluate closing the road through the playa. Avoid new road construction that would impact habitat.

***Silene occidentalis* var. *longistipitata* Conservation Assessment and Strategy (USDA FS 2007g)**: 1) Protect all occurrences from disturbance activities (livestock grazing, logging, fuels activities, and dispersed camping and OHV use) except where prescribed for Silene habitat enhancement, or where unavoidable due to road maintenance activities. 2) Conduct directive surveys in potential habitat for additional occurrences.

***Orcuttia tenuis* Species Management Guide (USDA FS and USDI BLM 1990):** 1) All populations will be protected from direct disturbance by Forest Service management activities. Disturbance here includes excessive grazing, vehicle traffic within vernal pools, and hydrologic manipulation within pools. When necessary, fencing will be the primary method of protection. 2)Vernal pool hydrology of all pools containing Orcuttia tenuis will be maintained by designing all earth-moving projects within the drainage area to allow unchanged drainage into the vernal pools.

Interim Management Prescriptions: Interim Management prescriptions were developed in for Lassen National Forest Sensitive plant species in 2001 (USDA FS 2001b). Only those species with the potential to be impacted by the additional of unauthorized routes in one or more of the Action Alternatives are displayed below. There are currently no Management Prescriptions developed for Special Interest plant species.

***Astragalus pulsiferae* var. *suksdorfii* – Suksdorf's milk-vetch**

Large occurrences (>1 acre) – Maintain an undisturbed core area of at least 50% of the occurrence; allow disturbance in non-core areas of large occurrences, and monitor effects.

Small occurrences (<1 acre) – Protect entire occurrence from disturbance.

***Monardella follettii*- Follett's monardella**

Maintain undisturbed core area of at least 75% of the occurrence(s); allow disturbance in non-core area of the occurrence(s), and monitor effects.

***Packera eurycephala* var*. lewisrosei*- Lewis Rose's ragwort**

Allow no more than 50% of each occurrence on the Lassen to be impacted by land disturbance activities. Monitor the activities' effect on the plant.

Federally Listed Species: Listing History

Greene's Tuctoria (*Tuctoria greenei*)

Slender Orcutt Grass (*Orcuttia tenuis*)

Original Listing: FR notice: 62 FR 14338

Date Listed: March 26, 1997

Classification: Endangered *(Tuctoria greenei)*

Threatened *(Orcuttia tenuis)*

Critical Habitat Designation: The final rule to designate critical habitat for these species was published on August 6, 2003 (USDI FWS 2003a: 46684-46732).

Associated Rulemakings: Critical habitat for this species was proposed on September 24, 2002 (67 FR 60033) (USDI FWS 2002a). The final rule to designate critical habitat for the Greene's tuctoria and slender Orcutt grass was published on August 6, 2003 (USDI FWS 2003a). A re-evaluation of non-economic exclusions from the August 2003 final designation was published on March 8, 2005 (70 FR 11140) (USDI FWS 2005b). An evaluation of economic exclusions from the August 2003 final designation was published on August 11, 2005 (USDI FWS 2005a). Administrative revisions were published on February 10, 2006 (71 FR 7117) (USDI FWS 2006a). Clarifications on the economic and non-economic exclusions for the final designation of critical habitat were published on May 31, 2007 (72 FR 30279) (USDI FWS 2007c).

Supporting Documents

Greene's Tuctoria (*Tuctoria greenei*) 5-Year Review: Summary and Evaluation (USDI FWS 2007d).

Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (USDI FWS 2005c)

Actions from Recovery Plan: General recovery criteria for *Tuctoria greenei* and *Orcuttia tenuis* as well as 18 other listed plants and animals are described in the Recovery Plan (USDI FWS 2005c). This Recovery Plan uses an ecosystem-level approach because many of the listed species and species of concern co-occur in the same natural ecosystem and share the same threats. The overall goal of the Recovery Plan is to achieve and protect in perpetuity self-sustaining populations throughout the full ecological, geographical, and genetic range of each species by ameliorating or eliminating the threats that caused the species to be listed, for the eventual delisting of both *Tuctoria greenei* and *Orcuttia tenuis*.

The over-arching recovery strategy for these species is habitat protection and management. The five key elements that comprise this ecosystem-level recovery and conservation strategy are: (1) habitat protection; (2) adaptive management, restoration, and monitoring; (3) status surveys; (4) research; and (5) public participation and outreach.

Recovery Actions Needed: The actions needed to meet the recovery criteria are: 1) protect habitat within core areas, vernal pool regions, and all other areas that contribute to recovery,

as appropriate; 2) refine areas for vernal pool conservation by conducting Geographic Information Systems, Remote Sensing, and other analyses; 3) restore habitat where needed and adaptively manage vernal pool conservation areas; 4) develop and implement standardized survey any monitoring protocols to determine success in meeting recovery criteria; 5) conduct research necessary to refine management techniques and recovery criteria; 6) develop and implement cooperative programs and partnerships by establishing regional recovery implementation working groups; and 7) develop and implement participation programs in the form of outreach and education.

Effects Analysis Methodology

Area of Effect for Botanical Resources

The widths and/or areas described below were chosen to analyze the effects of the proposed routes on botanical resources for direct, indirect and cumulative effects discussions:

1. Direct and indirect effects to federally-listed, Sensitive and Special Interest plant species as well as potential habitat for these species were assessed using the area within 100 feet of existing or proposed routes. In general, direct effects are most likely to occur within a zone of 30 feet on either side of the route, due to the need for parking and pulling off to allow another vehicle to pass. Indirect effects are most likely to occur within a zone of 100 feet, or an additional 70 feet beyond the 30 foot zone.
2. Direct and indirect effects for federally-listed plant species and Designated Critical Habitat were assessed by determining existing or proposed routes within 300 feet of occupied vernal pools. 300 feet is the SNFPA, RCA buffer width used for Special Aquatic Features, which includes vernal pools.
3. Direct and indirect effects for Botanical Special Areas, RNA's and SIA's were assessed by determining routes which entered the established boundaries of each.
4. The No Action alternative, which allows for cross-country travel, was assessed using the project area described in Chapter 2. The project area was also used to analyze cumulative effects to rare species for all alternatives.

Those species located within these geographic widths and/or areas were considered to have the highest potential to be impacted or influenced by the proposed route designation. The rare species existing condition discussion below will focus on those species located within the project area.

Analysis of Methodology

The analysis of effects on rare plant species was a three-step process (FSM 2005b). In the first step, all listed or proposed rare species that were known or were believed to have

potential to occur in the analysis area were identified. This list was developed by reviewing the U.S. Fish and Wildlife List for Lassen NF (USDI FWS 2009), Regional Foresters Sensitive Plant List (USDA FS PSW Region 2006b), Lassen NF rare plant records from 1987-2009 (USDA FS LNF 2009), as well as Threatened, Endangered, Sensitive (TES), and Special Interest plant geodatabases (USDA FS LNF 2009), as well as California Natural Diversity Database (CNDDB) records (CDFG CNDDB 2008).

The second step was field reconnaissance surveys. Field surveys were conducted on all routes that were identified as having either 1) potential Threatened, Endangered, or Sensitive (TES) plant habitat, and no recent surveys or 2) having known occurrences of TES plants within 100 feet of proposed routes, and no recent monitoring visits. Field surveys were conducted specifically for this project in 2007 and 2008 at the time of the year when plants were evident and identifiable. For each rare plant site found, information was collected that described the size of the occurrence, location and habitat characteristics, and any existing or potential threats were identified. Results were also recorded in route cards found in Table A-2 of Appendix A. Additionally, information on plant data from past field surveys, monitoring, and personal field observations was also utilized during the analysis.

All of this information was used in step three of the analysis, where data was imported into one or more Lassen NF, Geographic Information System (GIS) databases and used to analyze potential habitat, proximity to routes, identify effects, and to develop mitigation measures.

Assumptions specific to the botanical resources analysis

See Chapter 3 Introduction for a list of common assumptions.

- 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 motor 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.
- 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 meadows, which exist on gentle slopes or flat terrain with little or no vegetation or natural barriers to motor vehicles.
- Without specific prevention and/or control measures, invasive non-native plants (weeds) will continue to spread along and within surfaced and unsurfaced motor vehicle roads and trails.
- Motor vehicle use of unsurfaced roads/trails/areas will increase sediment production and erosion. As use increases, sediment production and erosion will increase.

- "Designation" is an administrative act which does not trigger the need for NEPA analysis; therefore, impacts from motorized use on current NFTS roads were not analyzed.
- Seasonal motor vehicle use restrictions for winter recreation, wet weather, and hunting access was not analyzed because these actions on existing NFTS roads provide no beneficial or negative effects to rare plants or their habitat.
- Change in vehicle class, including proposed mixed-use on ML 3 and ML 4 roads, and the change in maintenance level objective on ML 3 roads to ML 2 roads, was not analyzed because the type of vehicle legally allowed to use a road has no beneficial or negative impact on rare plant species or their associated habitat.

Data Sources

Route-specific botanical data (e.g, rare species, meadows, fens, habitats, etc.), including results of route-specific surveys for rare species.

Route inventories collected in Step 1 of Travel Management and associated TAP tabular data sets.

GIS layers of the following data: routes, plant communities (CALVEG) (USDA FS PSW Region 1999), geology, meadows, hydrology, fens, vernal pools, TES plants, Species Interest plants, and vernal pool geodatabases etc. (Appendix B).

California National Diversity Database records (CDFG CNDDB 2008) and CNPS Inventory of Rare and Endangered Plants (2009)

Scientific literature

Botanical Resources Indicators and Methodology by Action

The following indicator measures related to motorized routes located in or near rare plant occurrences or habitats were used to assess the impacts of the alternatives for each action. For all the actions described below, botanical resources will be analyzed for:
Short-term timeframe: 1 year
Long-term timeframe: 20 years
Spatial boundary: Project Area
Rational: Literature indicates that direct effects can occur when individual plants are broken, crushed, or trampled by vehicles traveling or parking off road surfaces, or their habitat is physically impacted, such as disturbing or compacting the soil (Davidson and Fox 1974, Ouren et al. 2007, Wilshire et al. 1978). Indirect effects to rare plants can occur from soil erosion or compaction, dust fugitives, or from the potential displacement of rare and native species with non-native or invasive species (Davidson and Fox 1974, Wilshire et al. 1978, Ouren et al. 2007).

Direct/Indirect effects of the prohibition of cross-country motor vehicle travel, and of adding facilities (unauthorized roads and motorized trails) to the NFTS including season of use and vehicle class

Indicators for Sensitive and Special Interest plant species

Miles of unauthorized routes within 100 feet of rare plant sites or adjacent to suitable rare plant habitat.

The number of acres of potential habitat for rare plants within 100 feet of unauthorized routes.

Total number of plant occurrences within 100 feet of unauthorized routes.

Indicators for federally-listed plant species and associated Designated Critical Habitat

Number of occurrences within 100 feet of existing or proposed unauthorized routes.

Miles of unauthorized routes within 100 feet of vernal pool habitat.

Miles of unauthorized routes within 300 feet around occupied vernal pools.

Indicators for designated Special Areas on the Forest

Miles of unauthorized routes within Research Natural Areas or Special Interest areas.

Methodology: GIS analysis of existing unauthorized routes, buffered by appropriate distances, adjacent to rare plant occurrences, habitat guilds, vernal pools, and Designated Critical Habitat.

Direct/Indirect effect from changes to the existing NFTS (i.e. the conversion of ML 1 roads to Motorized Trails)

Indicators for Sensitive and Special Interest plant species:

- Miles of ML 1 roads coverted to Motorized Trails within 100 feet of rare plant sites or adjacent to suitable rare plant habitat.
- The number of acres of potential habitat for rare plants within 100 feet of ML 1 roads converted to Motorized Trails.
- Total number of rare plant occurrences within 100 feet of ML 1 roads converted to Motorized Trails.

Indicators for federally-listed plant species and associated Designated Critical Habitat

Number of occurrences within 100 feet of ML 1 roads proposed for conversion to Motorized Trails.

Miles of ML 1 roads proposed for conversion to Motorized Trails within 100 feet of vernal pool habitat.

Miles of ML 1 roads proposed for conversion to Motorized Trails within 300 feet around occupied vernal pools.

Indicators for designated Special Areas on the Forest

Miles of ML 1 roads proposed for conversion to Motorized Trails within Research Natural Areas or Special Interest areas.

Methodology: GIS analysis of ML 1 routes proposed for opening up as Motorized Trails, buffered by appropriate distances, rare plant occurrences/habitat and Designated Critical Habitat, with site-specific documentation on known occurrences.

Cumulative Effects

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

Long-term timeframe: 20 years

Spatial boundary: Project Area

Methodology: Analysis of known past, ongoing and future impacts to those occurrences with the potential to be impacted by the addition of unauthorized routes to the NFTS, or changes to the NFTS.

Affected Environment and Environmental Consequences

Affected Environment for Rare Plant Species

Lassen National Forest encompasses a portion of six Counties including Modoc, Lassen, Plumas, Butte, Tehama, Shasta, and Siskiyou within its borders. Within these Counties exists a diverse range of floristic areas, including the Modoc Plateau, the Southern Cascade Mountains, the Cascade Range Foothills, and northern Sierra regions. Much of Eagle Lake District consists of yellow pine forest interspersed with meadows and low sage flats, including vernal pools and alkaline playas. Mixed conifer forests are also present at higher elevations within Eagle Lake Ranger District. Almanor Ranger District is largely comprised of mixed conifer forests, interspersed with meadows and fens. Yellow pine forests occur at lower elevations in the eastern part of the District. Although most soils on Lassen NF are from volcanic parent material, granitic soils occur in the High Lakes region in the southwest part of Almanor District, providing habitat for different plant species. The vegetation also changes dramatically to the west in the Ishi Wilderness region, with chaparral, gray pine, oak woodlands, and vernal pools and swales supporting different plant species from those on Eagle Lake Ranger District. Hat Creek Ranger District has diverse plant habitats, ranging from the yellow pine forests, juniper woodlands, and vernal pools on the Hat Creek Rim, up to subalpine mixed conifer forest on Burney Mountain and alpine vegetation within the Thousand Lakes Wilderness. Manzanita and mountain mahogany dominate large lava flows in the Hat Creek area and north of the Pit River.

Sensitive and Special Interest Plant Species

The Lassen NF provides habitat for approximately 1,600 vascular and over 100 non-vascular plant taxa (USDA FS 2008a), which represents approximately 28 percent of the California vascular plant flora (Hickman 1993). Of these 158 are considered Sensitive of Special Interest Plants on Lassen NF; however, only one species is endemic. *Eriogonum spectabile* (Barron's buckwheat) is known to only three occurrences on the Almanor Ranger District where it is found south of the Caribou Wilderness.

Federally-listed Plant Species and Associated Designated Critical Habitat

There is currently one federally-listed, threatened plant species within the project area, *Orcuttia tenuis* (slender Orcutt grass), as well as habitat for one federally-listed, endangered plant species *Tuctoria greenei* (Greene's Tuctoria), which has a single occurrence adjacent to the analysis area on private lands. The U.S. Fish and Wildlife Service (USDI FWS 2003a) has designated approximately 23,500 acres of Designated Critical Habitat for both of these species on Lassen NF.

Orcuttia tenuis, slender Orcutt grass, is federally-listed as threatened and State-listed as endangered. It is a small, annual grass distinguishable from other grasses by its 5-toothed lemma (Hickman 1993). *Orcuttia tenuis* is limited to drying and dried beds of relatively deep vernal pools or vernal pool type habitat with clay soils. On Lassen NF it is known to 20 occurrences, all of which are currently open to cross-country travel. However, of the 20 occupied pools within the project area, only 12 are found within 10 Designated Critical Habitat (DCH) core areas which total approximately 21,885 acres on NFS lands (Map 24).

Tuctoria greenei, Greene's tuctoria, is federally-listed as endangered and State-listed as Rare. It is similar to *Orcuttia tenuis* except that its lemma is 10-toothed (Hickman 1993). It grows in similar vernal pool habitat as *Orcuttia tenuis*, except it prefers the margins of deeper pools instead of the deeper portions of the pool (Stone et al. 1988), where it also blooms in late summer. There is currently only one occurrence of this species, located outside of its typical range within the Central Valley of California, at Murken Lake on private lands within the administrative boundaries of Lassen NF. This occurrence was located in 1991, and numerous project related surveys since have not located additional occurrences on Lassen National Forest lands (USDA FS LNF 2009). As a result, there are currently no known occurrences of this species on NFS lands, but the Lassen NF does have approximately 1,551 acres of DCH currently open to cross-country travel, located within a single core area (Map 24).

Existing Conditions related to direct and indirect impacts to rare plant species

Unless stated otherwise, "rare plant species", as referred to in this analysis, include federally-listed, as well as Sensitive and Special Interest plant species. Currently, there are one federally-listed endangered, one federally-listed threatened, 45 Sensitive, and 113 Special Interest plant species designated on Lassen NF. A majority of these have known

occurrences on Lassen NF; however, some are only suspected to occur at this point, as potential habitat may exist, but no occurrences have been documented. Of the 160 species designated as rare on Lassen NF, one federally-listed threatened, 33 Sensitive, and 50 Special Interest species (84 total) are known to occur within the analysis area for this project. There are 273 mapped occurrences of TES species, and 750 mapped occurrences of Special Interest plant species within the project area. Table 97 lists all federally-listed, Pacific Southwest Region Sensitive, and Lassen NF Special Interest plant species that are known to occur on Lassen NF, and are included in the analysis for this project. Also included is the rare plant status, the number of Lassen NF occurrences, and habitat guilds (described below) for each species. See the Biological Evaluation and the Botany Report for a complete list of all species considered in the analysis.

Of the 160 species considered in the analysis, several species were omitted because they are found in locations inaccessible to OHVs, such as rock outcrops, on the side of trees, within water bodies, or in locations outside the planning area. The following three Sensitive plant species are eliminated from further analysis for those reasons: *Collomia larsenii*, *Ptilidium californicum,* and *Sedum albomarginatum.*

The following 20 Special Interest plant species are eliminated from further analysis for those reasons stated above: *Asplenium septentrionale, Campanula scabrella, Cardamine bellidifolia* var. *pachyphylla, Carex limosa, Epilobium palustre, Erigeron nivalis, Eriogonum pyrolifolium* var. *pyrolifolium, Lewisia cantelovii, Polystichum krickebergii, P. lonchitis, Potamogeton filiformis, P. praelongus, P. robbinsii, P. zosteriformis, Schoenoplectus heterochaetus, S. subterminalis, Subularia aquatica* var. *americana, Utricularia intermedia, U. minor,* and *U. ochroleuca.*

In addition, those Sensitive and Special Interest plant species that have no known or confirmed occurrences on Lassen NF were also dropped from the analysis because it is unknown if these species exist on the forest and the potential habitat for these species has not yet been undetermined.

The following nine Sensitive plant species are eliminated from further analysis for those reasons: *Botrychium lunaria, Bruchia bolanderi, Buxbaumia viridis, Fritillaria eastwoodiae, Helodium blandowii, Hydrotheria venosa, Monardella stebbinsii, Oreostemma elatum,* and *Thelypodium howellii* ssp. *howellii.*

The following 42 Special Interest plant species are eliminated from further analysis for those reasons stated above: *Antennaria flagellaris, Bulbostylis capillaris, Calycadenia oppositifolia, Campanula wilkinsiana, Carex comosa, C. constanceana, C. inops* ssp. *inops, C. sheldonii, Clarkia borealis* ssp. *arida, C. mosquinii, Claytonia parviflora* ssp. *grandiflora, C. umbellata, Cordylanthus capitatus, Crataegus castlegarensis, Cypripedium californicum, Darlingtonia californica, Draba aureola, Eremogone cliftonii, Erigeron compactus* var. *compactus, Eriogonum umbellatum* var. *ahartii, Frangula purshiana* ssp. *ultramafica, Geum aleppicum, Juncus dudleyi, Lysimachia thyrsiflora, Muhlenbergia jonesii, Navarretia*

heterandra, Nemophila breviflora, Oryzopsis exigua, Packera indecora, Picea engelmannii, Polygonum polygaloides ssp. *esotericum, Pseudostellaria sierrae, Rhamnus alnifolia, Rhynchospora capitellata, Scutellaria galericulata, Silene suksdorfii, Smelowskia ovalis* var. *congesta, Smilax jamesii, Sphaeralcea munroana, Stachys palustris* ssp. *pilosa, Streptanthus drepanoides,* and *Suksdorfia ranunculifolia.*

Table 97 Species considered in analysis, status, known occurrences, and habitat guilds

Species	Status[a]	# mapped occurrences in Analysis Area	Habitat Guild(s)[b]
Tuctoria greenei (Greene's tuctoria)	FE, CR	-	VP
Orcuttia tenuis (Slender Orcutt grass)	FT, CE	20	VP
Arabis constancei (Constance's rockcress)	S	1	U
Astragalus pulsiferae var. suksdorfii (Suksdorf's milkvetch)	S	13	SB, F
Botrychium ascendens (Upswept moonwort)	S	9	R
Botrychium crenulatum (Scalloped moonwort)	S	19	R
Botrychium minganense (Mingan moonwort)	S	27	R
Botrychium montanum (Western goblin)	S	28	R
Botrychium pinnatum (Northwestern moonwort)	S	2	R
Calochortus longebarbatus var. longebarbatus (Long-haired star tulip)	S	1	FM
Calystegia atriplicifolia ssp. buttensis (Butte County morning glory)	S	2	Low elevation F
Clarkia gracilis ssp. albicaulis (White-stemmed clarkia)	S	5	CO
Clarkia mildrediae ssp. mildrediae (Mildred's clarkia)	S	1	Openings in F
Cryptantha crinita (Silky cryptantha)	S	10	CO
Cypripedium fasciculatum (Clustered lady's-slipper)	S	1	F
Cypripedium montanum (Mountain lady's-slipper)	S	3	F
Eriogonum prociduum (Prostrate buckwheat)	S	1	SB
Eriogonum spectabile (Baron's buckwheat)	S	3	Open ridges in F
Juncus leiospermus var. leiospermus (Red Bluff dwarf rush)	S	5	CO
Lewisia kelloggii ssp. hutchisonii (Hutchison's lewisia)	S	1	Bare sites F, B
Limnanthes floccosa ssp. bellingeriana (Bellinger's meadowfoam)	S	3	CO
Lomatium roseanum (Adobe parsley)	S	1	B
Lupinus dalesiae (Quincy lupine)	S	18	Dry Gaps in F
Meesia triquetra (Three-ranked hump-moss)	S	46	FM
Meesia uliginosa (Broad-nerved hump-moss)	S	7	FM
Mimulus evanescens (Ephemeral monkey-flower)	S	4	FM, R
Monardella follettii (Follett's monardella)	S	2	U

Species	Status[a]	# mapped occurrences in Analysis Area	Habitat Guild(s)[b]
Packera eurycephala var. lewisrosei (Lewis Rose's ragwort)	S	4	U
Penstemon personatus (Closed-throated beardtongue)	S	2	F
Penstemon sudans (Susanville beardtongue)	S	7	F, B
Phacelia inundata (Playa phacelia)	S	3	FM
Rorippa columbiae (Columbia yellow-cress)	S	2	FM
Rupertia hallii (Hall's rupertia)	S	12	Low elevation F
Scheuchzeria palustris var. americana (American scheuchzeria)	S	3	FM
Silene occidentalis ssp. longistipitata (Long-stiped western campion)	S	7	Openings in F
Allium sanbornii var. sanbornii (Sanborn's onion)	SI	1	B
Arnica fulgens (Hillside arnica)	SI	9	SB, FM
Astragalus inversus (Susanville milk-vetch)	SI	113	F
Astragalus pauperculus (Depauperate milk-vetch)	SI	15	CO
Betula glandulosa (Bog birch)	SI	1	FM
Botrychium simplex (Yosemite moonwort)	SI	6	R
Callitropsis bakeri (Baker cypress)	SI	7	F
Carex geyeri (Geyer's sedge)	SI	1	Openings in F
Carex lasiocarpa (Slender sedge)	SI	6	FM
Carex petasata (Liddon's sedge)	SI	17	F, SB
Claytonia palustris (Marsh claytonia)	SI	25	R
Dimeresia howellii (Doublet)	SI	1	B
Drosera anglica (English sundew)	SI	8	FM
Erigeron elegantulus (Volcanic daisy)	SI	2	SB
Erigeron inornatus var. calidipetris (Hot rock daisy)	SI	32	F
Erigeron petrophilus var. sierrensis (Northern Sierra daisy)	SI	2	U
Eriogonum tripodum (Tripod buckwheat)	SI	1	B
Eriophorum gracile (Slender cottongrass)	SI	13	FM
Gratiola heterosepala (Boggs lake hedge-hyssop)	SI, CE	8	FM
Hackelia amethystina (Amethyst stickseed)	SI	4	Gaps in F, SB
Hackelia cusickii (Cusick's stickseed)	SI	31	SB
Hierochloë odorata (Vanilla grass)	SI	2	FM, lodgepole F
Hulsea nana (Little hulsea)	SI	1	B
Iliamna bakeri (Baker's globemallow)	SI	10	post-fire in F, B
Juncus hemiendytus var. abjectus (Center Basin rush)	SI	23	FM
Lilium humboldtii ssp. humboldtii (Humboldt lily)	SI	2	Low elev. F, CO
Limnanthes floccosa ssp. floccosa (Woolly	SI	17	CO

Species	Status[a]	# mapped occurrences in Analysis Area	Habitat Guild(s)[b]
meadowfoam)			
Lycopus uniflorus (Northern bugleweed)	SI	3	FM
Mimulus glaucescens (Shield-bracted monkeyflower)	SI	15	R
Mimulus pygmaeus (Egg lake monkeyflower)	SI	54	FM, R
Navarretia subuligera (Awl-leaved navarretia)	SI	1	CO
Penstemon cinicola (Ash beardtongue)	SI	24	FM, F
Penstemon heterodoxus var. shastensis (Shasta beardtongue)	SI	19	FM, F
Penstemon janishiae (Janish's beardtongue)	SI	3	B
Phlox muscoides (Moss phlox)	SI	3	B
Piperia colemanii (Coleman's rein orchid)	SI	4	F
Pogogyne floribunda (Profuse-flowered pogogyne)	SI	52	FM
Polyctenium fremontii var. fremontii (Fremont's combleaf)	SI	1	R, SB
Polygonum bidwelliae (Bidwell's knotweed)	SI	15	Gaps in F,CO
Potentilla newberryi (Newberry's cinquefoil)	SI	2	FM
Rhynchospora alba (White beaked-rush)	SI	2	FM
Senecio hydrophiloides (Sweet marsh ragwort)	SI	30	SB, FM
Sparganium natans (Small bur-reed)	SI	5	FM, R
Stellaria longifolia (Long-leaved starwort)	SI	4	R
Stellaria obtusa (Obtuse starwort)	SI	71	R
Stenotus lanuginosus (Woolly stenotus)	SI	38	SB
Streptanthus longisiliqus (Long-fruit jewelflower)	SI	8	Gaps in F, CO
Thermopsis californica var. argentata (Silvery false lupine)	SI	29	F
Trifolium andersonii var. andersonii (Anderson's clover)	SI	1	F
Trillium ovatum ssp. oettingeri (Salmon Mountains wakerobin)	SI	8	F

aStatus abbreviations: FE – federally-listed Endangered, FT – federally-listed Threatened, S – Forest Service Sensitive, SI – Forest Service Special Interest, CR – State listed Rare, CE – State listed Endangered; bGuilds abbreviations: B–Barren, CO –Chaparral/Oak Woodlands, F – Forest, FM – Fens and Meadow, R – Riparian Areas, SB –Sagebrush, U – Ultramafic, VP – Vernal Pools.

Aggregating Rare Species for Analysis of Effects

As many of these species occur in the same or similar habitats, and the effects of motor vehicle use may vary by habitat, the rare plant species being considered in this analysis have been grouped into guilds based on habitat requirements. The following habitat guilds have been selected to represent the species addressed.

Habitat Guild Descriptions

While the rare plant species known or suspected to occur in the analysis area vary widely in their ecological requirements and life history characteristics, many occur in similar broad habitat types where the effects of motorized vehicle use are comparable. For the purposes of this analysis, the rare plant species being considered have been grouped into vegetation type guilds, based on these general habitat requirements. The following section describes the eight habitat guilds designed to study the impacts of rare plant species and lists the species assigned to each group. Each of the guilds includes one or more vegetation types identified in the Existing Vegetation map (CALVEG) of Lassen NF, completed by the Remote Sensing Lab of the Forest Service Pacific Southwest Region (1999), or are in existing Lassen NF GIS data layers for fens, wetlands, streams, vernal pools, and geology (Appendix B). However, some species may occur in one or more guild, e.g., the Suksdorf's milkvetch (*Astragalus pulsiferae* var*. suksdorfii*) occurs in sagebrush (SB), and in lodgepole forest (F). There are also several species which occur in edge habitats, sites where two guilds come together. For these species, elements of two different guild habitat types are important.

In many cases, the habitat requirements for rare plant species are poorly defined, and there are typically several other factors affecting their occurrence other than simply the vegetation community. Often times, the actual potential habitat is at a scale that is too small to be delineated on the GIS layers available for use. Some species, for example, are found on small vernal swale areas within the blue oak woodland community, or within small pockets of a specific substrate or vegetation type that are not individually mapped out in the CALVEG or geology databases; therefore, it is difficult to quantify these nuances in habitat preference. In these cases, the vegetation type that encompasses these areas may have been used. As a result, the amount of potential habitat affected and/or available for these species is significantly overestimated for many species. The quantitative use of the guilds is provided for comparative purposes between alternatives, and should not be interpreted as a precise estimate of the amount of habitat available or affected for any particular species within the guild. The project record and botanical reports for this analysis contains additional information on species and vegetation types assigned to each guild, and their proximity to unauthorized routes.

Impacts to the vernal pool Habitat Guild which contain only the federally-listed endangered species, *Tuctoria greenei*, and threatened species, *Orcuttia tenuis*, will be analyzed separately, using the Lassen NF vernal pool and the Designated Critical Habitat layers.

Barren (B) – includes species found in talus, rocky gravel, scree, rock outcrops, and lava flows.

Chaparral/Oak Woodland (CO) – includes species found in the low elevation habitats of chaparral, oak woodlands, and gray pine forests.

Fen and Meadow (FM) – includes species growing in openings with more or less grasses, sedges, and herbs that grow under moist or saturated conditions, including wetlands with substantial accumulations of peat (fens), and edges of lakes, reservoirs, or playas, and vernal pools.

Forested (F) – includes those species found in ponderosa pine, Jeffrey pine, lodgepole pine, red fir, or mixed conifer forested communities, generally montane to subalpine.

Riparian Areas (R) – includes species found along the margins of perennial, intermittent or ephemeral streams, as well as seep species that may be associated with these areas.

Sagebrush (SB) – includes species found in Great Basin and montane shrub communities,

e.g., big sagebrush, silver sage, low sage, bitterbrush, and Western juniper.

Ultramafic (U) – includes those species restricted to ultramafic and serpentine substrates.

Vernal Pool (VP) – includes known vernal pool habitat for the federally-listed species, *Orcuttia tenuis* and *Tuctoria greenei*.

Barren (B)

This plant guild includes a wide variety of rocky habitat types. It includes alpine scree and talus fields, which occur only at the highest points within Lassen NF, such as the top of Magee Peak in the Thousand Lakes Wilderness. It also includes rock outcrops, open gravelly hillslopes, lava beds and talus fields occurring at all elevations throughout Lassen NF. These sites provide harsh growing conditions for plants, having little soil, although cracks and shallow basins within the rocks can capture and hold water for plants. These sites provide specialized niches for several rare plant species. Types in the CALVEG layer used to calculate this potential habitat include barren and perennial grasslands, due to the presence of this vegetation type on top of the Diamond Mountains where many of these species are found (USDA FS PSW Region 1999).

Lassen National Forest Sensitive plant species occurring in Barren sites are: *Lewisia kelloggii* ssp*. hutchisonii, Lomatium roseanum,* and *Penstemon sudans.* Lassen National Forest SI species occurring in Barren habitats include: *Allium sanbornii* var*. sanbornii*, *Dimeresia howellii*, *Eriogonum tripodum, Hulsea nana*, *Iliamna bakeri, Penstemon janishiae,* and *Phlox muscoides*.

The following Barren species are found within 100 feet of existing unauthorized routes: *Iliamna bakeri, Penstemon janishiae* and *Phlox muscoides*.

Chaparral/Oak Woodland (CO)

This habitat type occurs mostly in the southwestern portion of Almanor RD, in and around the Ishi Wilderness and Finley Lake, and within the northwestern portion of Hat Creek RD. These areas are mostly in the western foothills of the Sierra and Cascade Mountain Ranges, as they slope down into the Central Valley of California. However, Oregon oak woodlands occur in the northwest region of Lassen NF in the Soldier Mountain area. Vegetation types within this category include open oak woodlands, dense chaparral of manzanita, ceanothus, and gray pine woodlands, as well as low elevation vernal pools, swales, and areas, which intergrade between all of these vegetation types. Since rare plant species in this guild cannot be defined by existing CALVEG types, due to the small gap habitats they are found, the surrounding CALVEG types were used for the potential habitat determination (USDA FS PSW Region 1999). In addition, to narrow the analysis to the lower elevation oak and chaparral habitat types on Lassen NF, focus areas were developed to determine potential habitat within these areas. See the project record for focus area descriptions and the CALVEG types used to determine potential habitat for this guild.

Lassen National Forest Sensitive plant species that occur in the Chaparral/Oak Woodland Habitat Guild are: *Clarkia gracilis* ssp. *albicaulis*, *Cryptantha crinita*, *Juncus leiospermus* var*. leiospermus,* and *Limnanthes floccosa* ssp. *bellingeriana*. Lassen National Forest SI species that occur in Chaparral/Oak Woodland habitats are: *Astragalus pauperculus*, *Lilium humboldtii* ssp. *humboldtii*, *Limnanthes floccosa* ssp. *floccosa, Navarretia subuligera, Polygonum bidwelliae,* and *Streptanthus longisiliqus*.

The following Chaparral/Oak Woodland species are found within 100 feet of existing unauthorized routes: *Astragalus pauperculus, Cryptantha crinita, Juncus leiospermus* var. *leiospermus, Limnanthes floccosa* ssp. *bellingeriana, L. floccosa* ssp*. floccosa*, and *Polygonum bidwelliae*.

Fens and Meadows (FM)

This habitat type includes open areas vegetated with a more or less dense cover of grasses, sedges, and forbs that prefer seasonally moist or saturated conditions. These sites may be surrounded by grasslands, forests, or shrublands, and includes fens, alkaline playas and habitat adjacent to lakes, and reservoirs, which are scattered throughout the project area.

Fens are defined as groundwater-fed wetland ecosystems that develop where perennially saturated soils and cool temperatures slow the decomposition of plant material, allowing it to accumulate and form organic soils, called peat (Cooper et al. 2005). They are considered significant resources, due to their unique hydrologic characteristics (USDA FS 2007a); ability to support high levels of biodiversity, including rare species (USDA FS 2007a); relative rarity across the Sierra Nevada (Bartolome et al. 1990); and ability to remain relatively stable for long periods of time, storing plant and climatic data over millennia (Chimner et al. 2002). They are inherently tied to hydrological processes and it has been demonstrated that small-scale disturbances caused by water diversions, channels, trails, and other management

actions can have substantial impacts on their hydrologic and biotic integrity (Cooper et al. 1998, Weixelman and Cooper 2009). In addition, they support a suite of plants, many endemic to these systems, and rare throughout their range. On Lassen NF, there are 52 documented fens, occurring mostly in Almanor RD. Inventory of fens is estimated at approximately 80 percent, based on an informal check of airphotos in the unsurveyed portions of the Almanor Ranger District, where the majority of fens on the Lassen NF are found.

The Lassen National Forest Sensitive plant species occurring in Fen and Meadow habitats are: *Calochortus longebarbatus* var. *longebarbatus, Mimulus evanescens, Meesia triquetra, M. uliginosa, Phacelia inundata,* and *Scheuchzeria palustris* var. *americana*. Lassen National Forest SI species found in Fen and Meadow habitats are: *Arnica fulgens, Betula glandulosa, Carex lasiocarpa, Drosera anglica, Eriophorum gracile, Juncus hemiendytus* var. *abjectus, Hierochloë odorata, Lycopus uniflorus, Mimulus pygmaeus, Penstemon cinicola, P. heterodoxus* var. *shastensis, Pogogyne floribunda, Potentilla newberryi, Rhynchospora alba, Senecio hydrophiloides*, and *Sparganium natans*. **The following Fen and Meadow species are found within 100 feet of existing unauthorized routes: *Carex lasiocarpa, Eriophorum gracile, Gratiola heterosepala, Juncus hemiendytus* var. *abjectus, Meesia triquetra, Mimulus evanescens, M. pygmaeus, Penstemon cinicola, P. heterodoxus* var. *shastensis, Phacelia inundata, Pogogyne floribunda, Potentilla newberryi, Rorippa columbiae* and *Senecio hydrophiloides*.**

Forested (F)

The Forested plant guild includes mixed conifer, red fir, lodgepole and eastside pine forests. They may include any possible canopy mix of white fir, red fir, Douglas fir, Jeffrey pine, ponderosa pine, sugar pine, lodgepole pine, and incense cedar. These range from relatively dense westside forests with high canopy covers, to relatively open eastside yellow pine forests. These forests extend from the sagebrush and chaparral zones up to subalpine forest, ranging in elevation from approximately 3,200 to 8,200 feet. Understory plant communities are often sparse, ranging from communities of annuals, bunchgrasses, and forb species in yellow pine forests, to almost no understory plants under dense red fir canopies. Many of the plants within this guild are found in “gap” habitats within forested areas or are common in ecotone areas where two vegetation types intergrade. See the project record for the CALVEG types used to determine potential habitat for this guild.

Lassen National Forest Sensitive plant species that occur in the Forested guild are: *Astragalus pulsiferae* var. *suksdorfii*, *Calystegia atriplicifolia* ssp. *buttensis*, *Cypripedium fasciculatum*, *C. montanum*, *Eriogonum spectabile*, *Lewisia kelloggii* ssp. *hutchisonii*, *Lupinus dalesiae*, *Penstemon personatus*, *P. sudans*, *Rupertia hallii*, and *Silene occidentalis* ssp. *longistipitata*. Lassen National Forest SI species that occur in the Forested guild are: *Astragalus inversus*, *Callitropsis bakeri*, *Carex geyeri*, *C. petasata*, *Erigeron inornatus* var.

calidipetris, *Hackelia amethystina*, *Hierochloë odorata*, *Iliamna bakeri*, *Lilium humboldtii* ssp. *humboldtii*, *Penstemon cinicola P*. *heterodoxus* var. *shastensis*, *Piperia colemanii*, *Polygonum bidwelliae*, *Streptanthus longisiliqus*, *Thermopsis californica* var. *argentata*, *Trifolium andersonii* var. *andersonii*, and *Trillium ovatum* ssp. *oettingeri*.

The following Forested species are found within 100 feet of existing unauthorized routes: *Astragalus inversus, A. pulsiferae* var. *suksdorfii, Callitropsis bakeri, Carex petasata, Erigeron inornatus* var. *calidipetris, Hackelia amethystina, Iliamna bakeri, Lupinus dalesiae, Penstemon cinicola, P. heterodoxus* var. *shastensis, P. personatus, Polygonum bidwelliae, Silene occidentalis* ssp. *longistipitata, Thermopsis californica* var. *argentata, Trifolium andersonii* var. *andersonii,* and *Trillium ovatum* ssp. *oettingeri*.

Riparian Areas (R)

These are areas immediately bordering the edges of intermittent, ephemeral, and perennial streams. Also included in this group are moist areas surrounding small seeps. Forested riparian areas include streambanks under dense forest canopies in mixed conifer forests, particularly on Almanor Ranger District, but they also occur in aspen, yellow pine, and lodgepole pine forests. More open riparian areas range from drainages through montane meadows with willows, alders, and dense sedges in Almanor RD, to the intermittent and ephemeral drainages scattered throughout the eastern portion of Lassen NF on the Eagle Lake and Hat Creek Ranger Districts. Riparian vegetation along streams helps to maintain the water table by holding streambanks in place, and shades the water to keep stream temperatures cooler. It is also critically important for preventing erosion and sedimentation in streams and other water bodies. Rare plant species found in seep habitats are also included in this guild, since these areas are associated with riparian areas throughout Lassen NF. However, seeps are limited in number and distribution and have not been well documented or mapped on Lassen NF; therefore, quantification of the amount (acreage) of this habitat affected by the proposed routes is limited to the existing stream inventory GIS layers, where most seeps are believed to be found within the 100 ft buffer used for this analysis.

Lassen National Forest Sensitive plant species that occur in Riparian Areas are: *Botrychium ascendens*, *B. crenulatum*, *B. minganense*, *B. montanum*, *B. pinnatum,* and *Mimulus evanescens*. Lassen National Forest SI species occurring in Riparian Areas are: *Botrychium simplex, Claytonia palustris, Mimulus glaucescens, M. pygmaeus, Polyctenium fremontii* var. *fremontii, Sparganium natans, Stellaria longifolia,* and *S. obtusa*.

The following Riparian species are found within 100 feet of existing unauthorized routes: *Mimulus evanescens, M. glaucescens, M. pygmaeus*, and *Stellaria obtusa*.

Sagebrush (SB)

This habitat type includes big sagebrush sites, typical of Great Basin sagebrush habitat, silver sagebrush habitat, and low sagebrush flats, common in heavy clay soils such as in Pine Creek and Harvey Valleys on Eagle Lake Ranger District. Sites are often rocky, and

frequently interfinger with bitterbrush, open juniper woodlands, and yellow pine forests. Sagebrush habitats are also common surrounding vernal pool sites. See the project record for the CALVEG types used to determine potential habitat for this guild.

Lassen National Forest Sensitive plant species that occur in Sagebrush habitats are: *Astragalus pulsiferae* var. *suksdorfii* and *Eriogonum prociduum.* Lassen National Forest SI species occurring in Sagebrush habitats are: *Arnica fulgens, Carex petasata, Erigeron elegantulus, Hackelia amethystina, H. cusickii, Polyctenium fremontii* var. *fremontii, Senecio hydrophiloides,* and *Stenotus lanuginosus.*

The following Sagebrush species are found within 100 feet of existing unauthorized routes: *Astragalus pulsiferae* var. *suksdorfii, Carex petasata, Hackelia amethystina, H. cusickii, Senecio hydrophiloides,* and *Stenotus lanuginosus*.

Ultramafic (U)

Serpentine soils and rock outcrops derived from metamorphic and igneous ultramafic rock that contain iron magnesium silicate and impurities of heavy metals. Ultramafic soils are high in magnesium, iron, cobalt, nickel, and chromium, and low in nitrogen, phosphorus, potassium, and calcium. They are toxic to plant species not specifically adapted to them. As a result, they support a number of rare, endemic plant species. On Lassen NF, ultramafic soils are known to occur on Almanor Ranger District, near Yellow and Grizzly Creeks, and areas adjacent to Lotts Lake.

Lassen National Forest Sensitive plant species occurring in Ultramafic habitats are: *Arabis constancei*, *Monardella follettii,* and *Packera eurycephala* var. *lewisrosei*. The only known Lassen National Forest SI species that occurs in Ultramafic habitats is *Erigeron petrophilus* var. *sierrensis*.

The following Ultramafic species are found within 100 feet of existing unauthorized routes: *Erigeron petrophilus* var. *sierrensis, Monardella follettii*, and *Packera eurycephala* var. *lewisrosei*.

Vernal pools (V)

Vernal pool habitats are depressions or swales with relatively impermeable soils that fill with water in the winter and during spring snowmelt, and gradually dry out as summer progress. They areas are dominated by low-growing species of annual grasses and forbs adapted to germination and early growth under water. On the Lassen, this unique habitat type ranges from tiny wetlands to vernal lakes, and many pools are actually part of larger silver/or low sage basins (USDA FS LNF 2009). Vernal pools on the Lassen NF have been found on all three Ranger Districts, primarily in Lassen and Shasta counties, but a few pools are can also be found in northern Plumas and southeastern Siskiyou counties. These pools are all considered part of the Modoc Plateau Vernal Pool Region, developed by the U.S. Fish and Wildlife Service within the Vernal Pool Recovery Plan (USDI FWS 2005a). The vernal pools in the region are of the Northern Basalt Flow and Northern Volcanic Mudflow types because the substrate was formed by volcanic activity.

Lassen National Forest federally-listed plant species occurring in Vernal Pool habitats are: *Orcuttia tenuis* and *Tuctoria greenei.*

The following Vernal Pool plant species are found within 100 feet of existing unauthorized routes: *Orcuttia tenuis*.

Affected Environment for other Botanical Resources—Special Areas

Research Natural Areas—RNA's

Research Natural Areas (RNAs) in National Forest are public lands protected permanently to maintain biological diversity and provide ecological baseline information, education and research (Cheng 2004). Specifically, they are established by the Chef of the Forest Service for several reasons: 1) to contribute to the preservation of examples of all significant natural ecosystems for the purposes of research and ecological study; 2) to provide gene pools; and 3) where appropriate, to protect habitats of rare and endangered species of plants and animals (FSM 2008b).

FSM 4063.3 outlines protection and management standards within a RNA. These standards do not permit roads, trails, fences, or signs on an established RNA unless they contribute to the objectives or to the protection of the area. There are eight RNAs on the Lassen NF (Table 98).

Existing Conditions related to Research Natural Areas

There are 2.5 miles of unauthorized routes within the Blacks Mountain, Cub Creek, Indian Valley, Timbered Crater RNA's on the Lassen NF.

Table 98 Special Areas on the Lassen National Forest

Special Area Type	Name	Target Element/Feature
RNA	Cub Creek RNA	Mixed Conifer Forest
RNA	Blacks Mountain RNA	Interior Ponderosa Pine
RNA	Green Island Lake	Moss/Bog
RNA	Indian Creek	Blue oak/Foothill pine
RNA	Soda Ridge	*White fir (Abies concolor)*
RNA	Timbered Crater	*Baker cypress (Callitropsis bakeri) and Northern basalt vernal pool*
RNA	Graham Pinery (Iron Mountain)	Pacific Ponderosa Pine and California Black Oak
RNA	Mayfield	Knobcone Pine
SIA	Black Rock	Geologic
SIA	Crater Lake	Geologic
SIA	Deep Hole	Geologic
SIA	Homer/Deerheart	Scenic
SIA	Montgomery Creek	Botanic
SIA	Murken	Botanic
SIA	Willow Lake Bog	Botanic/Aquatic

Source: USDA FS PSW Region 1993, Cheng 2004.

Special Interest Areas—SIA's

Special Interest Areas (SIA's) are broadly defined to include areas of unusual or outstanding botanical, aquatic, scenic, geologic, zoological, paleontological, cultural or other unique characteristics that may merit special attention and management. Established SIA's are managed to protect their unique resources and, where appropriate, to foster their use and enjoyment by the public (USDA FS PSW 1993). Forest Service Manual 2372.4 (FSM 1990) outlines protection and management standards within a SIA. These standards specify that a) roads and trails be located without disturbing the special feature of the established area and that b) roads and trails are kept to the minimum necessary for public enjoyment. There are seven designated SIA's on the Lassen NF., three of which were established for their specific botanical features (Table 98).

Existing Conditions related to Special Interest Areas

There are 0.10 miles of unauthorized routes within the Murken SIA.

Environmental Consequences

General Types of Impacts

Impacts to rare plants and their habitats vary across all alternatives. In general, alternatives with fewer miles of routes open for motor vehicle use show reduced effects to rare plants and their habitats.

Direct Effects

Direct effects occur when individual plants are broken, crushed, or trampled by vehicles traveling or parking off road surfaces, or their habitat is physically impacted, such as disturbing or compacting the soil (Ouren et al. 2007, Wilshire et al. 1978). Vehicles traveling on or parking off of the route surface can result in death, altered growth, or reduced seed set through physically breaking, crushing, or uprooting plants (Davidson and Fox 1974, Ouren et al. 2007, Wilshire et al. 1978, Cole and Bayfield 1993). 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; these impact can affect plant vigor and survival success (Wilshire et al. 1978).

Direct effects are dependent upon the intensity and timing of disturbance. Effects are also dependent upon the number of plants at a specific location and the proportion of the occurrence impacted. Repeated damage of this type weakens the compensatory capabilities of rare plants, which can lead to degradation of habitat and eventually to the replacement of native plants species with non-native species more adapted to frequent disturbances, such as invasive weeds (Ouren et al. 2007).

Indirect Effects

Indirect effects are caused by the action and are later in time, or further removed in distance, but are still reasonably foreseeable. Indirect impacts to rare plants can occur from soil erosion or compaction, dust fugitives, or from the potential displacement of rare and native species with non-native or invasive species (Davidson and Fox 1974, Ouren et al. 2007, Shipley et al. 1978). Indirect impacts to soil from repeated off-road use can lead to the degradation of habitat for rare plants and other native plant communities. Soil compaction, erosion, and modification of soil properties can affect the distribution, abundance, growth rate, reproduction, and size of plants (Ouren et al. 2007). Wilshire and Nakata (1976) report that initial use by OHVs results in a loss of cohesion and lateral displacement of soils, while repeated use leads to compaction. The effects of soil erosion on plants can include undercutting of root systems as routes are enlarged by erosion; creation of new erosion channels in areas not used by vehicles; wind erosion of adjacent destabilized areas; burial of plants by debris eroded from areas of use; and reduction of the biological capability of the soil by physical modification and stripping of fertile layers (Wilshire et al. 1978).

Soil compaction and the subsequent decrease in infiltration and distribution of water through the soil profile can lead to decreased moisture available for plant growth (Snyder et al. 1976). Compaction caused from repeated off-highway vehicle use, can result in reduced seed germination (Davidson and Fox 1974), seedling survival, soil water infiltration (Wilshire et al. 1978), plant and root growth (Phillips and Kirkham 1962). Meadows are particularly susceptible to compaction due to the fact that most meadows remain wet into August, with many staying wet year-round. In rare plant habitat, soils subjected to vehicular traffic that become compacted and eroded due to wheel ruts may become unsuitable for seedling development and the sustainability or expansion of that rare plant population could be affected.

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 (Ouren et al. 2007, Munger et al. 2003, Trombulak and Frissell 2000, Wilshire et al. 1978). Trombulak and Frissell (2000) report the spread of exotics by vehicles through habitat alteration, stress on native species, and creation or maintenance of movement corridors. Repeated damage to rare plant species can lead to the degradation of habitat and eventually to the replacement of native plant species, with species more adapted to frequent disturbance, such as invasive weeds. Off-highway vehicles have been shown to accelerate plant invasions (Von der Lippe and Kowarik 2007) by reducing native plant biomass and diversity (Brooks 1995), and creating edge habitats which can generate conditions that promote the establishment of non-native or invasive plant species along road corridors (Trombulak and Frissell 2000, Ouren et al. 2007). For a more detailed discussion of the effects of roads and vehicles on weed invasion, and the effects of weeds on native vegetation, refer to the effects section for noxious weeds.

Dust from motor vehicle use has also been shown to decrease native plant cover and vigor by reducing rates of photosynthesis, respiration, transpiration (Spellerberg and Morrison 1998), and water-use efficiency. Dust can block photosynthesis, respiration, and transpiration, and may even be sufficient in some cases to alter community structure (Trombulak and Frissell 2000).

Cumulative Effects

A cumulative effect can result from the incremental impact of the action when added to the effects of past, present, and reasonably foreseeable future actions. Past activities are considered part of the existing conditions and are discussed within the Affected Environment section above. This is because the 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. 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 to those effects.

The project area was chosen as the cumulative effects analysis area for all rare species within this analysis. Ongoing or future actions on private lands within Lassen NF boundary may also have had cumulative impacts on these species, but since survey requirements and mitigations for rare plant species are not known, the type and extent of the potential impacts to rare plant species on private lands cannot be quantified.

Ongoing and future activities such as fuels reduction, timber projects, as well as special uses and other activities (Appendix C) would be surveyed using similar standards as the routes proposed to be added to the NFTS for the Motorized Travel Management Project. Mitigation measures for Botanical Resources were developed, when needed, to ensure species viability or to minimize the impacts to TES or Special Interest plant species on a project-by-project basis. Ongoing range management actions within the project area can impact rare plant species by trampling, altering habitat, or directly by utilizing rare plant species as forage. These impacts could add cumulatively to those potential impacts associated with implementation of the No Action alternative. In addition, ongoing and future activities that are associated with the proposed route system could impact rare species growing along or in the vicinity of a route. These activities may include routine maintenance such as brushing, signing, cleaning, or clearing of debris, or increased levels of dispersed camping or recreation along and near routes. The rare plant monitoring Strategy (Chapter 2, Appendix D) requires monitoring of road and trail conditions within rare plant occurrences to detect if resource damage is occurring to rare plant species, and will instigate the development of species-specific mitigations or route closure if detrimental impacts are found.

Effects of Alternatives to Rare Plant Species and Botanical Resources

The following sections provide a discussion of the direct, indirect, and cumulative effects of each alternative to habitat guilds, rare plant species and botanical resources. For rare plants only those species with the potential to be affected directly or indirectly by the proposed project (those within 100 feet of a proposed route) are discussed in detail in this document. The remainder of the discussion is focused on the general effects to rare species and habitats guilds from motor vehicle use.

The following table summarizes the number of unauthorized routes miles opened for motorized travel within each habitat guild by alternative (Table 99). Also displayed is the number of acres of potential habitat within 100 feet of existing unauthorized routes, which have the highest potential of being directly or indirectly impacted by cross-country travel. Many Special Interest plant species on Lassen NF were not mapped accurately and the exact acres for these occurrences and/or species cannot be quantified for specific occurrences. This is especially true for Special Interest plant species, which are much more common on the forest and are not regularly monitored. While the exact acres and numbers of plants for potentially impacted occurrences may not be known for all occurrences within the project area, assumptions can be made about impacts within 100 feet of designated routes to asses the effects to these occurrences between Alternatives.

For all habitat guilds, the No Action Alternative has the highest estimated number of unauthorized routes and impact to potential habitat, due to the continuation of cross-country travel under this alternative. Impacts are lessened or eliminated as fewer unauthorized routes are added under the Action Alternatives 2- Modified 5 (Table 99).

Alternative 1 –No Action

Alternative 1 has the greatest negative effect on rare plant species and habitats. Under the No Action Alternative, all inventoried unauthorized routes will remain open and continue to be used; however, the largest impact of this alternative is from cross-country travel, which has the potential to affect all but the most inaccessible rare species and habitats (Table 99). Within the project area there is approximately 947,555 acres of potential rare plant habitat, based on the location of the various habitat guilds created for each species. Thus, approximately 88 percent of the 1,072,488 acre project area is considered potential habitat for one or more rare plant species. Therefore, due to the large area of potential habitat existing within the project area it is impossible to quantify when and where rare plant species and habitats will be impacted by motor vehicles; therefore, the analysis below uses the 1,089 miles of unauthorized routes as a representation of current motor vehicle use on Lassen NF. Due to the potential scope of these effects, the analysis of this alternative also focuses on a discussion of effects to habitat groups, rather than to individual species. However, the analysis of federally-listed species is based on known occurrences and potential habitat as well as impacts to the critical habitat around occupied vernal pools.

Table 99 Approximate number of miles of unauthorized routes, and acres of potential habitat impacted within each Habitat Guild[a]

Habitat Guilds	Measure	Alternative					
		1 No-Action	2	3	4	5	Mod5
Barren	Miles of Proposed Unauthorized Routes	0	0	0	0.2	0.9	0.9
	Miles of Unauthorized Routes	21.3	0	0	0	0	0
	Total Miles	**21.3**	**0**	**0**	**0.2**	**0.9**	**0.9**
	Acres of Potential Habitat	**481**	**>1**	**0**	**5.3**	**25**	**25**
Chaparral/ oak woodland	Miles of Proposed Unauthorized Routes	0	1.2	0	0.6	1.6	1.6
	Miles of Unauthorized Routes	50.3	0	0	0	0	0
	Total Miles	**50.3**	**1.2**	**0**	**0.6**	**1.6**	**1.6**
	Acres of Potential Habitat	**1,248**	**27**	**0**	**17**	**40**	**40**
Fen/ Meadow	Miles of Proposed Unauthorized Routes	0	4.0	0	1.8	9.6	9.6
	Miles of Unauthorized Routes	114.8	0	0	0	0	0
	Total Miles	**114.8**	**4.0**	**0**	**1.8**	**9.6**	**9.6**
	Acres of Potential Habitat	**2,789**	**93**	**0**	**48**	**239**	**239**
Forested	Miles of Proposed Unauthorized Routes	0	17.0	0	8.4	44.5	46.9
	Miles of Unauthorized Routes	858.7	0	0	0	0	0
	Total Miles	**858.7**	**17.0**	**0**	**8.4**	**44.5**	**46.9**
	Acres of Potential Habitat	**21,562**	**413**	**0**	**217**	**1,116**	**1,177**
Riparian	Miles of Proposed Unauthorized Routes	0	0.3	0	0.3	1.5	1.5
	Miles of Unauthorized Routes	48.3	0	0	0	0	0
	Total Miles	**48.3**	**0.3**	**0**	**0.3**	**1.5**	**1.5**
	Acres of Potential Habitat	**1,259**	**10**	**0**	**11**	**44**	**44**
Sagebrush	Miles of Proposed Unauthorized Routes	0	0.4	0	1.3	3.1	3.1
	Miles of Unauthorized Routes	97.4	0	0	0	0	0
	Total Miles	**97.4**	**0.4**	**0**	**1.3**	**3.1**	**3.1**
	Acres of Potential Habitat	**2,303**	**9**	**0**	**31**	**73**	**73**
Ultramafic	Miles of Proposed Unauthorized Routes	0	0	0	0	0.1	0.1
	Miles of Unauthorized Routes	1.6	0	0	0	0	0
	Total Miles	**1.6**	**0**	**0**	**0**	**0.1**	**0.1**
	Acres of Potential Habitat	**40**	**0**	**0**	**0**	**3**	**3**

[a.] Acres/miles not additive due to overlapping habitat guilds.

With the implementation of the No Action alternative, cross-country travel will continue the threat of impacts to known and potential rare plant habitat across Lassen NF. As a result, this alternative has the greatest negative effect on all habitat guilds and their associated species.

Direct and Indirect Effects of Continuation of cross-country motor vehicle travel and use of existing unauthorized roads

Sensitive and Special Interest Plant species and Habitat Guilds

With the implementation of the No Action alternative there would be no direct effects to Sensitive or Special Interest plant species, except those associated with ongoing activities. Of the 1,023 mapped occurrences within the project area, there are 33 Sensitive and 114 Special Interest plant occurrences currently documented within 100 feet of the 1,089 miles of unauthorized routes within the project area (Table 100). In addition, Alternative 1 has the highest number of route miles (1,013 miles) and acres (25,223 acres) that intersect rare plant occurrences or associated habitat (Table 100).

Table 100 Summary of indicator measures for the analysis of effects to Sensitive and Special Interest plant species for the prohibition of crosscountry travel and the addition of routes under Alternative 1

Measure	Total
Miles of unauthorized routes within 100 feet of rare plant sites or within or adjacent to suitable rare plant habitat.	1,013 miles
The number of acres of potential habitat for rare plants within 100 feet of unauthorized routes.	25,223 acres
Total number of rare plant occurrences within 100 feet of unauthorized routes.	147

Barren Habitat Guild

Barren habitats can be heavily impacted by off-road travel, due to the open nature of many of these sites. Some of these habitats such as talus and scree slopes found on ridges tops throughout Lassen NF are easily accessed, while lava flow and rock outcrops provide a natural barrier to cross-country travel. The No Action Alternative has the highest estimated number of unauthorized routes in this guild, due to the continuation of cross-country travel under this alternative.

The Barren habitat guild also has three rare plant occurrences within 100 feet of unauthorized routes (Table 101). Both *Penstemon janishiae* and *Phlox muscoide*s grow on open ridge tops on the Diamond Mountains, in areas very accessible to cross-country travel, and are therefore at risk of direct or indirect effects from the implementation of the No Action alternative. However, *Iliamna bakeri* grows in lava fields where it is protected from potential OHV impacts, due to the inaccessibility of these areas on the forest.

Table 101 The number of Barren Guild species occurrences known within 100 feet of unauthorized routes by alternative

Species	Alternative					
	1 No Action	2	3	4	5	Mod 5
Iliamna bakeri	1	0	0	0	0	0
Penstemon janishiae	1	0	0	0	0	0
Phlox muscoides	1	0	0	0	0	0
Total Rare plant occurrences	**3**	**0**	**0**	**0**	**0**	**0**

Chaparral/Oak Woodland Habitat Guild

With the implementation of the No Action alternative, cross-country travel will continue on Lassen NF, providing the highest risk to Chaparral/Oak Woodland Guild habitats and their associated species. There are many different habitats associated with the rare plant species this guild, but all are found within lower elevation chaparral and oak woodland areas. Currently, there are six chaparral/oak woodland species, with a total of 18 occurrences that are found within 100 feet of existing unauthorized routes across Lassen NF (Table 102).

Table 102 The number of Chaparral/Oak Woodland Guild species occurrences known within 100 feet of unauthorized routes by alternative

Species	Alternative					
	1 No Action	2	3	4	5	Mod 5
Astragalus pauperculus	1	0	0	0	0	0
Cryptantha crinita	7	0	0	0	0	0
Juncus leiospermus* var. *leiospermus	2	0	0	0	0	0
Limnanthes floccosa* ssp. *bellingeriana	1	0	0	0	0	0
Limnanthes floccosa* ssp. *floccosa	5	0	0	0	0	0
Polygonum bidwelliae	2	0	0	0	0	0
Total Rare plant occurrences	**18**	**0**	**0**	**0**	**0**	**0**

Within this guild are habitats and species which tend to grow in fairly open and/or vernally wet areas between oaks and dense chaparral stands. These somewhat scattered, open habitats provide easy access to cross-country travel, which could potentially impact plants which grow in these areas. The six species known to these habitats are common in vernally wet swales or can be found in open, gravelly, shallow soil areas, which also provide unobstructed access for potential cross-country travel. As a result, rare plants within this guild have a high probably of receiving indirect impacts especially during spring and early summer while soils are wet.

Fen and Meadow Habitat Guild

The No Action Alternative has the highest estimated number of unauthorized routes in this guild, due to the continuation of cross-country travel under this alternative. Fens and

meadows, as well as other riparian areas, can be degraded by long-term OHV use from impacts such as dewatering, rutting, or uses to these systems that alter drainage patterns. Roads within these habitats can be detrimental to the functionality of these systems, and these areas can be highly susceptible to compaction due to the fact that many fens and meadows, particularly on the west side of Lassen NF, remain wet year-round. As a result, species within open wet habitats are the most susceptible to continued long-term impacts from use of these areas. Fens are particularly susceptible to impacts from OHV use within them, as motor vehicle use has the potential to disrupt key hydrological processes essential to maintaining the integrity of the fen system. With continued use, there is the potential to remove/kill vegetation, which can dewater the fen, causing oxidation of the peat

Routes that pass through or along edges of meadows can cause long-term adverse impacts to rare plant habitat and individuals, which can include impacts such as a loss of vegetation, accelerated erosion, and soil compaction. Soil compaction can influence drainage patterns as well as cause ruts in these well-defined soils. In either case, water infiltration into meadow soils is slowed or drainage patterns altered. These effects can change the type of vegetation occurring in disturbed portions of a meadow from the desired native grasses and sedges to an early seral type of vegetation.

Currently, there are 14 Fen and Meadow species, with a total of 37 occurrences that are found within 100 feet of existing unauthorized routes across Lassen NF (Table 103). Regardless of the specific habitat types in which these species are found, all are susceptible to impacts from cross-country travel, especially during wet periods.

Forested Habitat Guild

The Forested Guild has the most species potentially affected by cross-country travel within the No Action alternative. This guild encompasses not only dense, west side high elevation forests, but also the more open yellow pine forests common to the eastern portion of Lassen NF, and is the largest guild in terms of vegetation types utilized by rare plants. Of the 84 known occurrences found within 100 feet of existing unauthorized routes, *Astragalus inversus* occurrences make up approximately 40 percent of those species potentially impacted (Table 104). Although endemic to northeastern California, *Astragalus inversus* is the most common rare plant species on Lassen NF, and while it is not abundant anywhere, it is scattered over a very large area covering most of the Hat Creek and Eagle Lake Ranger Districts. As a result, any impacts from the No Action alternative will not affect the viability of the species across its range. Without this species, there are only 15 Forested Habitat Guild species, with a total of 51 occurrences that are found within 100 feet of existing unauthorized routes that have the potential to be impacted by the No Action alternative (Table 104).

The 15 species that remain tend to be found in either “gap” (e.g., *Silene occidentalis* ssp. *longistipitata)* areas within forested types, or in transition areas with another habitat type, such as sagebrush (e.g., *Astragalus pulsiferae* ssp. *suksdorfii)*. Habitats for these species

are primarily located in upland habitats that are not as susceptible to cross-country travel impacts as those species found the Fen and Meadows or Sagebrush Guilds.

Riparian Habitat Guild

Like the Fen and Meadows Guild, riparian areas and their associated species can also be permanently impacted by cross-country travel. Impacts from cross-country travel are similar to those for Fen and Meadows habitats, including altering drainage patterns, reducing water quality, depositing sediment into streams, and impacting the streambank habitats where many of these species occur. Currently there are four species, with a total of 11 occurrences, found within 100 feet of unauthorized routes across Lassen NF (Table 105).

Rare plant species that grow in seasonally wet streamside habitats such as Mimulus *pygmaeus* have the potential to be impacted less than those species found in perennial wet sites like *Stellaria obtusa*.

Table 103 The number of Fen and Meadow species occurrences known within 100 feet of unauthorized routes by alternative

Species	Alternative					
	1 No Action	2	3	4	5	Mod 5
Carex lasiocarpa	1	0	0	0	0	0
Eriophorum gracile	1	0	0	0	0	0
Gratiola heterosepala	1	0	0	0	0	0
Juncus hemiendytus* var. *abjectus	2	0	0	0	0	0
Meesia triquetra	1	0	0	0	0	0
Mimulus evanescens	3	0	0	0	0	0
Mimulus pygmaeus	6	0	0	0	0	0
Penstemon cinicola	4	0	0	1	2	2
Penstemon heterodoxus var. shastensis	1	0	0	1	1	1
Phacelia inundata	1	0	0	0	0	0
Pogogyne floribunda	10	0	0	0	0	0
Potentilla newberryi	1	0	0	0	0	0
Rorippa columbiae	1	0	0	0	0	0
Senecio hydrophiloides	4	0	0	0	0	0
Total Rare plant occurrences	**37**	**0**	**0**	**2**	**3**	**3**

Table 104 The number of Forested Guild species occurrences known within 100 feet of unauthorized routes by alternative

Species	Alternative					
	1 No Action	2	3	4	5	Mod 5
Astragalus inversus	33	0	0	0	0	0
Astragalus pulsiferae var. suksdorfii	9	0	0	1	1	1

Species	Alternative					
	1 No Action	2	3	4	5	Mod 5
Callitropsis bakeri	1	0	0	0	0	0
Carex petasata	4	0	0	0	1	1
Erigeron inornatus var. calidipetris	10	0	0	0	0	0
Hackelia amethystina	2	0	0	0	1	1
Iliamna bakeri	1	0	0	0	0	0
Lupinus dalesiae	3	0	0	0	0	0
Penstemon cinicola	4	0	0	1	2	2
Penstemon heterodoxus* var. *shastensis	1	0	0	1	1	1
Penstemon personatus	1	0	0	0	0	0
Polygonum bidwelliae	1	0	0	0	0	0
Silene occidentalis ssp. longistipitata	1	0	0	0	0	0
Thermopsis californica var. argentata	11	1	0	0	1	1
Trifolium andersonii var. andersonii	1	0	0	0	0	0
Trillium ovatum ssp. oettingeri	1	0	0	0	0	0
Total Rare plant occurrences	**84**	**1**	**0**	**3**	**7**	**7**

Table 105 The number of Riparian Guild species occurrences known within 100 feet of unauthorized routes by alternative

Species	Alternative					
	1 No Action	2	3	4	5	Mod 5
Mimulus evanescens	3	0	0	0	0	0
Mimulus glaucescens	1	0	0	0	0	0
Mimulus pygmaeus	6	0	0	0	0	0
Stellaria obtusa	1	0	0	0	0	0
Total Rare plant occurrences	**11**	**0**	**0**	**0**	**0**	**0**

Sagebrush Habitat Guild

The Sagebrush habitats which make up this guild can be characterized by open, easily accessible areas that are primarily scattered throughout the eastern portion of Lassen NF. These habitats are easily accessible by cross-country travel, and in the spring can be most impacted by cross-country travel, specifically within the habitat types that hold water such as where silver sage occurs. Currently there are six species, with a total of 25 occurrences, found within 100 feet of unauthorized routes across Lassen NF (Table 106).

Table 106 The number of Sagebrush Guild species occurrences known within 100 feet of unauthorized routes by alternative

Species	Alternative					
	1 No Action	2	3	4	5	Mod 5
Astragalus pulsiferae* var. *suksdorfii	9	0	0	1	1	1
Carex petasata	4	0	0	0	1	1
Hackelia amethystina	2	0	0	0	1	1
Hackelia cusickii	2	0	0	0	0	0
Senecio hydrophiloides	4	0	0	0	0	0
Stenotus lanuginosus	4	0	0	0	0	0
Total Rare plant occurrences	**25**	**0**	**0**	**1**	**3**	**3**

Potentially impacted species are found primarily in low sage plant communities and with unrestricted travel through these areas, the viability of these occurrences could be reduced.

Ultramafic Habitat Guild

This is a fairly rare habitat guild on Lassen NF, where ultramafic soils exist on approximately 452 acres within the Yellow and Grizzly Creek drainages, and lands adjacent to Lotts Lake on the Almanor Ranger District. However, due to the nature of these distinctive soils, these areas are not only home to a variety of rare plants, but also a destination spot for dispersed campers, due to the unique qualities of these areas. Currently there are three species, with a total of four occurrences, found within 100 feet of unauthorized routes within the project area (Table 107).

Table 107 The number of Ultramafic Guild species occurrences known within 100 feet of unauthorized routes by alternative

Species	Alternative					
	1 No Action	2	3	4	5	Mod 5
Erigeron petrophilus* var. *sierrensis	1	0	0	0	0	0
Monardella follettii	1	0	0	1	1	1
Packera eurycephala* var. *lewisrosei	2	0	0	1	1	1
Total Rare plant occurrences	**4**	**0**	**0**	**2**	**2**	**2**

Serpentine (ultramafic) soils are generally shallow and rocky, with low water-holding capacity and rooting depths. These conditions inhibit plants from developing deep root systems and also increase the vulnerability of serpentine soils to erosion (Whittaker 1954). Motor vehicles negatively affect this unique plant community and the rare species that it supports by creating disturbed soils that are highly vulnerable to increased erosion. In areas where motor vehicle use has occurred, vegetation and soil recovery rates are generally very slow (Harrison et al. 2006).

Federally-listed plant species and associated Designated Critical Habitat (DCH)

Federally-listed Species

Alternative 1 has the greatest negative effect on both *Orcuttia tenuis* and *Tuctoria greenei* and their associated vernal pool habitat. The largest impact of this alternative is from cross-country travel, which will continue the threat of impacts to these occurrences and their vernal pool habitats, including Designated Critical Habitat throughout the project area. Only those occurrences with the potential to be affected directly or indirectly by the proposed project (those within 100 feet of a proposed route) are discussed using the following indicators to measure effects (Table 108). Impacts to critical habitat were analyzed by determining the number of miles of unauthorized routes within 300 feet of occupied vernal pools within in critical habitat core areas (Table 108).

Table 108 Summary of indicator measures for the analysis of effects to federally-listed plant species and associated DCH for the prohibition of cross-country travel and the addition of routes under Alternative 1

Measure	Total
Miles of unauthorized routes within 100 feet of vernal pool habitat.	3.4
Miles of unauthorized routes within 300 feet around occupied vernal pools.	5.7
Total number of occurrences within 100 feet of unauthorized routes.	**7**[a]

[a]TUGR on private land and not counted in analysis.

Direct effects as defined by the Endangered Species Act (ESA) are those that are caused by the proposed action and occur at the time of the action, while indirect effects are those that are caused by the proposed action and are later in time but still reasonably certain to occur. There would be no direct or indirect effects to the known occurrence of *Tuctoria greenei* from the implementation of the No Action Alternative; however, there are currently seven known occurrences of *Orcuttia tenuis* and approximately 3.4 miles of routes within 100 feet of vernal pool habitats that could receive direct and indirect impacts from the continuation of cross-country travel and use of unauthorized routes within the project area (Table 108).

The use of unauthorized routes within or adjacent to vernal pool habitats can cause habitat fragmentation, alteration, and degradation of vernal pools habitats and their associated species. When OHVs drive through vernal pools they may impair hydrological functions by displacing soil, causing erosion, or damaging the swale or riparian connectivity, thus resulting in hydrological changes to these systems. In addition, poorly designed trail and roads systems near vernal pools may cause additional erosion and result in siltation of the vernal pool, which may inhibit germination of listed plant species. Impacts from trampling of plants by OHVs may reduce the reproductive output of vernal pool species, and plants may be crushed or killed (USDI FWS 2005a). All of these impacts could be occurring and

would continue to occur to listed species and their associated vernal pools habitat if cross-country travel is allowed to continue throughout the project area.

Designated Critical Habitat

Impacts to critical habitat for both species would be similar to those discussed above. ESA defines critical habitat as specific geographic areas that contain features essential for the conservation of a threatened or endangered species that may require special management and protection (USDI FWS 2003b). Critical habitat may include an area that is not currently occupied by the species but that will be needed for its recovery (USDI FWS 2007b). As a result, consultation with the U.S. Fish and Wildlife Service (USFWS) is required only for those projects that affect areas that contain the physical and biological features necessary to the species survival (USDI FWS 2003b). The primary constituent elements or PCEs of critical habitat define these features (Fuller 2003).

For vernal pool plants, the primary constituent elements are those habitat components that are essential for the primary biological needs of germination, growth, reproduction and dispersal (USDI FWS 2003b). These primary constituent elements are found in areas that support vernal pools, swales or other ephemeral ponds and depressions and their associated watersheds (USDI FWS 2003b). Specifically, the USFWS final rule and designation of critical habitat determined that there are two primary constituent elements (PCEs) for *Orcuttia tenuis* and *Tuctoria greenei* (USDI FWS 2003a):

1. Vernal pools, swales, and other ephemeral features of appropriate sizes and depth that sustain *Orcuttia tenuis* and *Tuctoria greenei* germination, growth and reproduction, and the adjacent uplands of these depressions.

2. The associated watershed(s) and hydrologic features including the pool basin, swales, and surrounding uplands that contribute to the filling and drying of the vernal pool or ephemeral wetland, and that maintain suitable periods of pool inundation, water quality, and soil moisture for *Orcuttia tenuis* and *Tuctoria greenei* germination, growth and reproduction, and dispersal.

Put simply, the two PCE's for these species are vernal pools habitats with known occurrences of either *Orcuttia tenuis* or *Tuctoria greenei* (PCE 1), and the area around these pools that is believed to provide the associated watershed influence (PCE 2). Therefore, the USFWS states that although a proposed action may take place inside a DCH core area, if those actions do not affect the primary constituent elements for the subject vernal pool taxa, then these actions will have no effect or are not likely to adversely affect critical habitat within the proposed project (Fuller 2003). Therefore, only those pools that have the two required PCEs need to be assessed for impacts to critical habitat.

Within the project area, there are 12 vernal pools that have an occurrence of *Orcuttia tenuis,* and one pool occupied with *Tuctoria greenei* (occurrence on private), found within the 23,436 acres of Designated Critical Habitat (USDI FWS 2003a). Only these pools found

within the 11 core areas need to be assessed for impacts due to the presence of both PCE's. The 11 core areas mapped on the forest range from approximately 387 to 8,435 acres and may have anywhere from one to three vernal pools that contain one of these listed species (Map 24). As a result, the remaining vegetation types within these core areas consist mainly of eastside pine forest, lava fields and various sagebrush vegetation types that do not need to be assessed for impacts from various travel management actions, including the addition of unauthorized routes to the NFTS.

Higher elevation vernal pools on the forest are characterized as typically having an inlet on one end but are surrounded on two or three sides by lava bluffs or other topographic features which block the outlet, or are closed basins (USDA FS and USDI BLM 1990). Thus, for this analysis, in the absence of site-specific watershed mapping around pools occupied by either *Orcuttia tenuis* or *Tuctoria greenei*, a default buffer of 300 feet was used around occupied vernal pools within critical habitat to represent PCE 2. 300 feet is the SNFPA defined RCA buffer for Special Aquatic Features, which includes vernal pools, and since most vernal pools on the Lassen are on relatively flat ground, and/or are closed basins, it was assumed that 300 feet would be adequate to capture any influence an unauthorized route may be having on the vernal pools in the area.

As a result, of the 55.3 miles of routes that are currently open for use within Designated Critical Habitat core areas, only 5.7 miles are actually found within 300 feet of an occupied vernal pool within the project area. With the implementation of the No Action Alternative, cross-country travel and the use of unauthorized routes would most likely continue and impacts to the critical habitat are expected to increase over time. Direct and indirect impacts to critical habitat would be similar to those impacts discuss above, including the potential to alter, fragment, and degrade vernal pool habitat. These impacts can also impair the hydrologic function of the pool, causing increased erosion and sedimentation, which can ultimately inhibit germination of listed species (USDI FWS 2005a).

Special Areas

Currently there are five Special Areas, with a total of 2.6 miles of unauthorized routes within their boundaries (Table 109). With the implementation of Alternative 1, motorized vehicle use would continue to occur with the Murken SIA, as well as Blacks Mountain, Cub Creek, Indian Creek, and the Timbered Crater RNAs. These areas were designated to protect significant geological, botanical, vegetation, aquatic or scenic feature. Unmanaged motorized vehicle use within these areas has the potential to significantly degrade or disturb these special features.

Table 109 Existing miles of unauthorized routes within Botanical Special Areas

Botanical Resource	LNF Status	Alternative					
		1 No Action	2	3	4	5	Mod 5
Black Rock	SIA	0	0	0	0	0	0
Blacks Mountain RNA	RNA	0.5	0	0	0	0	0
Crater Lake	SIA	0	0	0	0	0	0
Cub Creek RNA	SIA	0.5	0	0	0	0	0
Deep Hole	SIA	0	0	0	0	0	0
Graham Pinery (Iron Mountain)	RNA	0	0	0	0	0	0
Green Island Lake	RNA	0	0	0	0	0	0
Homer/Deerheart	RNA	0	0	0	0	0	0
Indian Creek	RNA	0.3	0	0	0	0	0
Mayfield	RNA	0	0	0	0	0	0
Montgomery Creek	SIA	0	0	0	0	0	0
Murken	SIA	0.1	0	0	0	0.1	0.1
Soda Ridge	RNA	0	0	0	0	0	0
Timbered Crater	RNA	1.2	0	0	0	0	0
Willow Lake Bog	SI	0	0	0	0	0	0
	Total	**2.6**	**0**	**0**	**0**	**0.1**	**0.1**

Direct/Indirect Effects of Changes to the existing NFTS (ML1 roads converted to Motorized Trails)

There are no direct, indirect or cumulative effects to Botanical resources from changes to the NFTS under Alternative 1, because no there are no ML 1 roads proposed for conversion to Motorized Trails under this Alternative.

Cumulative Effects of Continuation of cross-country motor vehicle travel, use of existing unauthorized roads and changes to NFTS

Federally-listed, Sensitive and Special Interest plant species and associated Guilds and DCH

The implementation of Alternative 1 would not improve conditions for rare species or their habitats. Cross-country vehicle travel would continue, and the proliferation of routes would increase within the project area. Unmanaged motor vehicle use on Lassen National Forest has the potential for negative direct and indirect effects to all of the rare species known to occur within the project area.

Under this alternative, motor vehicles traveling on and off of unauthorized routes would continue to trample, kill, and uproot rare species (Wilshire et al. 1978; Ouren et al. 2007; Cole and Bayfield 1993; Davidson and Fox 11974). Indirect effects to rare species and their associated habitats described in the general effects section could apply to all occurrences and species found within the project analysis area. However, the potential impacts would most likely occur to those species within 100 feet of existing unauthorized routes. Guilds

which contain open, accessible habitats such as the Fen and Meadow and Sagebrush Guilds are most susceptible, as are vernal pools.

One of the largest potential impacts from cross-country motorized travel is the increased risk of noxious weed introduction and spread (Trombulak and Frissell 2000, Ouren et al. 2007). Noxious weeds reduce the quality of native (including rare plant) habitat by displacing native species, altering nutrient and fire cycles, degrading soil structure, and decreasing the quality and availability of forage for wildlife (Bossard et al. 2000). Noxious weeds are spread by roads, motorized trails, recreational activities (such as camping, hiking, horseback riding, and hunting), and ongoing land management activities such as road maintenance and range management. Under this alternative, all but the most inaccessible habitats are at risk of noxious weed invasion and spread from cross-country motor vehicle travel, due to the potential for all roads within the project area to spread weeds.

Ongoing and foreseeable future actions, such as timber harvests, fuels reduction, and woodcutting activities, have also created skid trails and temporary roads that often contribute to cross-country travel and the creation of unauthorized routes. Under this alternative, these negative impacts would not be addressed or mitigated and would continue to occur at an increased rate.

The effects of present and future projects on rare species would likely be minimal since all projects are surveyed to similar standards and mitigation measures are designed for those species on a project-by-project basis, in which viability is a concern.

Special Areas

The implementation of Alternative 1 would also not improve conditions for Special Areas such as RNA's and SIA's. Cross-country vehicle travel would continue, and the proliferation of routes would increase within the project area. Unmanaged motor vehicle use on Lassen National Forest has the potential for negative direct and indirect effects to all Special Areas located within the project area.

While many of these areas have features with are resilient to cross-country travel, such as the Blacks Mountain RNA, which was established for its unique assemblage of Interior Ponderosa Pine. Other areas, such as the Timber Crater RNA was established not only for the presence of the rare Baker Cypress, but also for the presence of Northern Basalt Vernal Pools within its boundaries. Uncontrolled cross-county travel could degrade the vernal pools for which this RNA was established. Overall, with the implementation of Alternative 1, approximately 2.6 miles of routes would continue to exist within these areas. However, there are currently no ongoing or foreseeable future projects within any Special Areas that will add cumulatively to those impacts from the implementation of Alternative 1 (Appendix C).

Action Alternatives (2 thru Modified 5): Summary of Environmental Consequences for Individual Species

Detailed discussions of potential affects to federally-listed and rare plant species and their associated habitats for the Action Alternatives (2- Modified 5) are found below. Only those species that were found within 100 feet of unauthorized routes proposed for addition under each alternative are analyzed for direct, indirect, and cumulative effects. In addition, both Alternative 5 and the Modified Alternative 5 propose to convert six miles of ML 1 roads to motorized trails and open them to motorized use; however, there are no TES or Special Interest plant species found along these routes, so impacts are only assessed for potential rare plant habitat.

This section provides information on the species affected, including abundance, distribution, and habitat specificity for each species. When available, data on acres of effected habitat and species is provided. As stated earlier, many Special Interest plant species on Lassen NF, however, were not mapped accurately and the exact acres for these occurrences and/or species cannot be quantified. As a result, only a general discussion on effects to these occurrences will be provided. Unless clarified, rare plant species within the analysis of the Action Alternatives refers to Sensitive and Special Interest plant species only. Federally-listed species and associated critical habitat will be discussed separately.

Impacts to federally-listed and rare plants from the Action Alternatives would be similar to those discussed within the No Action Alternative above; however, with the prohibition of cross-country travel, and the closure of most or all of the unauthorized routes within the Action Alternatives, direct and indirect impacts to these species would be far fewer. As a result, it is possible that federally-listed and rare plant species and their associated habitats could receive some potential benefits from the non-designation of routes and the prohibition of cross-country travel. However, these potential benefits are diluted over time since all currently unauthorized routes, while not open for public use, will remain on the landscape until project-specific NEPA analysis proposes permanent closures and/or decommissioning. Therefore, there would be few added benefits in the short-term, however, in the long-term (20+ years), routes may naturally heal and revegetate enough to eliminate indirect impacts within or adjacent to federally-listed and rare plants occurrences and associated habitats.

Alternative 3 is different in that it only proposes the prohibition of cross-country travel, but no unauthorized routes would be added to the NFTS. As a result, there would be no direct or indirect effects to any federally-listed or rare plant species or habitats from the implementation of Alternative 3, since no unauthorized routes are proposed for addition to the NFTS under this alternative.

Currently there are nine rare plant occurrences that have been documented within 100 feet of a route proposed for addition under one or more of the Action Alternatives, found within Fen and Meadow, Forested, Sagebrush, and Ultramafic Habitat Guilds (Table 107). If species are found in more than one Guild (Table 97), they will be discussed in the habitat

guild that is perceived to have the highest potential for species impacts from off-road vehicles (most open habitat).

Sensitive and Special Interest Plant species

Fens and Meadows Habitat Guild

There are two rare plant species, *Penstemon cinicola* and *Penstemon heterodoxus* var. *shastensis*, within the Fen and Meadow Guild, found within 100 feet of routes proposed for addition that may be impacted with the implementation of the one or more of the Action Alternatives (Table 110).

Penstemon cinicola (Ash beardtongue)

Penstemon cinicola grows in volcanic, sandy, or rocky soil in sagebrush openings, yellow pine, or lodgepole forests within Lassen, Modoc, and Siskiyou counties of California, Nevada, and Oregon (USDA FS LNF 2009, CNPS 2001). The California Native Plant Society ranks this species as List 4.3, meaning that it has a limited distribution, but is not very endangered in California (2009). Lassen NF this species is known to 24 occurrences, primarily on Eagle Lake Ranger District. Known occurrences on the Lassen range from 1 to 500 plants, with the estimated number of individuals believed to be approximately 3,300 individuals scattered throughout the forest (USDA FS LNF 2009).

Two occurrences of *Penstemon cinicola* (Lassen NF Occurrence #8 and Lassen NF Occurrence #9) occur within 100 feet of the unauthorized routes proposed for addition under one or more of the Action Alternatives. This species tends to grow in the edge habitats of drying meadows and forested habitats as well as within openings of timbered stands.

Occurrence #8- This occurrence has the potential to be impacted under Alternative 4, Alternative 5, and the Modified Alternative 5 (Table 110). This is a large occurrence that stretches along the meadow system associated with Robbers Creek for over a mile north of a private inholding, and continues to the south of private land with a few isolated suboccurrences to the east. *Penstemon cinicola* plants are found along the edge of Creek and meadow system where they integrade with the adjacent lodgepole forest. Plant numbers were recorded as approximately 250, however, the exact size and numbers of individuals is unknown (USDA FS 1995). Route ULA420 runs along the eastern boundary of the northern portion of the meadow system, but terminates at a barrier, prior to entering the actual riparian area (Table A-2, Appendix A). Since the route does not enter the riparian area where individual plants are found, any potential impacts to this occurrence should be limited.

Occurrence #9- This occurrence is only proposed for addition under Alternative 5 and the Modified Alternative 5 (Table 110). It is found along the drying edges within a lodgepole pine stand surrounding Lower Feather Lake, a seasonally wet playa, adjacent to route UNE047. Numbers were estimated as approximately 300 individuals within the two

suboccurrences (USDA FS 1996); however, only one suboccurrence is located within 100 feet of the proposed route.

Table 110 Rare plant species located with 100 feet of unauthorized proposed for addition within all Alternatives.

Species	Guild[a]	Occurrence /Suboccur	Route Number	Alternatives					
				1	2	3	4	5	Mod 5
Astragalus pulsiferae var. suksdorfii	SB	8E	UNE405	X			X	X	X
Carex petasata	SB	16	UBB876	X				X	X
Hackelia amethystina	SB	2	ULA536	X				X	X
Monardella follettii	U	1	ULA061	X				X	X
Packera eurycephala* var. *lewisrosei	U	1	ULA061	X				X	X
Penstemon cinicola	FM	8	ULA420	X			X	X	X
Penstemon cinicola	FM	9	UNE047	X				X	X
Penstemon heterodoxus var. shastensis	FM	1	340327UC03	X			X	X	X
Thermopsis californica var. argentata	F	4	UNH001	X	X			X	X

[a]Guilds used in analysis of effects: FM – Fens and Meadows, F – Forested, SB – Sagebrush, U – Ultramafic.

Direct and Indirect Effects

Since individual plants or habitat for the Robbers Creek (#8) occurrence are not accessible from the unauthorized route due to a barrier, there would be no direct and few, if any, potential indirect effects possible for this occurrence with the addition of ULA420 under Alternative 4, Alternative 5 and the Modified Alternative 5.

The Feather Lake occurrence (#9) is found in upland habitat adjacent to a seasonally wet playa. Since this species is associated with a seasonally wet system its habitat can be susceptible to degradation due to repeated and continued use, especially during the spring months when this area is wet. Impacts could include trampling of plants and associated compaction and erosion of the habitats, as well as the potential for the introduction of noxious weeds. However, due to the scattered nature of this occurrence, impacts will be confined to only a potion of its habitat, so overall affects to the entire occurrence will be minor.

Cumulative Effects

At present, only the Feather Lakes *Penstemon cinicola* occurrence is found within a proposed vegetation management project (Appendix C). This occurrence is found within the upcoming Willow Springs DFPZ and Restoration Project, where vegetation management, prescribed fire and aspen release activities are proposed. This occurrence is also found adjacent to dispersed campsites, so continued recreation activities within this area could

also impact individual plants and associated habitat. In addition, firewood cutting activities also have the potential to impact individuals, since this occurrence is located in an easily accessible lodgepole stand.

Both *Penstemon cinicola* occurrences are located within active grazing allotments (Robbers Creek and Upper Pine Creek) where individuals can receive additional impacts from livestock use. However, grazing impacts should be transitory and should not affect the viability of either occurrence on the forest. Overall, these activities could cause additional direct and indirect impacts that add cumulatively to those impacts from the addition of unauthorized routes within their habitat. This species, while uncommon, is stable on the Lassen NF with 24 occurrences currently found scattered throughout the forest (USDA FS LNF 2009). As a result, less than 1 percent of the known occurrences on *Penstemon cinicola* on the forest have the potential for impacts by the implementation of unauthorized routes proposed within the Action Alternatives.

Penstemon heterodoxus var. shastensis (Shasta beardtongue)

There is currently one occurrence of *Penstemon heterodoxus* var. *shastensis* (Lassen NF Occurrence #1) that comes within 100 feet of unauthorized routes proposed for addition within Alternative 4, Alternative 5, and the Modified Alternative 5 (Table 110).

Penstemon heterodoxus var. *shastensis* grows in seasonally wet meadows in coniferous forests and is endemic to Butte, Lassen, Modoc, Plumas, Shasta, and Siskiyou Counties in California (CNPS 2001). The California Native Plant Society ranks this species as List 4.3, meaning that it has a limited distribution, but is not very endangered in California (2009). On Lassen NF, Shasta beardtongue is known from 20 occurrences scattered across all three Ranger Districts. Occurrences range from one to over 2,000 individuals, with total number of individuals on Lassen NF estimated at approximately 3,700 (USDA FS LNF 2009).

Occurrence #1- This is a large occurrence located adjacent to Burney Springs Meadow on the Hat Creek Ranger District. Burney Springs is a popular dispersed camping destination. The *Penstemon heterodoxus* var. *shastensis* occurrence is located within the adjacent seasonally wet meadow, south of route 340327UC03 which is used to access camping areas (USDA FS 2004b). Plant numbers were recorded to be between 100 and 1,000 individuals (USDA FS LNF 2009).

Direct and Indirect Effects

The meadow habitat where this species is found is particularly sensitive to impacts from motorized vehicle use, especially during spring months while the meadow is wet. Motorized vehicle use within or within close proximity to this habitat has the potential to disrupt key hydrological processes, which could have adverse indirect effects on this species. Ruts caused by motorized vehicles in wet meadows can alter the timing and direction of water flow and infiltration, particularly during the spring months when the meadow is wet. While, the implementation of either Alternative 4, Alternative 5 or the Modified Alternative 5 may potentially impact the Burney Springs occurrence of *Penstemon heterodoxus* var.

shastensis, this is a large occurrence which is scattered throughout the meadow. As a result, the entire occurrence is most likely not threatened by the addition of this route.

Cumulative Effects

Other ongoing and foreseeable future actions include recreation and fuel woodcutting activities, as well as the upcoming Whittington Forest Health Restoration and Fuels Reduction Project, which consists of vegetation management, aspen release, and various restoration activities, within and adjacent to Burney Springs Meadow (Appendix C). These activities can cause trampling of individuals and/or can alter the hydrology within the *Penstemon* occurrence by causing rutting and compaction of the meadow habitat. This could cause additional direct and indirect impacts to this occurrence that could add cumulatively to those impacts from the addition of route 340327UC03. However, this species is stable on the Lassen NF, where it is known from 20 occurrences (USDA FS LNF 2009), so any impacts received by the addition of this route will affect less than 1 percent of the known occurrences on the forest. As a result, the viability of this species should be maintained throughout the project area and its range with the implementation of Alternative 4, Alternative 5 or the Modified Alternative 5.

Forested Habitat Guild

Currently, there is only one rare plant species, *Thermopsis californica* var. *argentata* that has the potential to be directly or indirectly impacted within the Forested Guild under the Action Alternatives (Table 110). See the Sagebrush analysis for effects to *Astragalus pulsiferae* var*. suksdorfii, Carex petasata, Hackelia amethystina*, and Fen/Meadow Habitat Guild for impacts to *Penstemon cinicola* and *P. heterodoxus* var. *shastensis*.

Thermopsis californica var. argentata (silvery false lupine)

There is one occurrence of *Thermopsis californica* var. *argentata* (Lassen NF Occurrence #4) that comes within 100 feet of routes proposed within Alternative 2, Alternative 5 or the Modified Alternative 5 (Table 110).

Thermopsis californica var. *argentata* grows in open areas in yellow pine forests and juniper woodlands. It is endemic to California where it is known to the northeastern counties and to the southern counties of Los Angeles, Ventura, and Santa Barbara (CNPS 2001). The California Native Plant Society ranks this species as List 4.3, meaning that it has a limited distribution, but is not very endangered in California (2009). On the Lassen NF it is known to 29 occurrences all located within the northeastern portion of Hat Creek Ranger District (USDA FS LNF 2009). This species can many times be found along roads where it most likely benefits from runoff and the various small openings created along roads within its habitat. It is also commonly found in openings created by various other disturbances such as logging operations (USDA FS LNF 2009).

Occurrence # 4- This occurrence is found along route UNH001 running to the east of Wiley Ranch meadow, which is proposed for addition under Alternatives 2, 5, and the Modified Alternative 5. The occurrence begins along the northern edge of the meadow and

continues south along both sides of the route for approximately one mile. At the time this occurrence was located, numbers were estimated at over 10,000 individuals (USDA FS 1991).

Direct and Indirect Effects

This species will most likely receive some direct and indirect impacts from the addition of route UNH001 to the NFTS, since approximately 75 percent of this occurrence grows along the unauthorized route (USDA FS 1991). Direct impacts such as trampling or parking on the plants and the potential death of individuals could occur. However, since this occurrence is orientated along the route, it may be receiving some benefits from the adjacent roadside habitat. Indirect effects from compaction and erosion should not affect the species a great deal, since it is commonly found in disturbed areas in other parts of the forest (USDA FS LNF 2009). However, due to this species preference for roads side habitats it is particularly vulnerable to potential indirect impacts from noxious weed introduction and spread within its habitat. Overall, while there will most likely be negative impacts to individuals of this occurrence, it extends well beyond the unauthorized route location, so long-term viability of the occurrence should be maintained with the implementation of Alternative 2, 5 or the Modified Alternative 5.

Cumulative Effects

The only activities with the potential to add cumulatively to the addition of this route would be ongoing grazing within the North Hot Springs Allotment, dispersed camping activities adjacent to this route, and the upcoming Wiley Ranch Meadow Maintenance, Encroaching Pine Removal, and Oak Woodland Release Project. Grazing impacts are likely to be incidental and transitory, since the occurrence is located next to a large, mostly-fenced meadow system and grazing impacts to this species have not been noted in the past (USDA FS LNF 2009). Dispersed camping activities adjacent to this route could also cause additional impacts to this occurrence, since it is possible that vehicles will park adjacent to the route where plants are located, instead of driving into the forest to where dispersed sites are located. In addition, the Wiley Ranch Project may actually benefit the species by creating openings and small disturbed areas where this species tends to colonize.

Overall, all of these activities could add cumulatively to those potential impacts from the addition of this route to the NFTS; however, *Thermopsis californica* var. *argentata* is known to approximately 29 occurrences on Lassen NF, and is also found on adjacent private and National Forest System lands. In addition, this species is also somewhat tolerant of disturbance throughout its habitat. Therefore, any additional impacts would not affect the viability of this species on Lassen NF or across its range, due to the fact that less than 1 percent of the known occurrences within the project area have the potential to be impacted by the implementation of Alternative 2, 5 or the Modified Alternative 5.

Sagebrush Habitat Guild

Currently, there are three rare plant species, *Astragalus pulsiferae* var. *suksdorfii, Carex petasata,* and *Hackelia amethystina,* found along three unauthorized routes proposed for addition that have the potential to be directly or indirectly impacted within the Sagebrush Guild under the one or more of the Action Alternatives (Table 110). Actual acreage is known only for the *Astragalus pulsiferae* var. *suksdorfii* and *Carex petasata* occurrences within this Guild.

Astragalus pulsiferae var. suksdorfii (Suksdorf's milkvetch)

There is one occurrence of *Astragalus pulsiferae* var. *suksdorfii* (Lassen NF Occurrence #8), that is found within 100 feet of unauthorized routes proposed for addition within Alternative 4, Alternative 5 or the Modified Alternative 5 (Table 110).

Astragalus pulsiferae var. *suksdorfii* grows in open, loose volcanic substrates in sagebrush scrub and lodgepole or at the edge of eastside pine stands (Welsh et al. 2002), within a 25-mile radius around Mount Lassen (USDA FS LNF 2009). Habitats where this species is found generally have very low cover from trees, shrubs, or other herbs and have few barriers to cross-country travel. *Astragalus pulsiferae* var. *suksdorfii* is known from 13 occurrences on Lassen NF, one on adjacent private lands, and is disjunct in Washington, where only two small occurrences are known. The California Native Plant Society ranks this species as List 1B.2, meaning that it is rare, threatened, or endangered in California and elsewhere (2009). On the Lassen NF, occurrences range from 0.1 to 96 acres in size, and can be found in both disturbed and undisturbed sites on the forest. This species has shown to be very tolerant of disturbance, especially that which opens up the canopy and removes competing vegetation within potential habitat, and has been observed growing in and adjacent to roads with light to moderate use (USDA FS LNF 2009).

Occurrence #8 (Suboccurrence E) - This is the largest *Astragalus pulsiferae* var. *suksdorfii* occurrence on Lassen NF (USDA FS LNF 2009), found within Grays Valley adjacent to State Highway 44 on the Eagle Lake Ranger District (USDA FS 2007e). Of the nine suboccurrences which make up this site, only "E", which is approximately 80.8 acres, has the potential to be impacted directly or indirectly by use of proposed route UNE405 (Table 111). All totaled, this occurrence is approximately 95.46 acres, with only 1.85 acres within 100 feet of the proposed route (Table 111).

LNF Interim Management Prescriptions state that for large occurrences (>1 acre): Maintain an undisturbed core area of at least 50% of the occurrence; allow disturbance in non-core areas of large occurrences, and monitor effects (USDA FS 2001c).

Table 111 Potential impacts to *Astragalus pulsiferae* var. *suksdorfii* from Alternative 4 , 5 and the Modified Alternative 5.

Occurrence/ Suboccurrence	Route	Acres with potential for impact	Total size of Occurrence (Acres)	Percent of Occurrence affected
8E	UNE405	1.85	95.46	2

Direct and Indirect Effects

With the implementation of Alternative 4, Alternative 5 or the Modified Alternative 5, there is a high probability of direct impacts to individuals of *Astragalus pulsiferae* var. *suksdorfii* within and adjacent to route UNE405 proposed for addition to the NFTS. Individuals that are within 30 feet of the route may be directly impacted and may be killed and their seed production reduced by vehicles parking or driving over them repeatedly. Indirect effects would most likely come from dust fugitives within its habitat or the threat of noxious weed invasion. However, impacts to the overall Grays Valley site should be minimal, since this is a large occurrence and the proposed route only affects a portion of the western edge. In addition, monitoring of other occurrences of this species has found that it will recolonize moderately utilized roads, and that occasional impacts from vehicles should not be detrimental to the viability of this species over the long-term (USDA FS LNF 2009).

Cumulative Effects

Additional activities with the potential to impact this occurrence include a planned prescribed fire along Hwy 44 as part of the Eagle Lake burn program (Appendix C). Less than 25 percent of the occurrence is expected to be impacted by prescribed fire activities, and past observation has suggested that this species is tolerant of low intensity burns and will most likely benefit from the removal of duff within its habitat (USDA FS 2008c). This occurrence is also located within the Poison Lake grazing allotment; however, impacts from cattle are not expected, due to an adjacent fence along private land that keeps cattle from drifting onto the highway.

Effects to this occurrence from proposed burning activities will add cumulatively to those from the addition of route UNE405, but in the long-term this species should benefit from the prescribed fire within its habitat and will most likely spread into adjacent habitat with the removal of duff within its' low sage habitat. In addition, this is a very large occurrence and the addition of this route will affect less than 1 percent of the entire occurrence, therefore, the occurrence is expected to be maintained within the project area, with the implementation of Alternative 4, 5 or the Modified Alternative 5. In addition, impacts comply with the interim management prescriptions developed for this species on the forest (USDA FS 2001c).

Carex petasata (Liddon's sedge)

There is one occurrence of *Carex petasata* (Lassen NF Occurrence #16), that comes within 100 feet of unauthorized routes proposed for addition under Alternative 5 and the Modified Alterative 5 (Table 110).

Carex petasata is a perennial bunching or clumping *Carex* that grows in meadows within and on the edges of lower montane coniferous and eastside pine forests, as well as sagebrush flats in the eastern counties of California and elsewhere (USDA FS LNF 2009, CNPS 2001). The California Native Plant Society ranks this species as List 2.3, meaning that it is rare, threatened, or endangered in California but more common elsewhere, and it is not very endangered in California (2009). Currently on the Lassen NF this species is known to 17 occurrences scattered throughout a relative discrete area, primarily on the Eagle Lake Ranger District (USDA FS LNF 2009). This species does not exist in large numbers anywhere it is found and forestwide there are approximately 1,500 individuals (clumps) known to the 17 occurrences ranging from one to 335 individuals per occurrence (USDA FS LNF 2009).

Occurrence #16: This occurrence is located at Houseman Reservoir along unauthorized route number UBB876. This occurrence occurs between the ecotone of eastside pine/sagebrush and wet meadow and, at the time it was located in 2007, showed no evidence of any impacts (USDA FS 2007d). Total population size was recorded as only four clumps (<0.10 acre), all of which may receive direct and/or indirect impacts from the addition of this route.

Direct or Indirect Effects

It is not known how this species responds to disturbance since most occurrences are small and scattered throughout the project area; however, there is the potential for this occurrence to receive both direct and indirect impacts if vehicles were to drive off road into its habitat. This is a large clumping *Carex* species and is most likely tolerant of light impacts. However, since this occurrence is so small, it is possible that all four clumps of plants could be impacted or even killed with the addition of this route.

Cumulative Effects

Additional activities with the potential to impact this occurrence include the Eagle Lake grazing allotment and the Houseman Timber Sale and underburn projects (Appendix C). All of these activities have the potential to add cumulatively to those impacts by the additional of route UBB876 to the NFTS. Livestock grazing in the area has the greatest chance of adding additional impacts, though a recent site visit did not note any browsing to individuals of this occurrence (USDA FS 2007d). However, it is possible that individual plants could be trampled by cattle on their way to access water at the adjacent Houseman Reservoir, which would reduce their seed set and vigor.

This occurrence could also receive potential impacts from the Houseman Timber Sale and underburn project; however, underburning activities would mostly likely benefit this species, which has a clumping growth from that is usually tolerant of low intensity fires. In addition, plants are also located next to a system road and adjacent to the riparian area associated with Houseman Reservoir. As a result, impacts to this occurrence from timber removal operations are unlikely, due to riparian buffers required for this project. All of these

activities can add cumulatively to those potential impacts from the implementation of either Alternative 5 or the Modified Alternative 5, though additional impacts should be minor. Overall, this species, while not common is stable on the Lassen National Forest, so even with additional potential cumulative impacts viability of this species will be maintained within the project area, where less than 1 percent of all known occurrences have the potential to be impacted by the addition route UBB876 to the NFTS.

Hackelia amethystina (Amethyst stickseed)

There is one occurrence of *Hackelia amethystina* (Lassen NF Occurrence #2) that comes within 100 feet of unauthorized routes proposed for addition under Alternative 5 and the Modified Alternative 5 (Table 110).

Hackelia amethystina grows in forest openings, meadow edges, and dry sagebrush slopes within Glenn, Lake, Lassen, Mendocino, Placer, Plumas, Tehama, and Trinity counties in California (USDA FS LNF 2009, CNPS 2009). The California Native Plant Society ranks this species as List 4.3, which is not very threatened in California and with limited distribution elsewhere (2009). On Lassen NF this species is currently known to only four occurrences found on the slopes below the crest of the Diamond Mountains, within the southeast portion of Eagle Lake RD. Individual occurrence numbers range from approximately 60 to over 2,500 with total numbers believed to be near 3,300 (USDA FS LNF 2009).

Occurrence #2- (1 Suboccurrence): This occurrence is found along the northern slope of the Diamond Mountains within openings and along Forest Service road 28N52. One unauthorized route, ULA536, takes off this road and is within 100 feet from one of seven suboccurrences. There are an estimated 325 individuals within the entire occurrence, but only one suboccurrence is potentially impacted by the addition of the unauthorized route (USDA FS 2005g). Total acres of the occurrence are unknown at this time.

Direct and Indirect Effects

This species prefers open habitats within sagebrush and meadow areas that can easily be accessed by vehicles, and is therefore at risk from potential impacts related to the continued use of route ULA536. Direct impacts to this species include trampling and the potential death of individuals while indirect effects could occur from soil compaction and erosion within potential and existing habitats. However, only one of the seven suboccurrences is located within 100 feet of a route proposed for addition, so any impacts to the occurrence as a whole should be minor.

Cumulative Effects

Hackelia amethystina plants found along the ridge of the Diamond Mountains could receive additional impacts from ongoing grazing within the Diamond Mountain Allotment and recreation activities within and adjacent to the occurrence. However, grazing and recreation impacts should be minor, since this occurrence is found along an open ridge line, both of these activities would be scattered and transitory in nature throughout the occurrence. This

species is common along open ridge tops on the Diamond Mountains there would most likely only be minor impacts that could add cumulatively to those from the addition of unauthorized routes within either Alternative 5 or the Modified Alternative 5. Overall, with few potential effects to this occurrence these Alternatives have the potential to affect less than 1 percent of all known individuals found on the forest, so viability for this species will be maintained throughout the project area, and its range.

Ultramafic Guild

Currently, there are two rare plant species, *Monardella follettii* and *Packera eurycephala* var. *lewisrosei* that have the potential to be directly or indirectly impacted within the Ultramafic Guild under either Alternative 5 or the Modified Alternative 5 (Table 110).

The rare plant species within this guild have not been mapped accurately on Lassen NF, however, all unauthorized routes within Ultramafic habitats were visited and rare plant locations along these routes were mapped for this project. As a result, impacted and total occurrence acreages are estimates based on the location of ultramafic soils in the area and observed plants during monitoring visits (Table 112).

Table 112 Potential impacts to Ultramafic species from Alternative 5 and the Modified Alternative 5.

Species (Occurrence/ Suboccurrence)	Route	Acres with potential for impact	Total Occurrence (Acres)	Percent of Occurrence affected
Monardella follettii	ULA061	0.8	23.1	3.5
Packera eurycephala var. lewisrosei	ULA061	3.3	376.2	<1

Monardella follettii (Follett's monardella)

There is currently one occurrence of *Monardella follettii* (Lassen NF Occurrence #1), totaling 0.8 acres, that comes within 100 feet of an unauthorized route proposed for addition under either Alternative 5 or the Modified Alternative 5 (Table 112).

Monardella follettii is known in Plumas County in the northern Sierra Nevada Mountain Range and from one historic occurrence in Nevada County that has not been relocated since 1916 (CDFG CNDDB 2008). The Plumas National Forest currently has 34 occurrences (USDA FS 2008d), while Lassen National Forest has two known occurrences within the Yellow and Grizzly Creek drainages (USDA FS LNF 2009). This species is endemic to serpentine soils that are open and partially under a canopy in mixed conifer forests (USDA FS 2005e). In addition, it is commonly found in undisturbed sites, and disturbed sites such as abandoned roads, mining areas, old logging areas, skid trails, and areas within recent wildfire events (CDFG CNDDB 2008). The California Native Plant Society ranks this species as List 1B.2, meaning that it is rare, threatened, or endangered in California and elsewhere (2009).

Occurrence #1- This is a large occurrence found within the Yellow Creek drainage that has not been completely mapped within all known potential habitat. As a result, numbers are estimates based on where the plant is currently known to exist, primarily along NFTS Roads and Trails, and unauthorized routes within the area. However, it is most likely found within the same extent as *Packera eurycephala* var*. lewisrosei* within the Yellow Creek area, and has been documented along route ULA061 which leads to a dispersed campsite along Yellow Creek (USDA FS 2007f).

LNF Interim Management Prescriptions require that the forest maintain an undisturbed core area of at least 75% of the occurrence(s); allow disturbance in non-core area of the occurrence(s), and monitor effects (USDA FS 2001c).

Direct and Indirect Effects

Plant numbers along this route are estimated to be within the 100's, all of which have the potential to be directly or indirectly impacted by motor vehicle use associated with this route (USDA FS 2007f). However, the entire occurrence is quite large and potential impacts will only occur to approximately 0.8 acres of the estimated 23.1 acres of this occurrence (Table 112).

Although this species is tolerant of various disturbances (CDFG CNDDB 2008), any beneficial affect these activities may have provided could easily be overcome by the negative direct effect if repeated trampling and subsequent death of individuals occurs. Indirect effects from erosion, dust fugatives, and noxious weed invasion may also impact this occurrence with the implementation of either Alternative 5 or the Modified Alternative 5.

Packera eurycephala var. lewisrosei (Lewis Rose's ragwort)

There is currently one occurrence of *Packera eurycephala* var*. lewisrosei* (Lassen NF Occurrence #1), totaling 3.3 acres, that comes within 100 feet of an unauthorized route proposed for addition under either Alternative 5 or the Modified Alternative 5 (Table 112).

Packera eurycephala var*. lewisrosei* is currently limited to eastern Butte and western Plumas Counties (CDFG CNDDB 2008). Its habitat requirements are apparently less restrictive than other Ultramafic species, since it extends to ultramafic-influenced soils and is not limited to ultramafic rock outcrops (USDA FS 2005f). The California Native Plant Society ranks this species as List 1B.2, meaning that it is rare, threatened, or endangered in California and elsewhere (2009). Currently this species is known to 42 occurrences in California; 31 occurrences are currently found on Plumas National Forest and seven have been documented on adjacent private lands (USDA FS 2005f, 2008d). Lassen National Forest currently has four known occurrences within the Yellow, Grizzly, and Soda Creek drainages, and one occurrence south of Philbrook Lake (USDA FS LNF 2009).

Occurrence #1- This is a large occurrence found scattered throughout the Yellow Creek drainage, which includes unauthorized route UNL061. Plant numbers were estimated have been estimated through this large occurrence at between 100 to over 2,000 individuals (USDA FS LNF 2009), of which those within 100 feet of this unauthorized route could

receive direct or indirect impacts from the implementation of either Alternative 5 or the Modified Alternative 5. However, this is a large occurrence of over 376 acres, of which only 3.3 acres have the potential to be impacted by the addition of this route (Table 112).

LNF Interim Management Prescriptions allow for no more than 50% of each occurrence on the Lassen to be impacted by land disturbance activities (USDA FS 2001c).

Direct and Indirect effects

Packera eurycephala var. *lewisrosei* is found in both disturbed and undisturbed habitats, including old road cuts, roadsides, skid trails, and at the edges of burn piles. However, it does not appear more abundant in disturbed areas than undisturbed areas (USDA FS 2005f). Past observation has indicated that occurrences impacted by road widening or maintenance activities usually lose a small fraction of their individuals, but plants seem to readily recolonize road cuts (USDA FS 2008d). As a result, while there may be direct and indirect impacts to those individuals growing within 100 feet of route UNL061, this species seems tolerant of disturbance and will mostly recolonize moderately impacted areas.

Cumulative Effects to Monardella follettii and Packera eurycephala var. lewisrosei

There are no ongoing or future projects that will be occurring within ultramafic habitat for *Packera eurycephala* var. *lewisrosei* and *Monardella follettii* beyond ongoing dispersed recreation activities (Appendix C). Both occurrences are very large, and any incidental impacts to individuals from dispersed camping activities will not add cumulatively to those impacts from the addition of route ULA061 within Alternative 5 or the Modified Alternative 5. In addition, impacts from this project also fall within the Interim Management Prescriptions developed these species to ensure that viability of these species will be maintained on the forest (USDA FS 2001c).

Federally-listed Plant Species and Associated Designated Critical Habitat

Direct and Indirect Effects

There would be no direct or indirect effects from the implementation of any of the Action Alternatives 2, 3, 4, 5 or the Modified 5 to any occurrence of *Orcuttia tenuis* or *Tuctoria greenei* or potential vernal pool habitat, because there are no routes proposed for addition, or occurrences of either species within 100 feet of vernal pool habitat (Table 113).

Overall, within critical habitat core areas on the forest there are routes proposed for addition within Alternatives 4, 5 and the Modified Alternative 5; however, there are no routes proposed for addition within 300 feet of occupied vernal pools where the primary constituent elements occur for these species (Table 114). Therefore, even though there are routes proposed for addition within DCH core areas for both species, since all proposed routes are at least 300 feet from occupied vernal pools with the primary constituent elements, there would be no direct or indirect effect to Designated Critical Habitat from any of the Action Alternatives.

Table 113 The miles of unauthorized routes and number of federally-listed species occurrences located within 100 feet of known vernal pools by alternative

Species	Alternative					
	1 No Action	2	3	4	5	Mod 5
Orcuttia tenuis	7	0	0	0	0	0
Tuctoria greenei	0	0	0	0	0	0
Total number occurrences	**7**	**0**	**0**	**0**	**0**	**0**
Miles of Unauthorized Routes	**3.4**	**0**	**0**	**0**	**0**	**0**
Total Miles	**3.4**	**0**	**0**	**0**	**0**	**0**

Table 114 Approximate number of miles of unauthorized routes within DCH core areas.

Measure	Alternative					
	1 No Action	2	3	4	5	Mod 5
Number of miles within DCH Core Areas						
***Orcuttia tenuis* pools**	53.6	0	0	0.4	0.7	0.7
***Tuctoria greenei* pool**	1.7	0	0	0	0.2	0.2
Total Miles within DCH	**55.3**	**0**	**0**	**0.4**	**0.9**	**0.9**
Number of miles within 300 feet of occupied vernal pools in DCH Core Areas						
***Orcuttia tenuis* pools**	5.1	0	0	0	0	0
***Tuctoria greenei* pool**	0.6	0	0	0	0	0
Total Miles within DCH	**5.7**	**0**	**0**	**0**	**0**	**0**

Action Alternatives (2- Modified 5): Summary of Environmental Consequences to Botanical Resources

Since there are no direct or indirect effects to *Orcuttia tenuis* or *Tuctoria greenei* or their associated critical habitat, cumulative effects are not a concern for these species with the implementation of the Action Alternatives 2, 3, 4, 5 and the Modified Alternative 5.

The following sections present an overview of the effects analysis for each Action Alternative to rare plants and associated habitats, as well as special areas within the project area. In general, the greater the number of motorized routes added to the NFTS, the higher the risk and severity of negative impacts to botanical resources. Alternative 3, which does not designate unauthorized routes, has no direct or indirect impacts. While the preferred Alternative, the Modified Alternative 5, has the greatest impacts to botanical resources due to the highest number unauthorized routes being added under this alternative. In addition, this alternative is different than the other Action Alternatives except Alternative 5 in that it is the only Alternative which proposes to convert six miles of ML 1 roads to motorized trails.

Suitable potential habitat for rare plant species could also be impacted within the project area from ongoing and future grazing, fuels reduction, road maintenance, woodcutting, and recreation activities for all the Action Alternatives except Alternative 3. However, all rare plant species within the project area would receive some long-term benefit from the prohibition of cross-country travel within the project area. For Alternatives 2, 4, 5 and the Modified Alternative 5, all habitat guilds have proposed unauthorized routes or habitat with the potential to be impacted, except Ultramafic Habitats within Alternatives 2 and 4, since there are no unauthorized routes found within 100 feet of this guild under these alternatives (Table 99). These potential impacts, described within the general cumulative effects section, could add cumulatively to those impacts from the implementation of Alternatives 2, 4, 5 and the Modified Alternative 5. However, since these alternatives propose the addition of few unauthorized routes, and no ground-disturbing activities are proposed, there will be few added impacts to potential rare plant habitat by the implementation of these Alternatives.

In addition, route specific mitigation measures (Appendix E) and the Rare Plant Monitoring Strategy (Appendix D) were designed to ensure potential impacts are minimized or eliminated throughout the creation of the Motor Vehicle Use Map (MVUM), and into the future guarantee the long-term viability of these occurrences within the project area.

Alternative 2

Direct/Indirect Effects of Prohibition of cross country travel and the addition of unauthorized routes to the NFTS.

Sensitive and Special Interest Plant Species

Alternative 2 prohibits cross-country travel, and adds approximately 16 miles of routes as ML 2 roads and five miles of motorized NFTS trails, for a total of 21 miles added to the NFTS. Alternative 2 has the smallest impact to rare plant species from the addition of unauthorized roads and trails to the NFTS with only one rare plant occurrence found along a route proposed for addition under this alterative. In addition, this Alternative has the second lowest impact to rare plant habitat after Alternative 4, with 18 miles of unauthorized routes for a total of 434 acres that intersect rare plant occurrences or associated habitat across the forest (Table 115).

Table 115 Summary of indicator measures for the analysis of effects to rare plant species for the prohibition of cross-country travel and the addition of routes under Alternative 2

Measure	Total
Miles of unauthorized routes within 100 feet of rare plant sites or within or adjacent to suitable rare plant habitat.	18 miles
The number of acres of potential habitat for rare plants within 100 feet of unauthorized routes.	434 acres
Total number of plant occurrences within 100 feet of unauthorized routes.	1

Thermopsis californica var. *argentata*, within the Forested Habitat Guild, is the only species that has been documented within 100 feet of a route proposed for addition under Alternative 2 (Table 110). All other habitat guilds have some potential habitat that could be impacted by routes proposed for addition under this Alternative, with the exception of the Ultramafic Guild (Table 99). See the Environmental Consequences for Individual Species above for a detailed discussion on the effects to *Thermopsis californica* var. *argentata* by the implementation of Alternative 2. In general this species has shown to have a high tolerance for disturbance, particularly from vehicles, since most known occurrences on the forest are found along existing roads (USDA FS LNF 2009). Therefore, any impacts to this occurrence should be minor, but could include death, altered growth, or reduced seed set from physically breaking, crushing, or uprooting plants (Wilshire et al. 1978, Cole and Bayfield 1993).

Indirect effects to species are dependant upon the number is species–specific factors that include habitat-type, tolerance to disturbance, distance from route, and intensity and timing of disturbance. Since *Thermopsis californica* var*. argentata* is commonly found growing along roads, any negative effects caused by motorized vehicle use are most likely offset by whatever beneficial indirect effects the species receives growing in adjacent habitat. Due to its preference for roadside habitats, this species is particularly venerable to potential indirect impacts from noxious weeds introduction and spread within it habitat.

Federally-listed plant species and Designated Critical Habitat

There would be no direct or indirect or cumulative effects from the implementation of Alternatives 2 to any occurrence of *Orcuttia tenuis* or *Tuctoria greenei* or potential vernal pool habitat, because there are no routes proposed for addition, or occurrences of either species within 100 feet of vernal pool habitats (Table 113). In addition, there would also be no direct or indirect or cumulative effects from this Alternatives 2 to Designated Critical Habitat, because there are no unauthorized routes proposed for addition to the NFTS within DCH core areas (Table 114).

Special Areas

There are no routes proposed for addition to the NFTS within Alternative 2, in RNA's or SIA's, therefore, there will be direct, indirect or consequential cumulative effects from the implementation of this Alternative to either of these Special Areas on the forest (Table 98).

Direct/Indirect Effects of Changes to the existing NFTS (ML1 roads converted to Motorized Trails)

There are no direct, indirect or cumulative effects to Botanical Resources from changes to the NFTS under Alternative 2, because no there are no ML 1 roads proposed for conversion to Motorized Trails under this Alternative.

Cumulative Effects of Continuation of cross-country motor vehicle travel, use of existing unauthorized roads and changes to NFTS

There is only one Sensitive or Special Interest plant species, *Thermopsis californica* var. *argentata,* with the potential to be directly or indirectly impacted by the implementation of Alternative 2 (Table 110). This species is found along route UNH001 and could receive additional cumulative impacts from ongoing dispersed recreation and grazing activities, as well as from the upcoming Wiley Ranch project (Appendix C). However, with 29 occurrences currently known to the Lassen National Forest, Alternative 2 will potentially affect less than 1 percent of known occurrences within the project area. As a result, the viability of this species is expected to be maintained throughout the project area with the implementation of this Alternative. See the general cumulative effects section and the cumulative effects discussion for individual species for a detailed analysis of potential cumulative effects to this species.

Overall, this alternative has the lowest number of rare plant occurrences and the second lowest acres of rare plant habitat potentially impacted of the alternatives proposing the addition of unauthorized routes to the NFTS (Table 99 and Table 110). Though there will be some impacts to rare plants and their associated habitat, these will not affect the viability of any rare plant species within the project area or throughout its range.

In comparison to the other Action Alternatives (4, 5 and the Modified Alternative 5), that add unauthorized routes, Alternative 2 has the least miles and/or acres of habitat potentially impacted within the Barren, Riparian and Sagebrush, and the second lowest within Chaparral/Oak Woodland, Fen and Meadow, and Forested Habitat Guilds (Table 99). In addition, this Alternative has no routes proposed for addition within a Special Areas on the forest (Table 109), and no effects to federally-listed plant species or associated designated critical habitat.

Alternative 3

Direct/Indirect Effects of Prohibition of cross country travel and the addition of unauthorized routes to the NFTS

Federally-listed, Sensitive and Special Interest Plant Species

Alternative 3 also prohibits cross-country travel and no unauthorized routes would be added to the NFTS under this alternative. This alternative has the least impact to TES and Special Interest plants and their associated habitats since no unauthorized routes will be designated for use, and motor vehicle travel will be restricted to the existing NFTS. As a result, there would be no negative and only minor long-term (20+ years) beneficial direct and indirect effects to rare plant occurrences or potential habitat by the implementation of Alternative 3, since there would be no change to the existing NFTS.

Special Areas

There are no routes proposed for addition to the NFTS within Alternative 3, in RNA's or SIA's, therefore, there will be no direct, indirect or consequential cumulative effects from the

implementation of this Alternative to either of these Special Areas on the forest (**Error! eference source not found.**).

Direct/Indirect Effects of Changes to the existing NFTS (ML1 roads converted to Motorized Trails)

There are no direct, indirect or cumulative effects to Botanical Resources from changes to the NFTS under Alternative 3, because no there are no ML 1 roads proposed for conversion to Motorized Trails under this Alternative.

Cumulative Effects of Continuation of cross-country motor vehicle travel, use of existing unauthorized roads and changes to NFTS

Since there are no direct or indirect effects to Botanical Resources or their associated habitats, then cumulative effects are not a concern with the implementation of Alternative 3.

Alternative 4

Direct/Indirect Effects of Prohibition of cross country travel and the addition of unauthorized routes to the NFTS

Sensitive and Special Interest plant species

Alternative 4 prohibits cross-country travel, adds approximately 10 miles of unauthorized routes as ML 2 roads, but adds no unauthorized routes as motorized trails. This alternative has the potential to have the least impact on rare plant habitat from the addition of unauthorized routes to the NFTS, and has the second lowest impacts to rare plants with only three occurrences with the potential of being impacted by the addition of routes. Overall, approximately 10 miles of unauthorized routes for a total of 261 acres of potential habitat are within 100 feet of unauthorized routes proposed for addition within Alternative 4 (Table 116).

Table 116 Summary of indicator measures for the analysis of effects to rare plant species for the prohibition of cross-country travel and the addition of routes for Alternative 4.

Measure	Total
Miles of unauthorized routes within 100 feet of rare plant sites or within or adjacent to suitable rare plant habitat.	10 miles
The number of acres of potential habitat for rare plants within 100 feet of unauthorized routes.	261 acres
Total number of plant occurrences within 100 feet of unauthorized routes.	3

Within this alternative there is one Sensitive plant *Astragalus pulsiferae* var. *suksdorfii,* and two Special Interest plant species, *Penstemon cinicola* and *Penstemon heterodoxus* var. *shastensis,* within the Fen and Meadow and Sagebrush Habitat Guilds that are within 100 feet of unauthorized routes proposed for addition to the NFTS (Table 106). All other habitat guilds have some potential habitat that could be impacted by routes proposed for addition under this Alternative, with the exception of the Ultramafic Guild (Table 107). See

the Environmental Consequences for Individual Species above for a detailed discussion on the effects to these three species by the implementation of Alternative 4.

In general *Astragalus pulsiferae* var. *suksdorfii* has shown to have a high tolerance for disturbance within its habitat and a moderate ability to recolonize moderately utilized roads (USDA FS LNF 2009), so any detrimental impacts to this occurrence should be minor. In addition, the Robbers Creek *Penstemon cinicola* occurrence is expected to have few of any potential effects from the implementation of Alternative 4, since there is a barrier preventing vehicles from accessing habitat and individuals of this occurrence. While the *Penstemon heterodoxus* var. *shastensis* occurrence at Burney Springs may receive incidental impacts from the continued use of the route which runs along the edge of its meadow habitat.

Overall, all occurrences found along proposed routes have some risk of receiving direct and indirect effects from motorized vehicles use. These effects could include death, altered growth, or reduced seed set from physically breaking, crushing, or uprooting plants (Wilshire et al. 1978, Cole and Bayfield 1993). While, indirect impacts can occur from soil erosion or compaction, dust fugitives, or from the potential displacement of rare and native species with non-native or invasive species (Davidson and Fox 1974, Ouren et al. 2007, Shipley et al. 1978).

Federally-listed Plant Species and Designated Critical Habitat

There would be no direct or indirect or cumulative effects from the implementation of Alternatives 4 to any occurrence of *Orcuttia tenuis* or *Tuctoria greenei* or potential vernal pool habitat, because there are no routes proposed for addition, or occurrences of either species within 100 feet of vernal pool habitats (Table 113). In addition, there would also be no direct or indirect or cumulative effects from this Alternatives 4 to Designated Critical Habitat, because there are no unauthorized routes proposed for addition within 300 feet of occupied vernal pools where the primary constituent elements occur for these species (Table 114). See the Summary of Environmental Consequences for Individual Species section for a detailed analysis.

Special Areas

There are no routes proposed for addition to the NFTS within Alternative 4, in RNA's or SIA's, therefore, there will be no direct, indirect or consequential cumulative effects from the implementation of this Alternative to either of these Special Areas on the forest (Table 109).

Direct/Indirect Effects of Changes to the existing NFTS (ML1 roads converted to Motorized Trails)

There are no direct, indirect or cumulative effects to Botanical Resources from changes to the NFTS under Alternative 4, because no there are no ML 1 roads proposed for conversion to Motorized Trails under this Alternative.

Cumulative Effects of Continuation of cross-country motor vehicle travel, use of existing unauthorized roads and changes to NFTS

There are three Sensitive plant species (*Astragalus pulsiferae var. suksdorfii, Penstemon cinicola,* and *Penstemon heterodoxus* var. *shastensis)* that could receive direct and/or indirect impacts from the implementation of Alternative 4. As a result, all three could receive added impacts from one or more activities including grazing, prescribed fire, dispersed camping, vegetation management, and woodcutting within or adjacent to their habitat. These impacts would add cumulatively to those from the proposed action. See the general cumulative effects section and the cumulative effects discussion for individual species for a detailed analysis of potential cumulative effects to these species.

Overall, the three species potentially affected by the implementation of Alternative 4 are all stable across the Lassen National Forest, and with the addition of these routes, less than 1 percent of known occurrences will be impacted. In addition, cumulative effects from this alternative are far less than Alternative 1, primarily due to the ban on cross-country travel. Of all the Action Alternatives, Alternative 4 has the second lowest cumulative impact on rare plant species, but the lowest impact on suitable habitat by the addition of unauthorized routes to the NFTS.

In comparison to the other Action Alternatives (2, 5 and the Modified Alternative 5), Alternative 4 has the least miles and/or acres of potential impacted habitat within the Chaparral/Oak Woodland, Fen/Meadow, and Forested Habitat Guilds, and the second lowest within the Barren, Riparian, and Sagebrush Guilds (Table 99). Therefore, implementation of this alternative also has the potential to affect suitable habitat for rare plant species across the forest. However, this Alternative has no routes proposed for addition within a Special Areas on the forest (Table 109), and no effects to federally-listed plant species or associated designated critical habitat.

Alternative 5

Direct/Indirect Effects of Prohibition of cross country travel and the addition of unauthorized routes to the NFTS.

Sensitive and Special Interest plant species

Alternative 5 prohibits cross-country travel, adds 10 miles of currently unauthorized routes as ML 2 roads, and 43 miles of unauthorized routes as motorized NFTS trails, for a total of 53 miles of routes added to the NFTS. In addition, this alternative proposes to convert six miles of ML 1 roads to motorized trails and open them up to motor vehicle use. As a result, this alternative has the potential to have the largest impact on rare plants and their associated habitats of the Action Alternatives. It has the potential to impact nine rare plant occurrences both directly and indirectly, and has approximately 50 miles and 1,256 acres of potential habitat within 100 feet of the unauthorized routes proposed for addition under this alternative (Table 117).

Table 117 Summary of indicator measures for the analysis of effects to rare plant species for the prohibition of cross-country travel and the addition of routes for Alternative 5

Measure	Total
Miles of unauthorized routes within 100 feet of rare plant sites or within or adjacent to suitable rare plant habitat.	50 miles
The number of acres of potential habitat for rare plants within 100 feet of unauthorized routes.	1,256 acres
Total number of plant occurrences within 100 feet of unauthorized routes.	9

Eight rare plant species within nine occurrences have the potential to be affected by the addition unauthorized routes under this alternative. They include three Sensitive plant species, *Astragalus pulsiferae* var*. suksdorfii, Monardella follettii,* and *Packera eurycephala* var. *lewisrosei,* and five Special Interest plant species *Carex petasata, Hackelia amethystina, Penstemon cinicola, Penstemon heterodoxus* var. *shastensis,* and *Thermopsis californica* var*. argentata* (Table 110). These species are found within the Fen/Meadow, Forested, Sagebrush, and Ultramafic Habitat Guilds (Table 110). All of other habitat guilds also have the potential to be impacted by the addition of routes under this Alternative (Table 99). See the Environmental Consequences for Individual Species above for a detailed discussion on the effects to these eight species by the implementation of Alternative 5.

In general, the nine occurrences found along the proposed routes could received direct effects to individuals which could include, death, altered growth, or reduced seed set from physically breaking, crushing, or uprooting plants (Wilshire et al*.* 1978, Cole and Bayfield 1993). Indirect effects to species are dependant upon the number of species–specific factors that include habitat-type, tolerance to disturbance, distance from route, and intensity and timing of disturbance. Some rare plants currently found along routes, such as *Thermopsis californica* var*. argentata* and *Astragalus pulsiferae* var*. suksdorfii,* have shown that they are quite tolerant of disturbance, so the impacts from the addition of unauthorized routes within or adjacent to occurrences of these species would be minor. Regardless, all of the rare species and their associated habitats, found along these routes, are at high risk of indirect effects from noxious weed introduction and spread.

Federally-listed plant species and Designated Critical Habitat

There would be no direct or indirect or cumulative effects from the prohibition of cross-0country travel or the addition of unauthorized routes with the implementation of Alternative 5 to any occurrence of *Orcuttia tenuis* or *Tuctoria greenei* or potential vernal pool habitat, because there are no routes proposed for addition, or occurrences of either species within 100 feet of vernal pool habitats (Table 113). In addition, there would also be no direct or indirect or cumulative effects from this action under Alternatives 5 to Designated Critical Habitat, because there are no unauthorized routes proposed for addition within 300 feet of occupied vernal pools where the primary constituent elements occur for these species

(Table 114). See the Summary if Environmental Consequences for Individual Species section, and Alternative 1 for detailed analysis.

Special Areas

Alternative 5 proposes to add approximately 0.10 miles of unauthorized routes within the Murken SIA to the NFTS (Table 109). There are two routes, UNC105 and UNC106, proposed for addition, that are within the boundary of this Special Area. There are no routes proposed for any other SIA's or RNA's on the forest, so there will be to no direct, indirect or cumulative effects to the remaining Special Areas.

The Murken Special Interest Area was established as a Special Interest Area on the forest in response to the unique botanical flora located within the Murken Bench area. Specifically, this area represents a disjunct and isolated area of westside foothill vegetation in combination with Great Basin vegetation. Grey pine, Oregon Oak, buckbrush and redbud grow intermingled with eastside mountain mahogany, sagebrush, bitterbrush, and Idaho fescue within this area. Forest Service Manual 2372.4 (FSM 1990) directions specify that roads and trails within SIA's be located without disturbing the special feature of the established area. Since there is no ground disturbing activities associated with adding the routes to the NFTS, then there is little chance that their addition to the NFTS will impact the special features of this botanical SIA. Therefore, even though routes are being proposed for addition under Alternative 5, there will be no direct, indirect or cumulative effects to the Murken SIA from the implementation of this alternative.

Direct/Indirect Effects of Changes to the existing NFTS (ML1 roads converted to Motorized Trails)

Sensitive and Special Interest plant species

Unlike Alternative 2-4, Alternative 5 also proposes to convert six miles of ML 1 roads that are currently closed, to motorized tails. Since these roads are currently closed to motor vehicle use, Sensitive and Special Interest plants and habitat within 100 feet of these roads can potentially be impacted by this action. However, there are no Sensitive or Special Interest plant species found within 100 feet of these roads, so affects from this action to individuals is not a concern. Proposed routes are found within potential habitat for rare plant species within the Chaparral/oak Woodland, Forested, and Riparian Habitat Guilds, and could receive direct and indirect impacts from the conversion of these roads to motorized trails (Table 118). Direct, indirect and cumulative affects to rare plant habitat would be similar to those described for the addition of unauthorized routes to the NFTS, and any impacts to habitats from these routes will add cumulative to those impacts previously discussed. There are no motorized roads proposed within the Barren, Fen/Meadow, Sagebrush or Ultramafic Habitat Guilds so there will be no affects to these guilds from the implementation of this action.

Table 118 Potential habitat found within 100 feet of ML 1 roads proposed for conversion to a motorized trails.

Habitat Guilds[a]	Measure	Alternative					
		1 No Action	2	3	4	5	Mod 5
Chaparral/oak woodland	Miles of ML 1 roads to Motorized Trails	0	0	0	0	1.6	1.6
	Acres of Potential Habitat	**0**	**0**	**0**	**0**	**39**	**39**
Forested	Miles of ML 1 roads to Motorized Trails	0	0	0	0	5.6	5.6
	Acres of Potential Habitat	**0**	**0**	**0**	**0**	**140**	**140**
Riparian	Miles of ML 1 roads to Motorized Trails	0	0	0	0	0.2	0.2
	Acres of Potential Habitat	**0**	**0**	**0**	**0**	**6**	**6**
Total Miles of ML 1 roads to Motorized Trails[b]		**0**	**0**	**0**	**0**	**6.1**	**6.1**
Total Acres of Potential Habitat[b]		**0**	**0**	**0**	**0**	**154**	**154**

a Only those guilds potentially impacted by the action are displayed. bAcres/miles not addit9ve due to overlapping habitats guids.

Federally-listed plant species and Designated Critical Habitat

There would be no direct or indirect or cumulative effects to *Orcuttia tenuis* or *Tuctoria greenei* or potential vernal pool habitat by the conversion of ML 1 roads to motorized trails, because none of the proposed roads are found within 100 feet these species or their vernal pool habitats. In addition, proposed routes are not found within any Designated Critical Habitat core area, so there are no direct, indirect, or cumulative effect to federally-listed species or habitat from this action.

Special Areas

There would be no direct or indirect or cumulative effects to RNA's or SIA's by the conversion of ML 1 roads to motorized trails, because none of the proposed roads are found within their boundaries.

Cumulative Effects of Continuation of cross-country motor vehicle travel, use of existing unauthorized roads and changes to NFTS

Each of the nine occurrences found within 100 feet of unauthorized routes proposed under Alternative 5 have the potential to be directly or indirectly affected, therefore these species are also at risk of being cumulatively impacted. Each species could receive additional impacts from one or more activities including grazing, prescribed fire, dispersed camping, vegetation management and woodcutting within or adjacent to their habitat. These impacts would add cumulatively to those from the proposed action. See the general cumulative effects section and the cumulative effects discussion for individual species for a detailed analysis of potential cumulative effects to these species.

Overall, the eight species potentially affected by the implementation of Alternative 5 are all stable across the Lassen National Forest, and with the addition of these routes, less than 1 percent of known occurrences will be impacted. In addition, cumulative effects from this alternative are far less than Alternative 1, primarily due to the ban on cross-country travel. Of the Action Alternatives, Alternative 5 and the Modified Alternative 5 have the highest cumulative impact on rare plant species suitable habitat; however, impacts are few and scattered across the forest so the viability of all Sensitive or Special Interest plant species on the forest will be maintained with the implementation of this Alternative.

In comparison to the other Action Alternatives, Alternative 5 has the second highest number of miles and/or acres of potentially impacted habitat within all the habitat guilds behind the Modified Alternative 5 (Table 99). In addition, Alternative 5 proposes the addition of two routes, for a total of 0.10 miles, within Special Areas on the forest (Table 109); however, there are no effects to federally-listed plant species or associated designated critical habitat from the implementation of this alternative. Therefore, Alternative 5 has the potential to have the second greatest affect on Botanical Resources of the Action Alternatives.

Modified Alternative 5

Direct/Indirect Effects of Prohibition of cross country travel and the addition of unauthorized routes to the NFTS.

Sensitive and Special Interest plant species

The Modified Alternative 5 is very similar to Alternative 5, in that it also prohibits cross-country travel, but adds 10 miles of currently unauthorized routes as ML 2 roads, and 46 miles of unauthorized routes as motorized NFTS trails, for a total of 56 miles of routes added to the NFTS. The Modified Alternative 5 also proposes to convert six miles of ML 1 roads to motorized trails and open them up to motor vehicle use. As a result, this alternative has the potential to have similar impacts on rare plants and their associated habitats as Alternative 5. It has the potential to impact nine rare plant occurrences both directly and indirectly, and has approximately 52 miles and 1,317 acres of potential habitat within 100 feet of the unauthorized routes proposed for addition under this alternative (Table 119).

The only difference in the rare plant impacts from Alternative 5 is an increase in the number of miles (+2 miles) and potential habitat (+61 miles) impacted due to the addition of four new routes under this alternative (Table 99). Impacts to individual species and occurrences are the same as under Alternatives 5. Therefore, see the direct and indirect effects section under Alternative 5 above for discussions on impacts to Sensitive and Special Interest Plant Species.

Table 119 Summary of indicator measures for the analysis of effects to rare plant species for the prohibition of cross-country travel and the addition of routes for the Modified Alternative 5.

Measure	Total
Miles of unauthorized routes within 100 feet of rare plant sites or within or adjacent to suitable rare plant habitat.	52 miles
The number of acres of potential habitat for rare plants within 100 feet of unauthorized routes.	1,317 acres
Total number of plant occurrences within 100 feet of unauthorized routes.	9

Federally-listed plant species and Designated Critical Habitat

There would be no direct or indirect or cumulative effects from the implementation of the Modified Alternative 5 to any occurrence of *Orcuttia tenuis* or *Tuctoria greenei* or potential vernal pool habitat, because there are no routes proposed for addition, or occurrences of either species within 100 feet of vernal pool habitats (Table 113 (Table 113).

Overall, within critical habitat core areas on the forest there are routes proposed for addition within Alternatives 4, 5 and the Modified Alternative 5; however, there are no routes proposed for addition within 300 feet of occupied vernal pools where the primary constituent elements occur for these species (Table 114). Therefore, even though there are routes proposed for addition within DCH core areas for both species, since all proposed routes are at least 300 feet from occupied vernal pools with the primary constituent elements, there would be no direct or indirect effect to Designated Critical Habitat from any of the Action Alternatives.

Table 113). In addition, there would also be no direct or indirect or cumulative effects from the Modified Alternative 5 to Designated Critical Habitat, because there are no unauthorized routes proposed for addition within 300 feet of occupied vernal pools where the primary constituent elements occur for these species (Table 114). See the Summary if Environmental Consequences for Individual Species section, and Alternative1 for detailed analysis.

Special Areas

As with Alternative 5, the Modified Alternative 5 also proposes to add approximately 0.10 miles of unauthorized routes within the Murken SIA to the NFTS (Table 109). There are two routes, UNC105 and UNC106, proposed for addition, that are within the boundary of this Special Area. There are no routes proposed for any other SIA's or RNA's on the forest, so there will be to no direct, indirect or cumulative effects to the remaining Special Areas. See the Special Areas section under Alternative 5 for detailed discussion on the effects of the routes proposed for addition under this alternative.

Direct/Indirect Effects of Changes to the existing NFTS (ML1 roads converted to Motorized Trails)

Sensitive and Special Interest plant species

As with Alternative 5, the Modified Alternative 5 also proposes to convert six miles of ML 1 roads that are currently closed, to motorized tails. Effects to rare plants and potential habitat are the same for both Alternatives (Table 118). See the direct/indirect effects section for changes to the existing NFTS under Alternative 5 for a detailed analysis of potential impacts from this action to Sensitive and Special Interest plant species and their habitats.

Federally-listed plant species and Designated Critical Habitat

There would be no direct or indirect or cumulative effects to *Orcuttia tenuis* or *Tuctoria greenei* or potential vernal pool habitat by the conversion of ML 1 roads to motorized trails, because none of the proposed roads are found within 100 feet these species or their vernal pool habitats. In addition, proposed routes are not found within any Designated Critical Habitat core area, so there is no direct, indirect or cumulative effect to federally-listed species or habitat from this action.

Special Areas

There would be no direct or indirect or cumulative effects to RNA's or SIA's by the conversion of ML 1 roads to motorized trails, because none of the proposed roads are found within their boundaries.

Cumulative Effects of Continuation of cross-country motor vehicle travel, use of existing unauthorized roads and changes to NFTS

Cumulative effects for the Modified Alternative 5 are similar t that of Alternative. The only difference between the two alternatives is 2 miles of additional routes and 61 acres of habitat within the Forested Guild that could potentially be impacted. As with Alternative 5, each of the nine occurrences found within 100 feet of unauthorized routes proposed under the Modified Alternative 5 have the potential to be directly or indirectly affected, therefore these species are also at risk of being cumulatively impacted. Each species could receive additional impacts from one or more activities including grazing, prescribed fire, dispersed camping, vegetation management and woodcutting within or adjacent to their habitat. These impacts would add cumulatively to those from the proposed action. See the general cumulative effects section and the cumulative effects discussion for individual species for a detailed analysis of potential cumulative effects to these species.

Overall, the eight species potentially affected by the implementation of Alternative 5 are all stable across the Lassen National Forest, and with the addition of these routes, less than 1 percent of known occurrences will be impacted. In addition, cumulative effects from this alternative are far less than Alternative 1, primarily due to the ban on cross-country travel. Of the Action Alternatives, Alternative 5 and the Modified Alternative 5 have the highest cumulative impact on rare plant species suitable habitat; however, impacts are few and

scattered across the forest so the viability of all Sensitive or Special Interest plant species on the forest will be maintained with the implementation of either Alternative.

In comparison to the other Action Alternatives, the Modified Alternative 5 has the highest number miles and/or acres of potentially impacted habitat within all the habitat guilds (Table 99). In addition, the Modified Alternative 5 proposes the addition of two routes, for a total of 0.10 miles, within Special Areas on the forest (Table 109); however, there are no effects to federally-listed plant species or associated designated critical habitat from the implementation of this alternative. As a result, this alternative has the potential to have the greatest affect on Botanical Resources as compared to the other Action Alternatives; however, effects are virtually the same as Alternative 5.

Summary of Determinations

Impacts to federally-listed, Sensitive and Special Interest plant species and their habitats, as well as Special Areas vary across all alternatives and only Alternative 3 eliminates adverse affect to all Botanical Resources, since no unauthorized routes are proposed under this alternative (Table 120 and Table 121).

Table 120 Effects summary for the prohibition of cross-country travel and the addition of unauthorized routes to the NFTS by Alternative.

Indicator	Alternative					
	1 No Action	2	3	4	5	Mod 5
Prohibition of cross-country travel and addtion of unauthorized routes to the NFTS						
Sensitive and Special Interest plant species						
Miles of unauthorized routes within 100 feet of rare plant sites or adjacent to suitable rare plant habitat.	1,013	18	0	10	50	52
Acres of potential habitat for rare plants within 100 feet of unauthorized routes.	25,223	434	0	261	1,256	1,317
Total number of rare plant occurrences within 100 feet of unauthorized routes.	147	1	0	3	9	9
Federally-listed plant species and associated Designated Critical Habitat						
Miles of unauthorized routes within 100 feet vernal pool habitat.	3.4	0	0	0	0	0
Miles of unauthorized routes within 300 feet of occupied vernatl pools.	5.7	0	0	0	0	0
Total number of occurrences within 100 feet of unauthorized routes.	7	0	0	0	0	0
Special Areas						

Indicator	Alternative					
	1 No Action	2	3	4	5	Mod 5
Miles of unauthorized routes within Research Natural Areas or Special Interest Areas.	2.6	0	0	0	0.1	0.1

Note: Summary of various tables in the above analysis.

Table 121 Effects summary for the changes to the existing NFTS (ML 1 road converted to motorized trails by Alternative.

Indicator	Alternative					
	1 No Action	2	3	4	5	Mod 5
Changes to the existing NFTS (ML1 roads converted to Motorized Trails)						
Sensitive and Special Interest plant species						
Miles of ML 1 roads coverted to Motorized Trails within 100 feet of rare plant sites or adjacent to suitable rare plant habitat.	0	0	0	0	7.4	7.4
Acres of potential habitat for rare plants within 100 feet of ML 1 roads converted to Motorized Trails.	0	0	0	0	185	185
Total number of rare plant occurrences within 100 feet of ML 1 roads converted to Motorized Trails.	0	0	0	0	0	0
Federally-listed plant species and associated Designated Critical Habitat						
Number of occurrences within 100 feet of ML 1 roads proposed for conversion to Motorized Trails.	0	0	0	0	0	0
Miles of ML 1 roads proposed for conversion to Motorized Trails within 100 feet of vernal pool habitat.	0	0	0	0	0	0
Miles of ML 1 roads proposed for conversion to Motorized Trails within 300 feet around occupied vernal pools.	0	0	0	0	0	0
Special Areas						
Miles of ML 1 roads proposed for conversion to Motorized Trails within Research Natural Areas or Special Interest Areas	0	0	0	0	0	0

Direct/Indirect Effects of Prohibition of cross country travel and the addition of unauthorized routes to the NFTS.

In general, alternatives with fewer miles open for motor vehicle use show reduced effects to rare plant species and their habitats. A dramatic decrease in potential impacts to rare plants occurs when comparing the Action Alternatives 2, 4, 5, and Modified 5 against the No Action Alternative or Alternative 3. Differences are less dramatic when comparing Alternative 2, Alternative 4, Alternative 5, and the Modified 5 against each other (Table 120 and Table 121).

Direct/Indirect Effects of Changes to the existing NFTS (ML1 roads converted to Motorized Trails)

The conversion of ML 1 roads to motorized trails adds only minor additional impacts to Botanical Resources under Alternative 5 and the Modified Alternative 5 (Table 121).

Sensitive Plant Species Determinations

Table 122 displays the preliminary determinations for all Lassen NF Sensitive plant species analyzed within the project area. These effects to a species are based on professional experience, the existing conditions of botanical resources within the project area, and the potential impacts from the Action Alternatives. These effects determinations were based on the culmination of direct, indirect, and cumulative effects on a species or its potential habitat within the project area.

Table 122 Preliminary determinations for all Sensitive species analyzed within the Project area

	Determination[a]			
Species	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5 and Modified 5**
Arabis constancei	No Effect	No Effect	No Effect	May Effect (PHb)
Astragalus pulsiferae var. suksdorfii	May Effect (PH)	No Effect	May Effect	May Effect
Botrychium ascendens	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Botrychium crenulatum	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Botrychium minganense	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Botrychium montanum	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Botrychium pinnatum	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Calochortus longebarbatus var. longebarbatus	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Calystegia atriplicifolia ssp. buttensis	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Clarkia gracilis ssp. albicaulis	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Clarkia mildrediae ssp. mildrediae	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Cryptantha crinita	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Cypripedium fasciculatum	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Cypripedium montanum	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Eriogonum prociduum	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Eriogonum spectabile	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Juncus leiospermus var. leiospermus	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Lewisia kelloggii ssp. hutchisonii	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)

	Determination[a]			
Species	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5 and Modified 5**
Limnanthes floccosa ssp. bellingeriana	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Lomatium roseanum	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Lupinus dalesiae	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Meesia triquetra	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Meesia uliginosa	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Mimulus evanescens	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Monardella follettii	No Effect	No Effect	No Effect	May Effect
Packera eurycephala var. lewisrosei	No Effect	No Effect	No Effect	May Effect
Penstemon personatus	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Penstemon sudans	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Phacelia inundata	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Rorippa columbiae	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Rupertia hallii	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Scheuchzeria palustris var. americana	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)
Silene occidentalis ssp. longistipitata	May Effect (PH)	No Effect	May Effect (PH)	May Effect (PH)

[a]Determinations: No Effect = Will Not Affect the Species or potential habitat; May Affect = May Affect Individuals and Habitat, But Not Likely to Result in a Trend toward Federal Listing or Loss of Viability for the Species; [b]PH: Effects of potential habitat only.

Special Interest Plant Species Determinations

Table 123 displays the preliminary effects for all Lassen NF Special Interest plant species that were analyzed within the project area. As with determinations for Sensitive species, effects for Special Interest plant species are based on professional experience, the existing conditions of botanical resources within the project area, and the potential impacts from the Action Alternatives. These effect determinations were based on the culmination of direct, indirect, and cumulative effects on a species or its potential habitat within the project area.

Table 123 Preliminary effects for all Special Interest plant species analyzed within the project area

	Effects[a]			
Species	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5 and Modified 5**
Allium sanbornii var. sanbornii	Effects to PH	No Effects	Effects to PH	Effects to PH
Arnica fulgens	Effects to PH	No Effects	Effects to PH	Effects to PH
Astragalus inversus	Effects to PH	No Effects	Effects to PH	Effects to PH
Astragalus pauperculus	Effects to PH	No Effects	Effects to PH	Effects to PH
Betula glandulosa	Effects to PH	No Effects	Effects to PH	Effects to PH
Botrychium simplex	Effects to PH	No Effects	Effects to PH	Effects to PH
Carex geyeri	Effects to PH	No Effects	Effects to PH	Effects to PH
Carex lasiocarpa	Effects to PH	No Effects	Effects to PH	Effects to PH
Carex petasata	Effects to PH	No Effects	Effects to PH	Effects to individuals and PH
Claytonia palustris	Effects to PH	No Effects	Effects to PH	Effects to PH
Callitropsis bakeri	Effects to PH	No Effects	Effects to PH	Effects to PH
Dimeresia howellii	Effects to PH	No Effects	Effects to PH	Effects to PH
Drosera anglica	Effects to PH	No Effects	Effects to PH	Effects to PH
Erigeron elegantulus	Effects to PH	No Effects	Effects to PH	Effects to PH
Erigeron inornatus var. calidipetris	Effects to PH	No Effects	Effects to PH	Effects to PH
Erigeron petrophilus var. sierrensis	No Effects	No Effects	No Effects	Effects to PH
Eriogonum tripodum	Effects to PH	No Effects	Effects to PH	Effects to PH
Eriophorum gracile	Effects to PH	No Effects	Effects to PH	Effects to PH
Gratiola heterosepala	Effects to PH	No Effects	Effects to PH	Effects to PH
Hackelia amethystina	Effects to PH	No Effects	Effects to individuals and PH	Effects to individuals and PH
Hackelia cusickii	Effects to PH	No Effects	Effects to PH	Effects to PH
Hierochloë odorata	Effects to PH	No Effects	Effects to PH	Effects to PH
Hulsea nana	Effects to PH	No Effects	Effects to PH	Effects to PH
Iliamna bakeri	Effects to PH	No Effects	Effects to PH	Effects to PH

	Effects[a]			
Species	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5 and Modified 5**
Juncus hemiendytus var. abjectus	Effects to PH	No Effects	Effects to PH	Effects to PH
Lilium humboldtii ssp. humboldtii	Effects to PH	No Effects	Effects to PH	Effects to PH
Limnanthes floccosa ssp. floccosa	Effects to PH	No Effects	Effects to PH	Effects to PH
Lycopus uniflorus	Effects to PH	No Effects	Effects to PH	Effects to PH
Mimulus glaucescens	Effects to PH	No Effects	Effects to PH	Effects to PH
Mimulus pygmaeus	Effects to PH	No Effects	Effects to PH	Effects to PH
Navarretia subuligera	Effects to PH	No Effects	Effects to PH	Effects to PH
Penstemon cinicola	Effects to PH	No Effects	Effects to individuals and PH	Effects to individuals and PH
Penstemon heterodoxus var. shastensis	Effects to PH	No Effects	Effects to PH	Effects to individuals and PH
Penstemon janishiae	Effects to PH	No Effects	Effects to PH	Effects to PH
Phlox muscoides	Effects to PH	No Effects	Effects to PH	Effects to PH
Piperia colemanii	Effects to PH	No Effects	Effects to PH	Effects to PH
Pogogyne floribunda	Effects to PH	No Effects	Effects to PH	Effects to PH
Polyctenium fremontii var. fremontii	Effects to PH	No Effects	Effects to PH	Effects to PH
Polygonum bidwelliae	Effects to PH	No Effects	Effects to PH	Effects to PH
Potentilla newberryi	Effects to PH	No Effects	Effects to PH	Effects to PH
Rhynchospora alba	Effects to PH	No Effects	Effects to PH	Effects to PH
Senecio hydrophiloides	Effects to PH	No Effects	Effects to PH	Effects to PH
Sparganium natans	Effects to PH	No Effects	Effects to PH	Effects to PH
Stellaria longifolia	Effects to PH	No Effects	Effects to PH	Effects to PH
Stellaria obtusa	Effects to PH	No Effects	Effects to PH	Effects to PH
Stenotus lanuginosus	Effects to PH	No Effects	Effects to PH	Effects to PH
Streptanthus longisiliqus	Effects to PH	No Effects	Effects to PH	Effects to PH
Thermopsis californica var. argentata	Effects to individuals and PH	No Effects	Effects to PH	Effects to individuals and PH
Trifolium andersonii var. andersonii	Effects to PH	No Effects	Effects to PH	Effects to PH

	Effects[a]			
Species	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5 and Modified 5**
Trillium ovatum ssp. oettingeri	Effects to PH	No Effects	Effects to PH	Effects to PH

aEffects: No Effects = No effects to individuals or potential habitat; Effects to PH = No known occurrences, some impacts to potential habitat only; Effects to individuals and PH = Impacts to known occurrences and potential habitat.

Federally-listed Plant Species and Designated Critical Habitat Determinations

Since no unauthorized routes are within 100 feet of known occurrences or known vernal pool habitat, the Lassen National Forest Motorized Travel Management Project will have no effect on *Orcuttia tenuis* or *Tuctoria greenei* from the implementation of Alternative 2, Alternative 3, Alternative 4, Alternative 5 or the Modified Alternative 5.

Since no unauthorized routes are within 300 feet of occupied vernal pools within critical habitat core areas, the Lassen National Forest, Motorized Travel Management Project, will have no effect to Designated Critical Habitat for either *Orcuttia tenuis* or *Tuctoria greenei* from the implementation of Alternative 2, Alternative 3, Alternative 4, Alternative 5 or the Modified Alternative 5.

Summary of Effects Analysis to Botanical Resources across All Alternatives

Table 124 presents an overview of the average ranking of effects for each Alternative. Alternative 1 has the greatest negative effect on Botanical Resources, primarily due to the continued allowance of cross-country travel under this alternative, which has the potential to impact all but the most inaccessible of rare species and their habitat. Alternative 3 which bans cross-country travel, but does not designate any unauthorized routes, has the least impact on Botanical Resources. Of the Action Alternatives that contain unauthorized route designation as part of the proposed action, Alternative 2, has the lowest impacts to rare plants species and Alternative 4 has the lowest impact to rare plant habitats; however, differences are minor enough between the Action Alternatives that overall, the selection of either Alternative 2, 4, 5 or the Modified Alternative 5, would still ensure that the viability of all rare plant species within the project area is maintained. In addition, monitoring (Appendix D) and mitigation (Appendix E) strategies developed for those routes with potential affects to rare plant species would ensure that any future impacts are diminished or eliminated within these occurrences.

Table 124 Ranking of Alternatives for each indicator.

Indicators	Rankings of Alternatives for Each Indicator[a]					
	1	2	3	4	5	Mod 5
Prohibition of cross-country travel and addition of unauthorized routes to the NFTS						
Miles of unauthorized routes within 100 feet of rare plant sites or adjacent to suitable rare plant habitat[b]	1	4	5	4	4	4
Acres of potential habitat for rare plants within 100 feet of routes	1	4	5	4	4	4
Total number of rare plant occurrences within 100 feet of unauthorized routes[b]	1	4	5	4	3	3
Miles of unauthorized routes within 300 feet of occupied vernal pools.	1	5	5	5	5	5
Miles of unauthorized routes within Research Natural Areas or Special Interest Areas	1	5	5	5	4	4
Changes to the NFTS (ML 1 roads converted to Motorized Trails)						
Miles of ML 1 roads coverted to Motorized Trails within 100 feet of rare plant sites or adjacent to suitable rare plant habitat[b]	5	5	5	5	1	1
Acres of potential habitat for rare plants within 100 feet of ML 1 roads converted to Motorized Trails	5	5	5	5	1	1
Total number of rare plant occurrences within 100 feet of ML 1 roads converted to Motorized Trails[b]	5	5	5	5	5	5
Miles of ML 1 roads proposed for conversion to Motorized Trails within 300 feet around occupied vernal pools	5	5	5	5	5	5
Miles of ML 1 roads proposed for conversion to Motorized Trails within Research Natural Areas or Special Interest Areas	5	5	5	5	5	5
Average for Botanical Resources	**3**	**4**	**5**	**4**	**4**	**4**

[a]A score of 5 indicates the alternative is the best for botanical resources related to the indicator; a score of 1 indicates the alternative is the worst for botanical resources related to the indicator. [b]Ranking averaged for federally-listed and rare plant species.

3.12 Noxious Weeds

Changes between the DEIS and FEIS

Changes made to the Noxious Weeds section between the DEIS and the FEIS include: updates to data sources that reflect results of 2009 surveys for noxious weeds, increased detail in effects analysis to address DEIS comments, the addition of several references, the addition of noxious weed risk rating tables for each alternative, and the addition of Modified Alternative 5. The methodology for analysis of noxious weeds remains as described in the DEIS.

Introduction

In 2004, the U.S. Forest Service identified invasive species as one of four significant threats to forests and rangelands (USDA FS 2004a). Noxious weed species may alter fire regimes, change the food base for wildlife species, decrease range and forest productivity, and modify recreational or aesthetic values (Mack et al. 2000, Brooks et al. 2004).

Motorized vehicle travel is an important factor in the introduction and spread of noxious weed species. Motorized vehicles serve as vectors for weed dispersal and create environmental conditions that promote weed establishment (Trombulak and Frissell 2000). Noxious weed infestations are estimated to cover over 7,000 acres on the Lassen NF, and 80% of these known weed occurrences are within 100 feet of NFTS system roads or unauthorized routes. This section describes the affected environment for noxious weed species, current resource conditions, and the potential effects of project actions on noxious weeds. A noxious weed risk assessment is used to describe existing conditions within the project area and to evaluate and compare the effects of each alternative on noxious weed introduction and spread.

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

Direction relevant to the proposed action that is also pertinent to the management of noxious weeds:

Forest Service Manual 2081.03 (FSM 1995) 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.

Sierra Nevada Forest Plan Amendment (SNFPA). The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment identified standards and guidelines applicable to motor vehicle travel management and noxious weeds, which will be considered during the analysis process:

Inform forest users, local agencies, special use permittees, groups, and organizations in communities near national forests about noxious weed prevention and management.

Work cooperatively with California and Nevada State agencies and individual counties (e.g., Cooperative Weed Management Areas) to: (1) prevent the introduction and establishment of noxious weed infestations and (2) control existing infestations.

As part of project planning, conduct a noxious weed risk assessment to determine risks for weed spread (high, moderate, or low) associated with different types of proposed management activities. Refer to weed prevention practices in the Regional Noxious Weed Management Strategy to develop mitigation measures for high and moderate risk activities.

When recommended in project-level noxious weed risk assessments, consider requiring off-road equipment and vehicles (both Forest Service and contracted) used for project implementation to be weed free. Refer to weed prevention practices in the Regional Noxious Weed Management Strategy.

Minimize weed spread by incorporating weed prevention and control measures into ongoing management or maintenance activities that involve ground disturbance or the possibility of spreading weeds. Refer to weed prevention practices in the Regional Noxious Weed Management Strategy.

Conduct follow-up inspections of ground disturbing activities to ensure adherence to the Regional Noxious Weed Management Strategy.

Complete noxious weed inventories, based on regional protocol. Review and update these inventories on an annual basis.

As outlined in the Regional Noxious Weed Management Strategy, when new, small weed infestations are detected, emphasize eradication of these infestations while providing for the safety of field personnel.

Routinely monitor noxious weed control projects to determine success and to evaluate the need for follow-up treatments or different control methods. Monitor known weed infestations, as appropriate, to determine changes in weed population density and rate of spread.

Effect Analysis Methodology

A plant species is considered invasive if it is non-native to the ecosystem under consideration, and if its introduction causes or is likely to cause economic or environmental harm or harm to human health (Office of the President 1999). The 24 noxious weed species being considered in this analysis are invasive non-native plants that possess at least one of these characteristics (Table 125). This analysis includes invasive plant species from the California Department of Food and Agriculture (**CDFA**) list of noxious weeds (CDFA 2009) and the California Invasive Plant Council (**Cal-IPC**) California Invasive Plant Inventory (Cal-IPC 2006). While all noxious weed species identified on Lassen NF are of concern with regard to their potential to increase where rare, species are prioritized for inventory and treatment based upon the aggressiveness of the weed species, degree of regional concern, and feasibility of control. Some species listed in statewide inventories, such *Bromus tectorum* (cheatgrass) and *Verbascum thapsus* (woolly mullein), are not specifically addressed in this analysis because they are widespread and have not been inventoried on the Lassen NF. Several species tracked by the Lassen NF (e.g., *Cirsium vulgare*) are not a high priority for treatment and control because they are widespread on Lassen NF and are not observed to dominate plant communities where they occur. Other species, such as *Taeniatherum caput-medusae* (medusahead) and *Centaurea solstitialis* (yellow starthistle), are treated when infestations are detected early enough that manual treatments are effective, but are not treated in portions of the forest where infestations are widespread and beyond manual control.

Assumptions Specific to the Noxious Weed Analysis

A list of assumptions common to all resources is included in Chapter 3, Assumptions and Limitations. The following assumptions apply specifically to noxious weed analysis:

1. Without specific prevention and/or control measures, existing noxious weed infestations will likely spread and that the rate of spread will be increased by motorized vehicular activity. Infestations located along routes with motorized vehicle traffic may spread further along the route.
2. Project actions that change the season of use on NFTS roads and NFTS trails will not be analyzed. These actions would not in and of themselves have beneficial or negative effects to noxious weed risk management because routes would still be open for use at times when seeds and propagules may be spread by motorized vehicles.
3. Project actions that propose mixed-use on ML 3 and ML 4 roads or change operational maintenance levels from ML 3 to ML 2 will not be analyzed. Because both highway-legal and non-highway-legal motor vehicles may function as vectors for the spread of weeds and contribute to soil disturbance that facilitates weed

establishment (Christen and Matlack 2007, Ouren 2007, Schmidt 1989, Von Der Lippe and Kowarik 2007), such changes would not in and of themselves have discernible effects to noxious weed risk management.

4. A comparison of alternatives based upon analysis of the 24 species specifically addressed will apply to noxious weeds in general.

Data Sources

1. Data used to estimate the spatial extent of weed infestations across the Lassen NF and within the project area are drawn from the Lassen National Forest Botany Noxious Weeds geodatabase (Appendix B). This dataset represents the best available data on Lassen NF weed infestations. Acreage estimates are derived from mapped polygons of weed occurrences in this dataset. Where an infestation was originally mapped as a point, an area of 0.1 acres was assigned. Many infestations were mapped by hand prior to the advent of GPS technology, and so digitized polygons may under- or over-represent actual infestation size. The Lassen NF is continually working to improve the spatial accuracy of its noxious weed inventory by using GPS technology to map infestation perimeters.
2. Survey data are drawn from Lassen National Forest Botany Survey geodatabase (Appendix B) and project files. A route was considered surveyed for weeds if either a floristic survey or a noxious weed survey was conducted on the route between 2001 and 2009. Route-by-route review of project effects on noxious weeds is summarized in Table A-2 of Appendix A.
3. Site-specific information on noxious weed infestations is drawn from Lassen National Forest Botany Department project files and noxious weed species files (USDA FS LNF 2009).
4. The noxious weed risk assessment results are contained in the MTM_Noxious_Weeds geodatabase. A complete list of geospatial databases utilized as sources is included in Appendix B.
5. Scientific literature.

Noxious Weed Indicator

- Risk of noxious weed introduction and spread.

Noxious Weeds Methodology by Action:

A risk assessment describing the effects of each discrete project action on noxious weed introduction and spread serves as a measurement indicator to quantify and compare the direct and indirect effects of each alternative. Additional discussion of direct, indirect and

cumulative effects will follow under Environmental Consequences. The project area is defined as all NFS lands on the Lassen NF, excluding designated wilderness.

Direct/Indirect Effects of the prohibition of cross-country motor vehicle travel:

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Project Area.

Indicator: Risk of noxious weed introduction and spread.

Methodology: A noxious weed risk level was assigned to each unauthorized route mapped on the Lassen NF using the following criteria:

Presence of known CDFA A-rated weeds within 100 feet of route = **High Risk**

Lack of inventory or survey of route since 2001 = **High Risk**

Known B-, C-, or non-rated weeds within 100 feet of route = **Medium Risk**

Route and surveyed and weeds not found = **Low Risk**.

Rationale: With the continuation of cross-country travel, unauthorized routes can be expected to persist and contribute to the spread of noxious weeds across the project area over the next 20 years. When analyzing the effects of cross-country travel, it is not possible to quantify when and where noxious weeds will be encountered, spread, or introduced by motor vehicles; therefore, the 1,089 miles of 4,524 unauthorized routes are used as a proxy for current cross-country motorized vehicle use on Lassen NF. Routes traveled by motorized vehicles may serve as vectors for weed spread and zones of disturbed soil that promote weed establishment (Christen and Matlack 2008, Gelbard and Harrison 2003, Trombulak and Frissell 2000). The analysis area was restricted to 100 feet from unauthorized routes within the project area. Motorized vehicles are unlikely to disperse weed occurrences or create suitable habitat for weeds located further than 100 feet from routes. By assigning a higher risk level to unauthorized routes through or near known noxious weed infestations and a lower risk level to routes that have been surveyed with no noxious weeds found, we can quantify the risk of noxious weed spread with continued cross-country motor vehicle use. Where weed surveys were lacking or incomplete, weed presence was presumed. The medium classification for an individual route does not equate with an overall moderate rating in a risk assessment, as it includes many low priority species that would not typically be mitigated in a risk assessment for other projects. The medium risk rating in this analysis is used to compare project effects on lower priority weed species across the alternatives.

Direct/Indirect Effects of adding facilities (presently unauthorized roads or trails) to the NFTS:

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.
Spatial boundary: Project Area.
Indicator(s): Risk of noxious weed introduction and spread.
Methodology: A noxious weed risk level was assigned to each currently unauthorized route proposed for addition to the NFTS under Alternative 2, Alternative 4, Alternative 5, and Modified Alternative 5 using the following criteria:

Presence of known CDFA A-rated weeds within 100 feet of route = **High Risk**

Lack of inventory or survey of route since 2001 = **High Risk**

Known B-, C-, or non-rated weeds within 100 feet of route = **Medium Risk**

Route and surveyed and weeds not found = **Low Risk**.

Rationale: By assigning risk levels to routes that are proposed for addition to the NFTS under each alternative, we can quantify and compare the effects of this project action. Weed establishment and spread are associated with motorized vehicle traffic, and so routes passing through or near known weed infestations contribute a higher noxious weed risk than routes without known weed occurrences in their proximity. The analysis area was restricted to 100 feet from unauthorized routes proposed for addition to the NFTS. Motorized vehicles are unlikely to disperse weed occurrences or create suitable habitat for weeds located further than 100 feet from routes. Where weed surveys were lacking or incomplete, weed presence was presumed. The medium classification for an individual route does not equate with an overall moderate rating in a risk assessment, as it includes many low priority species that would typically not be mitigated in a risk assessment for other projects. The medium risk rating in this analysis is used to compare project effects on lower priority weed species across the alternatives.

Direct/Indirect Effects of proposed changes to the NFTS:

Proposed changes to the existing NFTS include the conversion of certain system roads that are currently closed to motorized use by the public (ML 1 roads) to ML 2 roads managed as Four-Wheel Driveway Trails (motorized trails). This action is proposed under both Alternative 5 and Modified Alternative 5. The direct/indirect effects of this action will be analyzed using the same methodology as for the addition of facilities to the NFTS.
Short-term timeframe: 1 year.
Long-term timeframe: 20 years.
Spatial boundary: Project Area.
Indicator(s): Risk of noxious weed introduction and spread.
Methodology: A risk level will be assigned to each current NFTS ML 1 road that is proposed for conversion to an ML 2 road managed as a motorized trail under Alternative 5 and Modified Alternative 5 using the following criteria:

Presence of known CDFA A-rated weeds within 100 feet of route = **High Risk**

Lack of inventory or survey of route since 2001 = **High Risk**

Known B-, C-, or non-rated weeds within 100 feet of route = **Medium Risk**

Route and surveyed and weeds not found = **Low Risk**.

Rationale: Rationale is as discussed under Direct/Indirect Effects of adding facilities (presently unauthorized roads and trails) to the NFTS.

Cumulative Effects:

Short-term timeframe: Not applicable.
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: Project Area.
Methodology: Cumulative effects will be discussed qualitatively, and will consider the incremental impact of the proposed actions on noxious weeds when added to other past, present and reasonably foreseeable actions.
Rationale: As proposed actions add cumulatively to motorized vehicle travel on the current NFTS, the cumulative effects analysis considers the existing NFTS network in addition to proposed additions and changes to the NFTS. The cumulative effects discussion also includes consideration of ongoing and foreseeable future actions contained in the ORFFA (Appendix C).

Affected Environment and Environmental Consequences

Affected Environment

The Lassen NF noxious weed inventory comprises the best available information on noxious weed distributions across the forest. This inventory is updated annually as new occurrences are found and infestations are mapped or remapped using GPS technologies. Targeted noxious weed surveys are conducted annually in conjunction with sensitive plant surveys and project work across the Forest. Project-specific surveys for noxious weeds were conducted along routes analyzed for Alternative 2, Alternative 4, Alternative 5, and Modified Alternative 5 in 2007, 2008, and 2009. Within the affected environment, the number and extent of occurrences of *Centaurea solstitialis* (yellow starthistle), *Cardaria* spp. (whitetop), *Centaurea* spp. (knapweeds), *Taeniatherum caput-medusae* (medusahead), and other species have increased over time. The total area infested by noxious weeds on the Lassen NF is currently estimated at over 7,000 acres, though the actual figure is likely considerably higher. Noxious weeds such as *Bromus tectorum* (cheatgrass) and *Verbascum thapsus* (mullein) are not tracked on Lassen NF, and inventories of species such as medusahead

and yellow starthistle are known to be incomplete. Within the project area, 542 occurrences of 24 species (7037.8 acres) are documented (Table 125).

Of the known noxious weed occurrences within the Affected Environment, 433 (80% of total occurrences) representing 6359.4 estimated acres (90% of total acreage) are located within 100 feet of routes that are open to motorized vehicle travel or within 100 feet of currently unauthorized routes (Table 125). The affected environment is thus characterized by a strong association between noxious weed infestations and the current network of roads and routes open to motorized vehicle travel.

Five of the 24 noxious weed species known to the project area occur within 100 feet of either currently unauthorized routes that are proposed for addition to the NFTS under Alternatives 2, Alternative 4, Alternative 5 or Modified Alternative 5; or roads currently closed to motorized vehicle use (ML 1 roads) and proposed as motorized trail under Alternative 5 and Modified Alternative 5:

Centaurea solstitialis (yellow starthistle)

Yellow starthistle is a CDFA C-rated noxious forb in the family Asteraceae. This species reproduces primarily by seed, persists at high population densities, and is associated with disturbance such as grazing, fire, and road construction. The seeds of yellow starthistle may persist in the soil for up to ten years (Zouhar 2002). This species is known to 79 occurrences within the project area, and is widespread on the western, low-elevation portions of the Lassen NF. Inventories within this area are incomplete, and the nearly 4,000 acres that this species is estimated to occupy within the project area is likely a significant underestimate. New, small infestations that are detected at higher elevations are treated annually with a goal of eradication. There is however no active treatment program for larger occurrences, as such infestations cannot effectively be treated with manual control strategies.

Table 125 Lassen NF noxious weed inventory within affected environment and within 100 feet of current NFTS routes, state or county roads, or unauthorized routes within the affected environment

				Within Affected Environment		Within 100 feet of Roads or Routes	
Species	**Common Name**	**CDFA rating**	**Cal-IPC rating**	**# Occ.**	**Gross Acres**	**# Occ.**	**Gross Acres**
Acroptilon repens	Russian Knapweed	B	moderate	3	0.9	3	0.9
Ailanthus altissima	Tree-of-heaven	not rated	moderate	2	0.2	2	0.2
Cardaria spp.	whitetop	B	moderate	18	1.9	17	1.8
Carduus pycnocephalus	Italian thistle	C	moderate	2	0.2	0	0.0
Centaurea diffusa	diffuse knapweed	A	moderate	3	0.4	3	0.4
Centaurea maculosa	spotted knapweed	A	high	19	4.3	18	4.2
Centaurea melitensis	tocolote	not rated	moderate	3	2.2	2	0.6
Centaurea solstitialis	yellow starthistle	C	high	79	3706.0	63	3519.3
Centaurea squarrosa	squarrose knapweed	A	moderate	8	249.8	6	205.5
Cirsium arvense	Canada thistle	B	moderate	34	13.1	25	8.5
Cirsium vulgare	bull thistle	C	moderate	12	132.4	8	129.2
Convolvulus arvensis	field bindweed	C	not rated	10	1.0	8	0.8
Cynodon dactylon	Bermudagrass	C	moderate	1	0.1	0	0.0
Cytisus scoparius	Scotch broom	C	high	5	1.2	5	1.1
Hypericum perforatum	Klamathweed	C	moderate	82	383.8	64	378.5
Isatis tinctoria	dyer's woad	B	moderate	15	158.0	13	100.8
Lepidium latifolium	perennial pepperweed	B	high	39	10.9	33	9.2
Leucanthemum vulgare	oxeye daisy	not rated	moderate	17	195.9	15	188.8
Linaria genistifolia ssp. dalmatica	Dalmatian toadflax	A	moderate	3	1.1	3	1.1
Onopordum acanthium	Scotch thistle	A	high	42	53.2	27	49.3
Rubus discolor	Himalayan blackberry	not rated	high	4	1.5	2	0.4
Salsola tragus	Russian thistle	C	limited	4	0.4	4	0.4

				Within Affected Environment		Within 100 feet of Roads or Routes	
Species	**Common Name**	**CDFA rating**	**Cal-IPC rating**	**# Occ.**	**Gross Acres**	**# Occ.**	**Gross Acres**
Salvia aethiopis	Mediterranean sage	B	limited	2	0.2	2	0.2
Taeniatherum caput-medusae	medusahead	C	high	135	2119.1	110	1758.2
Totals				**542**	**7037.8**	**433**	**6359.4**

Source: GIS query, November 2009 (Appendix B)

Lepidium latifolium (perennial pepperweed)

Perennial pepperweed is a CDFA B-rated noxious perennial forb in the family Brassicaceae. This species is a high priority for control on the Lassen NF, as it has the potential to severely degrade riparian sites by crowding out native vegetation. This species is known to 39 occurrences within the project area. Thought most of these occurrences consist of fewer than 25 stems, perennial pepperweed has been difficult to eradicate due to this species' ability to form new shoots from buds on lateral, creeping roots. Most sites within the project area are revisited annually to detect and promptly treat recurrence.

Leucanthemum vulgare (oxeye daisy)

Oxeye daisy is not rated by CDFA, but is inventoried on the Lassen NF. This species, in the family Asteraceae, may reproduce vegetatively from shoots that develop from buds on lateral roots. This species is known to 17 sites within the project area, where it is estimated to cover nearly 200 acres. Priority for treatment is given to new, small infestations that may be successfully decreased or eradicated with repeated manual treatments.

Taeniatherum caput-medusae (medusahead)

Medusahead is a CDFA C-rated noxious grass in the family Poaceae. This species is highly competitive and may form monotypic stands where it occurs. This grass is unpalatable to livestock and produces a prolific amount of seed annually. Successful suppression usually involves some combination of herbicide, fire and reseeding with other grass species (Archer 2001). This species is known to 135 occurrences within the project area, and it is widespread on the western, low-elevation portions of the project area. As with yellow starthistle, inventories within this area are incomplete, and the over 2,000 acres that this species is known to occupy within the project area is likely a significant underestimate. New, small infestations that are detected at higher elevations are treated annually with a goal of eradication. There is however no active eradication program for larger occurrences, as such infestations cannot effectively be treated with manual control strategies.

Environmental Consequences

The following sections provide a discussion of the direct, indirect, and cumulative effects of each alternative on noxious weeds using the measurement indicators described in Effects Analysis Methodology. This analysis utilizes the best available information on noxious weed occurrences within the project area to evaluate and compare the direct and indirect effects of each project action under each alternative. Site-specific effects will be discussed for routes assigned a medium or high risk of noxious weed invasion due to their proximity to known noxious weed occurrences. Cumulative effects will be discussed qualitatively.

General Types of Impacts

Direct and Indirect Effects

Direct effects to noxious weed plants would include the crushing of individual plants by vehicle traffic. Of greater concern are reasonably foreseeable effects that are further removed in time or distance. These indirect effects are captured by research identifying roads as 1) disturbances providing suitable habitat for weeds, and 2) vectors for weed spread (Christen and Matlack 2008, Gelbard and Harrison 2003). Many studies have established a correlation between habitat disturbance and weed invasion (Crawford et al. 2001, Jacobs and Sheley 2003, Sax 2002, Sher et al. 2002,). While some disturbances such as fire or flooding can be considered natural phenomena, anthropogenic alterations to habitat such as road construction may also create suitable habitat for weeds (Byers 2002). Belcher and Wilson (1989) found that 95 percent of leafy spurge infestations on a mixed-grass prairie were associated with disturbance from vehicle tracks, road construction, or fireguards. Noxious weeds may colonize disturbed sites such as roads because physical barriers that might otherwise keep them in check, such as unsuitable light, moisture, or soil conditions, are removed at disturbed sites (Parendes and Jones 2000). In addition, soil compaction caused by vehicle traffic may, in some habitats, favor colonization by fast-growing weed species over slower-growing native perennials (Prose et al. 1987).

Roads function as vectors for weed spread as well. Roads facilitate plant dispersal, and as a result noxious weeds may spread further and faster than average seed dispersal distances suggest (Mack and Lonsdale 2001, Von der Lippe and Kowarik 2007). A study of roadside floras found that seeds of the species found along roadsides were also found in mud affixed to the vehicles that travel them (Schmidt 1989). Seeds and propagules may be translocated in this way from home areas or from existing weed occurrences onto Lassen NF. A study conducted in Glacier National Park found that weed species richness was higher at roadsides and decreased with increased distance from roads, suggesting that weeds were invading from those roads outward into surrounding vegetation (Tyser and Worley 1992). A study of California foothill grassland communities found that increased distance from roads was associated with decreased exotic forb species richness and increased native grass species richness, and emphasized the importance of roadless areas as refugia for native species (Gelbard and Harrison 2003). It follows that restricting motorized use on roads would decrease the potential for the introduction of weed seeds and propagules and would eliminate or reduce motorized vehicle traffic as a source of soil disturbance.

Cumulative Effects

A cumulative effect can result from the incremental impact of a proposed action when added to the effects of past, present, and reasonably foreseeable future actions (40 CFR §1508.7). By examining current noxious weed inventories we capture the aggregate impact of past human actions and natural events that have led to current noxious weed distributions and

abundances (CEQ 2005). Past actions are therefore implicit within existing conditions and are addressed within the Affected Environment section above (Table 125).

Motorized vehicle use of current NFTS routes on the Lassen NF may function as vectors for the spread of noxious weeds and provide disturbed soils where weeds readily establish. Indeed, half of the noxious weed occurrences within the project area (representing 75% of inventoried acreage) are within 100 feet of current NFTS roads or trails (Appendix B). Actions that would add to the existing NFTS or change maintenance levels from ML 1 to ML 2 may have effects to noxious weed risk management that add cumulatively to effects from motorized use of current NFTS roads or trails. Additions and changes to the NFTS may result in a minor increase in motorized vehicles serving as vectors for weed spread and roads serving as zones of soil disturbance, adding cumulatively to the effects of ongoing and future motorized vehicle use of current NFTS routes on noxious weeds.

Other ongoing actions that may affect noxious weeds include vegetation management projects and associated road construction, prescribed fire activities, routine route maintenance, grazing in active range allotments (Map 23), special use permits, recreation, personal use woodcutting, use of mineral material sources, and routine noxious weed management (Appendix C). Activities associated with these actions may function as vectors for the spread of invasive plant species. Livestock and horses may transport weed seeds that attach to their hair and hooves or are deposited in their droppings. Timber harvesting equipment, road maintenance equipment, woodcutting traffic, and bicycles may transport weeds seeds and propagules in mud that sticks to their tires. Ongoing actions may also cause localized patches of disturbed soil that promote weed establishment. Routine road and facility maintenance, mineral material extraction, skid trails, and temporary roads constructed for timber harvest or vegetation management activities may create disturbed habitat through soil compaction and movement. Thinning, mastication, and prescribed burning treatments may create favorable conditions for the introduction and establishment of weeds by removing duff and decreasing shade through canopy removal. Hoof action from livestock grazing may disturb soils. These ongoing actions may contribute to the dispersal and establishment of noxious weed species on the forest and add cumulatively to the effects of motorized vehicle use.

Ongoing noxious weed management includes manual treatment (e.g., hand-pulling or digging) and biocontrol releases on known occurrences. Approximately 50 to 100 acres are treated annually by Lassen NF crews and through coordinated efforts with other local agencies. Many occurrences are revisited annually to assess whether treatments have eradicated the occurrences and to retreat when necessary. The result of these treatments is that many known occurrences have been diminished or eradicated. Other, larger infestations are beyond manual control and expected to persist and spread.

Future foreseeable actions are listed in Appendix C. Future actions that may contribute to noxious weed management and spread include timber harvest activities, vegetation

management projects, road maintenance, and watershed improvements. Potential effects to noxious weeds from future actions are identical to effects from ongoing actions. A noxious weed risk assessment would be completed for all future ground-disturbing actions. In addition, all future ground-disturbing actions would be surveyed for weeds and would incorporate Integrated Design Features (IDFs) into their proposed actions. The implementation of these IDFs will minimize the associated risk of noxious weed introduction and spread. These standard IDFs include where applicable:

1. Known noxious weed infestations will be identified, flagged where possible, and mapped for this project. Identified noxious weed sites within or adjacent to the project area containing isolated patches with small plant numbers would be treated (hand pulled or dug) prior to project implementation. Any infestations that are larger or difficult to pull will be avoided by harvesting equipment to prevent spreading weeds within the project.
2. New small infestations identified during project implementation will be evaluated and treated according to the species present and project constraints and avoided by project activities. If larger infestations are identified after implementation, they will be isolated and avoided by equipment, or equipment used would be washed after leaving the infested area and before entering an uninfested area.
3. Post-project monitoring for implementation and effectiveness of weed treatments and control of new infestations will be conducted as soon as possible and for a period of multiple years after completion of the project.
4. If project implementation calls for mulches or fill, they will be certified weed-free.
5. Off-road equipment would be weed-free prior to entering the Forest. Staging of equipment would be done in weed free areas.

Alternative 1

Direct/Indirect Effects

Alternative 1 presents a high risk of noxious weed introduction and spread. The largest impact of this alternative is the continuance of cross-country travel, which has the potential to introduce noxious weeds to areas that are not currently infested and to facilitate the expansion of existing occurrences. Under this alternative, it is not possible to quantify precisely when and where noxious weeds will be encountered, spread, or introduced by motor vehicles; therefore, the 1,089 miles of unauthorized routes are used as a proxy for current cross-country motor vehicle use on Lassen NF. The 4,542 unauthorized routes mapped on Lassen National Forest have among them 137 weed occurrences documented within 100 feet of routes (Table 126). Roughly half of the affected environment's known weed acreage is represented by these 137 occurrences. These weed occurrences may act

as source populations for new infestations as continued cross-country motorized vehicle traffic transports weed seeds and propagules to new locations.

Table 126 Numbers of noxious weed occurrences within 100 feet of currently unauthorized routes

Species	CDFA Rating	# Occ. w/in 100 ft. of Unauthorized Routes
Acroptilon repens	B	-
Ailanthus altissima	not rated	1
Cardaria spp.	B	4
Carduus pycnocephalus	C	-
Centaurea diffusa	A	1
Centaurea maculosa	A	4
Centaurea melitensis	not rated	-
Centaurea solstitialis	C	28
Centaurea squarrosa	A	4
Cirsium arvense	B	2
Cirsium vulgare	C	2
Convolvulus arvensis	C	3
Cynodon dactylon	C	-
Cytisus scoparius	C	2
Hypericum perforatum	C	21
Isatis tinctoria	B	5
Lepidium latifolium	B	4
Leucanthemum vulgare	not rated	6
Linaria genistifolia ssp. dalmatica	A	1
Onopordum acanthium	A	5
Rubus discolor	not rated	1
Salsola tragus	C	1
Salvia aethiopis	B	1
Taeniatherum caput-medusae	C	41
	Total	**137**

Source: GIS query, November 2009 (Appendix B)

Of the 4,542 unauthorized routes mapped on the Lassen NF, 24 are within 100 feet of known CDFA A-rated weeds and 2,721 have not been recently surveyed for noxious weeds (Appendix A, Appendix B, Table 127). Thus a total of 2,769 routes present a high risk of contributing to noxious weed introduction and spread. 233 unauthorized routes are near occurrences of CDFA B-rated, C-rated, or other noxious weed species and present a medium noxious weed risk. No noxious weeds were found along 1,564 unauthorized routes

that have been recently surveyed. These routes present a low risk of contributing to noxious weed introduction and spread.

Table 127 Number of unauthorized routes with low, medium, and high noxious weed risk ratings

	Risk Rating		
Risk Rating Basis	**Low Risk**	**Medium Risk**	**High Risk**
CDFA A-rated weeds within 100 ft. of route	--	--	24
CDFA B-, C-, or non-rated weed within 100 ft. of route	--	233	--
Route surveyed, no weeds found	1,564	--	--
Route not surveyed	--	--	2,721
Total	1,564	233	2,745

Source: GIS query, November 2009 (Appendix B)

Cumulative Effects

The current NFTS includes 3,340 miles available for motorized vehicle travel within the project area. With continued cross-country travel, the impacts of motorized vehicle traffic along the 1,089 miles of unauthorized routes inventoried on the Lassen NF would add cumulatively to impacts associated with the current NFTS. With continued cross-country motorized vehicle travel functioning both as a vector for weed spread and as a source of soil disturbance, the 137 occurrences that are located on or adjacent to unauthorized routes can be expected to persist and to spread over the next 20 years. Continued cross-country vehicle travel would also leave open the possibility of vehicles passing through most of the 542 weed occurrences documented to occur within the project area. While Integrated Design Features can be effective in reducing cumulative impacts for most projects, they are not all viable mitigations for ongoing and future motorized vehicle traffic. Public education can encourage motorized vehicle users to clean their vehicles prior to entry into Lassen NF, but there is no practicable way to ensure this is done. Additionally, many of the known weed occurrences near unauthorized routes are large infestations of high priority weeds for which treatment may not effectively reduce the risk of motorized vehicle traffic spreading infestations further. In sum, mitigation for continued cross-country travel under Alternative 1 is not feasible.

The effects of other ongoing and reasonably foreseeable future actions on noxious weeds are as discussed under General Types of Impacts. Ground-disturbing actions will be mitigated through Integrated Design Features incorporated within each proposed action. Implementation of these IDFs as discussed under General Types of Impacts will minimize the risk of noxious weed introduction and spread associated with future foreseeable actions.

Alternative 2

Direct/Indirect Effects of Prohibiting Cross-Country Travel

Cross-country motorized travel would be prohibited under Alternative 2, thus reducing the risk of noxious weed introduction and spread along 4,464 currently unauthorized routes not proposed for addition to the NFTS. The prohibition of cross-country travel would remove or reduce motorized vehicle traffic as a vector for noxious weed spread for 134 noxious weed occurrences (Table 126). This action to prohibit cross-country travel thus constitutes a beneficial effect for noxious weed risk management.

Direct/Indirect Effects of adding facilities (presently unauthorized roads or trails) to the NFTS

Of the 78 unauthorized routes proposed for addition to the NFTS under Alternative 2, 71 present a low risk of contributing to noxious weed introduction and spread, three present a medium risk, and four present a high risk (Appendix A, Appendix B, Table 128).

No noxious weeds were found along 71 unauthorized routes that have been recently surveyed. The addition of these routes would present a low risk of contributing to the introduction and spread of noxious weeds. The three medium risk routes pass within 100 feet of five occurrences of CDFA B-rated, C-rated, or other noxious weed species (Table 129). There are no CDFA A-rated noxious weeds known to occur within 100 feet of these 78 routes. High risk was assigned to four routes due to a lack of recent noxious weed inventories along them. These four routes would not be added to the MVUM prior to the completion of noxious weed surveys (Appendix E). If noxious weed infestations are found during surveys, they would be treated according to the species present. If the infestation were a CDFA A-rated weed for which no feasible mitigation could be implemented, addition to the MVUM would be re-evaluated.

Table 128 Number of unauthorized routes proposed for addition to the NFTS under Alternative 2 with low, medium, and high noxious weed risk ratings

	Risk Rating		
Risk Rating Basis	**Low Risk**	**Medium Risk**	**High Risk**
CDFA A-rated weeds within 100 ft. of route	--	--	0
CDFA B-, C-, or non-rated weed within 100 ft. of route	--	3	--
Route surveyed, no weeds found	71	--	--
Route not surveyed	--	--	4
Total	71	3	4

Source: GIS query, November 2009 (Appendix B)

Table 129 Weed occurrences within 100 feet of unauthorized routes proposed for addition to the NFTS under Alternative 2

Species	CDFA Rating	Site ID	Proposed Route	Route intersects occurrence?
Centaurea solsitialis	C	CESO3-116	UNO216	yes
Cirsium vulgare	C	CIVU-011	ULA187	yes
Lepidium latifolium	B	LELA2-044	ULA488-1	no
Leucanthemum vulgare	not rated	LEVU-018	ULA187	yes
Taeniatherum caput-medusae	C	TACA8-144	UNO216	yes

Source: GIS query, November 2009 (Appendix B)

Centaurea solstitialis *(yellow starthistle, CESO3-116)*

A one-tenth acre occurrence of *Centaurea solstitialis* (yellow starthistle, LNF #116), found during 2009 weed surveys, is located along and to the north of route UNO216. Though yellow starthistle is locally abundant in the Burney area, this occurrence is still small, and manual treatment is a feasible mitigation. Route UNO216 will not be added to the MVUM prior to the treatment of this yellow starthistle occurrence. Following treatment, Lassen NF will monitor this site for recurrence annually and treat if detected (Appendix D, Appendix E).

Cirsium vulgare *(bull thistle, CIVU-011)*

An occurrence of *Cirsium vulgare* (bull thistle, LNF #11) is located along and within the proposed route ULA187, where the route intersects Forest Service road 29N11. The occurrence occupies 0.1 acres of disturbed soils, within which *C. vulgare* has a canopy cover of 25 percent. Soil disturbance at this site stems from recent logging activity. *Cirsium vulgare* is widespread and not highly invasive on Lassen NF, where, though it establishes easily in disturbed areas, it is unlikely to persist and spread. Because *C. vulgare* is not a priority for treatment on the Lassen NF, no mitigation measures are proposed for this site.

Lepidium latifolium *(perennial pepperweed, LELA2-044)*

An occurrence of *Lepidium latifolium* (perennial pepperweed, LNF #44) is mapped within 100 feet of road ULA488-1, and is described as occurring 225 feet south of the dam for McCoy Flat Reservoir. This route is used for access to the reservoir shoreline, and so vehicle and foot traffic along the route is unlikely to pass through this weed occurrence. Thirty stems were noted at this site in 2007 and the plants were dug at this time. Ten stems were observed, dug and bagged in both 2008 and 2009. Lassen NF will continue to monitor and treat this site annually (Appendix D, Appendix E).

Leucanthemum vulgare *(oxeye daisy, LEVU-018)*

Approximately 1,500 individuals of *Leucanthemum vulgare* (ox-eye daisy, LNF #18) occur with *C. vulgare* along and near route ULA187. A dense patch of approximately 500 plants is located at the intersection of route ULA187 and Forest Service road 29N11. The occurrence continues south along Forest Service road 29N11 and north toward the intersection of

ULA187 and State Road 172, where it occurs in scattered patches through areas of recent logging activity. There is no active eradication program for this species within this portion of the Forest because the infestation is widespread and beyond control. In addition, this species is not A-, B- or C-rated by CDFA. No mitigation measures are therefore proposed for this site.

Taeniatherum caput-medusae *(medusahead, TACA8-144)*

Medusahead was found along route UNO216 during 2009 weed surveys. One patch is located at the junction of route UNO216 and County Road 7P200, another is located where UNO216 crosses a powerline access road. The occurrence has been mapped as approximately 0.3 acres with 40% canopy cover, with the infestation thought to extend north and south along the powerline corridor. Because this is a low-priority species for treatment on the Lassen NF except where the infestation is small enough to be treated with manual control methods, no mitigations are proposed for this site.

Direct/Indirect Effects of proposed changes to the NFTS

Alternative 2 would not convert any current ML 1 roads to ML 2 roads managed as motorized trail, therefore there would be no direct or indirect effects to noxious weeds from this action.

Cumulative Effects

The current NFTS includes 3,340 miles available for motorized vehicle use within the project area. The addition of 21 miles of currently unauthorized routes (78 routes) to the NFTS would add cumulatively to impacts associated with the current NFTS and bring the total number of miles available for motorized vehicle traffic to 3,361. While Integrated Design Features can be effective in reducing cumulative impacts for most projects, they are not all viable mitigations for ongoing and future motorized vehicle traffic. Public education can encourage motorized vehicle users to clean their vehicles prior to entry into Lassen NF, but there is no practicable way to ensure this is done. The incremental impact of the 21 miles of unauthorized routes proposed for addition to the NFTS under Alternative would be minor, as two of the known weed occurrences near these routes will be treated and monitored, and three of the known weed occurrences near these routes are infestations of low-priority species. The prohibition of cross-country motorized vehicle traffic would have a substantial beneficial effect on noxious weed risk management by eliminating most unauthorized routes as vectors for the introduction and spread of noxious weed species and decreasing the connectivity between occurrences along current NFTS routes where motorized vehicles travel.

The effects of other ongoing and reasonably foreseeable future actions on noxious weeds are as discussed under General Types of Impacts. Ground-disturbing actions will be mitigated through Integrated Design Features incorporated within each proposed action.

Implementation of these IDFs as discussed under General Types of Impacts will minimize the risk of noxious weed introduction and spread associated with future foreseeable actions.

Alternative 3

Direct/Indirect Effects of Prohibiting Cross-Country Travel

Cross-country motorized travel would be prohibited under Alternative 3, thus reducing the risk of noxious weed introduction and spread along 4,542 currently unauthorized routes not proposed for addition to the NFTS. The prohibition of cross-country travel would remove or reduce motorized vehicle traffic as a vector for noxious weed spread for 137 noxious weed occurrences (Table 126). This action to prohibit cross-country travel thus constitutes a beneficial effect for noxious weed risk management.

Direct/Indirect Effects of adding facilities (presently unauthorized roads or trails) to the NFTS

Alternative 3 would not add facilities to the NFTS, therefore there would be no direct or indirect effects to noxious weeds from this action.

Direct/Indirect Effects of proposed changes to the NFTS

Alternative 3 would not convert any current ML 1 roads to ML 2 roads managed as motorized trail, therefore there would be no direct or indirect effects to noxious weeds from this action.

Cumulative Effects

The incremental effect of Alternative 3 on existing and future motorized vehicle travel is limited to the effects of restricting cross-country travel. The prohibition of cross-country motorized vehicle traffic represents a substantial beneficial effect to noxious weed risk management by eliminating 4,452 unauthorized routes as vectors for the introduction and spread of noxious weed species and decreasing the connectivity between occurrences along current NFTS routes where motorized vehicles travel. Other ongoing and reasonably foreseeable future actions are as discussed under General Types of Impacts. Ground-disturbing actions will be mitigated through Integrated Design Features incorporated within each proposed action. Implementation of these IDFs as discussed under General Types of Impacts will minimize the risk of noxious weed introduction and spread associated with future foreseeable actions.

Alternative 4

Direct/Indirect Effects of Prohibiting Cross-Country Travel

Cross-country motorized travel would be prohibited under Alternative 4, thus reducing the risk of noxious weed introduction and spread along 4,498 currently unauthorized routes not proposed for addition to the NFTS. The prohibition of cross-country travel would remove or reduce motorized vehicle traffic as a vector for noxious weed spread for 135 noxious weed

occurrences (Table 126). This action to prohibit cross-country travel thus constitutes a beneficial effect for noxious weed risk management.

Direct/Indirect Effects of adding facilities (presently unauthorized roads or trails) to the NFTS

Of the 44 unauthorized routes proposed for addition to the NFTS under Alternative 4, 42 present a low risk of contributing to noxious weed introduction and spread, 2 present a medium risk, and no routes present a high risk (Appendices A and B, Table 130).

Table 130 Number of unauthorized routes proposed for addition to the NFTS under Alternative 4 with low, medium, and high noxious weed risk ratings

	Risk Rating		
Risk Rating Basis	**Low Risk**	**Medium Risk**	**High Risk**
CDFA A-rated weeds within 100 ft. of route	--	--	0
CDFA B-, C-, or non-rated weed within 100 ft. of route	--	2	--
Route surveyed, no weeds found	42	--	--
Route not surveyed	--	--	0
Total	42	2	0

Source: GIS query, November 2009 (Appendix B)

No noxious weeds were found along 42 unauthorized routes that have been recently surveyed. The addition of these routes would present a low risk of contributing to the introduction and spread of noxious weeds. The two medium risk routes pass within 100 feet of two occurrences of CDFA B-rated or C-rated noxious weed species (Table 131). There are no CDFA A-rated noxious weeds known to occur within 100 feet of these 44 routes.

Table 131 Weed occurrences within 100 feet of unauthorized routes proposed for addition to the NFTS under Alternative 4

Species	CDFA Rating	Site ID	Proposed Route	Route intersects occurrence?
Lepidium latifolium	B	LELA2-044	ULA488-1	no
Hypericum perforatum	C	HYPE-056	340327UC01	yes

Source: GIS query, November 2009 (Appendix B)

Hypericum vulgare *(Klamathweed, HYPE-056)*

An occurrence of *Hypericum perforatum* (Klamathweed, LNF #56) is located along Forest Road 26 near the proposed addition 340327UC01. Fifteen plants were observed to occur in this location in 2004 and were pulled. No plants were observed at this site in 2006 or in 2009. Lassen NF will monitor this site for recurrence annually and treat if detected (Appendix D, Appendix E).

Lepidium latifolium *(perennial pepperweed, LELA2-044)*

An occurrence of *Lepidium latifolium* (perennial pepperweed, LNF #44) is mapped within 100 feet of road ULA488-1, and is described as occurring 225 feet south of the dam for

McCoy Flat Reservoir. This route is used for access to the reservoir shoreline, and so vehicle and foot traffic along the route is unlikely to pass through this weed occurrence. Thirty stems were noted at this site in 2007 and the plants were dug at this time. Ten stems were observed, dug and bagged in both 2008 and 2009. Lassen NF will continue to monitor and treat this site annually (Appendix D, Appendix E).

Direct/Indirect Effects of proposed changes to the NFTS

Alternative 4 would not convert any current ML 1 roads to ML 2 roads managed as motorized trail, therefore there would be no direct or indirect effects to noxious weeds from this action.

Cumulative Effects

The current NFTS includes 3,340 miles available for motorized vehicle use within the project area. The addition of 10 miles of currently unauthorized routes (44 routes) to the NFTS would add cumulatively to impacts associated with the current NFTS and bring the total number of miles available for motorized vehicle traffic to 3,350. While Integrated Design Features can be effective in reducing cumulative impacts for most projects, they are not all viable mitigations for ongoing and future motorized vehicle traffic. Public education can encourage motorized vehicle users to clean their vehicles prior to entry into Lassen NF, but there is no practicable way to ensure this is done. The incremental impact of the 10 miles of unauthorized routes proposed for addition to the NFTS under Alternative would be minor, as both of the noxious weed occurrences along these routes will be monitored and treated if observed to recur. The prohibition of cross-country motorized vehicle traffic would have a substantial beneficial effect on noxious weed risk management by eliminating most unauthorized routes as vectors for the introduction and spread of noxious weed species and decreasing the connectivity between occurrences along current NFTS routes where motorized vehicles travel.

The effects of other ongoing and reasonably foreseeable future actions on noxious weeds are as discussed under General Types of Impacts. Ground-disturbing actions will be mitigated through Integrated Design Features incorporated within each proposed action. Implementation of these IDFs as discussed under General Types of Impacts will minimize the risk of noxious weed introduction and spread associated with future foreseeable actions.

Alternative 5

Direct/Indirect Effects of Prohibiting Cross-Country Travel

Cross-country motorized travel would be prohibited under Alternative 5, thus reducing the risk of noxious weed introduction and spread along 4,339 currently unauthorized routes not proposed for addition to the NFTS. The prohibition of cross-country travel would remove or reduce motorized vehicle traffic as a vector for noxious weed spread for 130 noxious weed occurrences (Table 126). This action to prohibit cross-country travel thus constitutes a beneficial effect for noxious weed risk management.

Direct/Indirect Effects of adding facilities (presently unauthorized roads or trails) to the NFTS

Of the 203 unauthorized routes proposed for addition to the NFTS under Alternative 5, 196 present a low risk of contributing to noxious weed introduction and spread, seven present a medium risk, and no routes present a high risk (Appendix A, Appendix B, Table 132).

No noxious weeds were found along 196 unauthorized routes that have been recently surveyed. These routes present a low risk of contributing to the introduction and spread of noxious weeds. The seven medium risk routes pass within 100 feet of eight occurrences of CDFA B-rated, C-rated, or other noxious weed species (Table 133). There are no CDFA A-rated noxious weeds known to occur within 100 feet of these 203 routes.

Table 132 Number of unauthorized routes proposed for addition to the NFTS under Alternative 5 with low, medium, and high noxious weed risk ratings

	Risk Rating		
Risk Rating Basis	**Low Risk**	**Medium Risk**	**High Risk**
CDFA A-rated weeds within 100 ft. of route	--	--	0
CDFA B-, C-, or non-rated weed within 100 ft. of route	--	7	--
Route surveyed, no weeds found	196	--	--
Route not surveyed	--	--	0
Total	196	7	0

Source: GIS query, November 2009 (Appendix B)

Table 133 Weed occurrences within 100 feet of currently unauthorized routes proposed for addition to the NFTS under Alternative 5

Species	CDFA Rating	Site ID	Proposed Route	Route intersects occurrence?
Centaurea solsitialis	C	CESO3-116	UNO216	yes
Cirsium vulgare	C	CIVU-011	ULA187	yes
Hypericum perforatum	C	HYPE-056	340327UC01	yes
Lepidium latifolium	B	LELA2-044	ULA488-1	no
Leucanthemum vulgare	not rated	LEVU-018	ULA187	yes
Leucanthemum vulgare	not rated	LEVU-020	ULA174, UBB865	yes
Taeniatherum caput-medusae	C	TACA8-144	UNO216	yes
Taeniatherum caput-medusae	C	TACA8-145	UNC181	yes

Source: GIS query, November 2009 (Appendix B)

Centaurea solstitialis *(yellow starthistle, CESO3-116)*

A one-tenth acre occurrence of *Centaurea solstitialis* (yellow starthistle, LNF #116), found during 2009 weed surveys, is located along and to the north of route UNO216. Though yellow starthistle is locally abundant in the Burney area, this occurrence is still small, and manual treatment is a feasible mitigation. Route UNO216 will not be added to the MVUM

prior to the treatment of this yellow starthistle occurrence. Following treatment, Lassen NF will monitor this site for recurrence annually and treat if detected (Appendix D, Appendix E).

Cirsium vulgare *(bull thistle, CIVU-011)*

An occurrence of *Cirsium vulgare* (bull thistle, LNF #11) is located along and within the proposed route ULA187, where the route intersects Forest Service road 29N11. The occurrence occupies 0.1 acres of disturbed soils, within which *C. vulgare* has a canopy cover of 25 percent. Soil disturbance at this site stems from recent logging activity. *Cirsium vulgare* is widespread and not highly invasive on Lassen NF, where, though it establishes easily in disturbed areas, it is unlikely to persist and spread. Because *C. vulgare* is not a priority for treatment on the Lassen NF, no mitigation measures are proposed for this site.

Hypericum perforatum *(Klamathweed, HYPE-056)*

An occurrence of *Hypericum perforatum* (Klamathweed, LNF #56) is located along Forest Road 26 near the proposed addition 340327UC01. Fifteen plants were observed to occur in this location in 2004 and were pulled. No plants were observed at this site in 2006 or in 2009. Lassen NF will monitor this site for recurrence annually and treat if detected (Appendix D, Appendix E).

Lepidium latifolium *(perennial pepperweed, LELA2-044)*

An occurrence of *Lepidium latifolium* (perennial pepperweed, LNF #44) is mapped within 100 feet of road ULA488-1, and is described as occurring 225 feet south of the dam for McCoy Flat Reservoir. This route is used for access to the reservoir shoreline, and so vehicle and foot traffic along the route is unlikely to pass through this weed occurrence. Thirty stems were noted at this site in 2007 and the plants were dug at this time. Ten stems were observed, dug and bagged in both 2008 and 2009. Lassen NF will continue to monitor and treat this site annually (Appendix D, Appendix E).

Leucanthemum vulgare *(oxeye daisy, LEVU-018)*

Approximately 1,500 individuals of *Leucanthemum vulgare* (ox-eye daisy, LNF #18) occur with *C. vulgare* along and near route ULA187. A dense patch of approximately 500 plants is located at the intersection of route ULA187 and Forest Service road 29N11. The occurrence continues south along Forest Service road 29N11 and north toward the intersection of ULA187 and State Road 172, where it occurs in scattered patches through areas of recent logging activity. There is no active eradication program for this species within this portion of the Forest because the infestation is widespread and beyond control. In addition, this species is not A-, B- or C-rated by CDFA. No mitigation measures are therefore proposed for this site.

Leucanthemum vulgare *(oxeye daisy, LEVU-020)*

Leucanthemum vulgare (oxeye daisy, LNF #20) is located along several miles of Highway 36 and Forest Service road 30N16, where it occurs along both sides of these roads. Proposed routes UBB865 and ULA174 intersect Forest Service road 30N16 within this

roadside weed occurrence. In 2007, rakes and hoes were used to remove approximately 57,000 stems of oxeye daisy from Lassen NF. The bulk of the infestation, however, remains on private lands where treatment is not currently planned. The addition of UBB865 and ULA174 to the NFTS poses a minimal incremental risk for spread of this occurrence. Because the infestation in this part of the forest is beyond manual control and the species is not A-, B- or C-rated by CDFA, no mitigation is proposed for this site.

Taeniatherum caput-medusae *(medusahead, TACA8-144)*

Medusahead was found along route UNO216 during 2009 weed surveys. One patch is located at the junction of route UNO216 and County Road 7P200, another is located where UNO216 crosses a powerline access road. The occurrence has been mapped as approximately 0.3 acres with 40% canopy cover, with the infestation thought to extend north and south along the powerline corridor. Because this is a low-priority species for treatment on the Lassen NF except where the infestation is small enough to be treated with manual control methods, no mitigations are proposed for this site.

Taeniatherum caput-medusae *(medusahead, TACA8-145)*

Medusahead was found along route UNC181 south of Sheep Flat during 2009 weed surveys, and it is widespread in this area of the forest. The infestation was estimated at 0.3 acres with 50% canopy cover of medusahead, and occurs in a patchy distribution along the route. Because this is a low-priority species for treatment on the Lassen NF except where the infestation is small enough to be treated with manual control methods, no mitigations are proposed for this site.

Direct/Indirect Effects of proposed changes to the NFTS

Alternative 5 would convert eight roads that are currently closed to motorized use by the public (ML 1 roads) to ML 2 roads managed as motorized trail. Of these, seven present a low risk of contributing to noxious weed introduction and spread, one presents a medium risk, and no routes present a high risk (Appendices A and B, Table 134).

Table 134 Number of current ML 1 roads proposed for conversion to ML 2 roads under Alternative 5 with low, medium, and high noxious weed risk ratings

	Risk Rating		
Risk Rating Basis	**Low Risk**	**Medium Risk**	**High Risk**
CDFA A-rated weeds within 100 ft. of route	--	--	0
CDFA B-, C-, or non-rated weed within 100 ft. of route	--	1	--
Route surveyed, no weeds found	7	--	--
Route not surveyed	--	--	0
Total	7	1	0

Source: GIS query, November 2009 (Appendix B)

No noxious weeds were found along seven roads that have been recently surveyed. These routes present a low risk of contributing to the introduction and spread of noxious weeds. The one medium risk routes pass within 100 feet of three occurrences of CDFA C-rated noxious weed species (Table 135). There are no CDFA A-rated noxious weeds known to occur within 100 feet of these eight roads.

Table 135 Weed occurrences within 100 feet of current ML 1 roads proposed for conversion to ML 2 roads under Alternative 5

Species	CDFA Rating	Site ID	Proposed Route	Route intersects occurrence?
Centaurea solstitialis	C	CESO3-038	28N29H	yes
Centaurea solstitialis	C	CESO3-057	28N29H	yes
Taeniatherum caput-medusae	C	TACA8-017	28N29H	yes

Source: GIS query, November 2009 (Appendix B)

Centaurea solstitialis *(yellow starthistle, CESO3-038)*

Yellow starthistle is widespread on the western, low-elevation portions of the Lassen NF, and has been documented as occurring throughout the geographic feature known as Middle Ridge (Occurrence #38). Inventories within this area are incomplete, and the 2,208 acres that this species is estimated to occupy within the project area is likely a significant underestimate. The proposed motorized trail 28N29H passes through Occurrence #38, which was estimated in 1999 to cover nearly 200 acres. Treatment priority for yellow starthistle is given to new, small infestations in higher elevation portions of the Lassen NF. There is no active eradication program for yellow starthistle in this portion of the Lassen NF because the infestation is widespread and beyond manual control. In addition, the Mill and Antelope wildfires that burned through nearby large portions of the Forest in 2008 have likely spread the infestation even further since last surveyed. Converting road 28N29H to a motorized trail may slightly increase the risk of motorized vehicle traffic spreading yellow starthistle, but as the species is so widespread in the area this incremental risk is minor relative to other factors that have contributed to the widespread distribution and high

abundances of yellow starthistle in this part of the Forest. No mitigation measures are therefore proposed.

Centaurea solstitialis *(yellow starthistle, CESO3-057)*

In a 2000 survey, yellow starthistle was mapped as occurring intermittently along 3.5 miles of NFTS road 28N29 and noted as likely extending well beyond the road into adjacent terrain. One of the mapped suboccurrences is at the junction of road 28N29 and the proposed motorized trail 28N29H. This occurrence is within the heavily infested western, low-elevation portion of the Lassen NF described above, and as with Occurrence #38, no treatment for Occurrence #57 is proposed. The effects of designating route 28N29 as a motorized trail may slightly increase the risk of motorized vehicle traffic spreading yellow starthistle, but as the species is so widespread in the area this incremental risk is minor relative to other factors that have contributed to the widespread distribution and high abundances of yellow starthistle in this part of the Forest. No mitigation measures are therefore proposed.

Taeniatherum caput-medusae *(medusahead, TACA8-017)*

Medusahead, as with yellow starthistle, occurs widely throughout the western, low-elevation portions of the Lassen NF and is likely significantly underreported in this area. Medusahead was documented as occurring across approximately 19 acres in the Middle Ridge area in 1999. The proposed motorized trail 28N29H bisects one documented suboccurrence. As with yellow starthistle, treatment priority for medusahead on the Forest is given to new, small infestations that can effectively be manually treated. In addition, wildfire that burned through nearby portions of the Forest in 2008 have likely spread the infestation even further. The effects of designating route 28N29 as a motorized trail may slightly increase the risk of motorized vehicle traffic spreading medusahead, but as the species is so widespread in the area this incremental risk is minor relative to other factors that have contributed to the widespread distribution and high abundances of medusahead in this portion of the Forest. No mitigation measures are therefore proposed.

Cumulative Effects

The current NFTS includes 3,340 miles available for motorized vehicle use within the project area. The addition of 53 miles of currently unauthorized routes to the NFTS (203 routes) and conversion of 6 miles of current ML 1 roads to ML 2 roads managed as motorized trail (8 trails) would add cumulatively to impacts associated with the current NFTS and bring the total number of miles available for motorized vehicle traffic to 3,399. While Integrated Design Features can be effective in reducing cumulative impacts for most projects, they are not all viable mitigations for ongoing and future motorized vehicle traffic. Public education can encourage motorized vehicle users to clean their vehicles prior to entry into Lassen NF, but there is no practicable way to ensure this is done. Of the eleven noxious weed occurrences at increased risk for spread under Alternative 5, three will be treated and monitored; while

eight are infestations of lower priority weeds for which no mitigations are proposed. The prohibition of cross-country motorized vehicle traffic would have a substantial beneficial effect on noxious weed risk management by eliminating most unauthorized routes as vectors for the introduction and spread of noxious weed species and decreasing the connectivity between occurrences along current NFTS routes where motorized vehicles travel.

The effects of other ongoing and reasonably foreseeable future actions on noxious weeds are as discussed under General Types of Impacts. Future ground-disturbing actions will be mitigated through Integrated Design Features incorporated within each proposed action. Implementation of these IDFs as discussed under General Types of Impacts will minimize the risk of noxious weed introduction and spread associated with future foreseeable actions.

Modified Alternative 5

Direct/Indirect Effects of Prohibiting Cross-Country Travel

Cross-country motorized travel would be prohibited under Modified Alternative 5, thus reducing the risk of noxious weed introduction and spread along 4,339 currently unauthorized routes not proposed for addition to the NFTS. The prohibition of cross-country travel would remove or reduce motorized vehicle traffic as a vector for noxious weed spread for 130 noxious weed occurrences (Table 126). This action to prohibit cross-country travel thus constitutes a beneficial effect for noxious weed risk management.

Direct/Indirect Effects of adding facilities (presently unauthorized roads or trails) to the NFTS

Of the 207 unauthorized routes proposed for addition to the NFTS under Modified Alternative 5, 200 present a low risk of contributing to noxious weed introduction and spread, seven present a medium risk, and no routes present a high risk (Appendix A, Appendix B, Table 136).

Table 136 Number of unauthorized routes proposed for addition to the NFTS under Alternative 5 with low, medium, and high noxious weed risk ratings

	Risk Rating		
Risk Rating Basis	**Low Risk**	**Medium Risk**	**High Risk**
CDFA A-rated weeds within 100 ft. of route	--	--	0
CDFA B-, C-, or non-rated weed within 100 ft. of route	--	7	--
Route surveyed, no weeds found	200	--	--
Route not surveyed	--	--	0
Total	200	7	0

Source: GIS query, November 2009 (Appendix B)

No noxious weeds were found along 200 unauthorized routes that have been recently surveyed. The addition of these routes to the NFTS presents a low risk of contributing to the introduction and spread of noxious weeds. The seven medium risk routes pass within 100 feet of five occurrences of CDFA B-rated, C-rated, or other noxious weed species (Table 137). There are no CDFA A-rated noxious weeds known to occur within 100 feet of these 207 routes.

Centaurea solstitialis *(yellow starthistle, CESO3-116)*

A one-tenth acre occurrence of *Centaurea solstitialis* (yellow starthistle, LNF #116), found during 2009 weed surveys, is located along and to the north of route UNO216. Though yellow starthistle is locally abundant in the Burney area, this occurrence is still small, and manual treatment is a feasible mitigation. Route UNO216 will not be added to the MVUM prior to the treatment of this yellow starthistle occurrence. Following treatment, Lassen NF will monitor this site for recurrence annually and treat if detected (Appendix D, Appendix E).

Table 137 Weed occurrences within 100 feet of currently unauthorized routes proposed for addition to the NFTS under Modified Alternative 5

Species	CDFA Rating	Site ID	Proposed Route	Route intersects occurrence?
Centaurea solsitialis	C	CESO3-116	UNO216	yes
Cirsium vulgare	C	CIVU-011	ULA187	yes
Hypericum perforatum	C	HYPE-056	340327UC01	yes
Lepidium latifolium	B	LELA2-044	ULA488-1	no
Leucanthemum vulgare	not rated	LEVU-018	ULA187	yes
Leucanthemum vulgare	not rated	LEVU-020	ULA174, UBB865	yes
Taeniatherum caput-medusae	C	TACA8-144	UNO216	yes
Taeniatherum caput-medusae	C	TACA8-145	UNC181	yes

Source: GIS query, November 2009 (Appendix B)

Cirsium vulgare *(bull thistle, CIVU-011)*

An occurrence of *Cirsium vulgare* (bull thistle, LNF #11) is located along and within the proposed route ULA187, where the route intersects Forest Service road 29N11. The occurrence occupies 0.1 acres of disturbed soils, within which *C. vulgare* has a canopy cover of 25 percent. Soil disturbance at this site stems from recent logging activity. *Cirsium vulgare* is widespread and not highly invasive on Lassen NF, where, though it establishes easily in disturbed areas, it is unlikely to persist and spread. Because *C. vulgare* is not a priority for treatment on the Lassen NF, no mitigation measures are proposed for this site.

Hypericum perforatum *(Klamathweed, HYPE-056)*

An occurrence of *Hypericum perforatum* (Klamathweed, LNF #56) is located along Forest Road 26 near the proposed addition 340327UC01. Fifteen plants were observed to occur in

this location in 2004 and were pulled. No plants were observed at this site in 2006 or in 2009. Lassen NF will monitor this site for recurrence annually and treat if detected (Appendix D, Appendix E).

Lepidium latifolium *(perennial pepperweed, LELA2-044)*

An occurrence of *Lepidium latifolium* (perennial pepperweed, LNF #44) is mapped within 100 feet of road ULA488-1, and is described as occurring 225 feet south of the dam for McCoy Flat Reservoir. This route is used for access to the reservoir shoreline, and so vehicle and foot traffic along the route is unlikely to pass through this weed occurrence. Thirty stems were noted at this site in 2007 and the plants were dug at this time. Ten stems were observed, dug and bagged in both 2008 and 2009. Lassen NF will continue to monitor and treat this site annually (Appendix D, Appendix E).

Leucanthemum vulgare *(oxeye daisy, LEVU-018)*

Approximately 1,500 individuals of *Leucanthemum vulgare* (ox-eye daisy, LNF #18) occur with *C. vulgare* along and near route ULA187. A dense patch of approximately 500 plants is located at the intersection of route ULA187 and Forest Service road 29N11. The occurrence continues south along Forest Service road 29N11 and north toward the intersection of ULA187 and State Road 172, where it occurs in scattered patches through areas of recent logging activity. There is no active eradication program for this species within this portion of the Forest because the infestation is widespread and beyond control. In addition, this species is not A-, B- or C-rated by CDFA. No mitigation measures are therefore proposed for this site.

Leucanthemum vulgare *(oxeye daisy, LEVU-020)*

Leucanthemum vulgare (oxeye daisy, LNF #20) is located along several miles of Highway 36 and Forest Service road 30N16, where it occurs along both sides of these roads. Proposed routes UBB865 and ULA174 intersect Forest Service road 30N16 within this roadside weed occurrence. In 2007, rakes and hoes were used to remove approximately 57,000 stems of oxeye daisy from Lassen NF. The bulk of the infestation, however, remains on private lands where treatment is not currently planned. The addition of UBB865 and ULA174 to the NFTS poses a minimal incremental risk for spread of this occurrence. Because the infestation in this part of the forest is beyond manual control and the species is not A-, B- or C-rated by CDFA, no mitigation is proposed for this site.

Taeniatherum caput-medusae *(medusahead, TACA8-144)*

Medusahead was found along route UNO216 during 2009 weed surveys. One patch is located at the junction of route UNO216 and County Road 7P200, another is located where UNO216 crosses a powerline access road. The occurrence has been mapped as approximately 0.3 acres with 40% canopy cover, with the infestation thought to extend north and south along the powerline corridor. Because this is a low-priority species for treatment

on the Lassen NF except where the infestation is small enough to be treated with manual control methods, no mitigations are proposed for this site.

Taeniatherum caput-medusae *(medusahead, TACA8-145)*

Medusahead was found along route UNC181 south of Sheep Flat during 2009 weed surveys, and it is widespread in this area of the forest. The infestation was estimated at 0.3 acres with 50% canopy cover of medusahead, and occurs in a patchy distribution along the route. Because this is a low-priority species for treatment on the Lassen NF except where the infestation is small enough to be treated with manual control methods, no mitigations are proposed for this site.

Direct/Indirect Effects of proposed changes to the NFTS

Modified Alternative 5 would convert eight roads that are currently closed to motorized use by the public (ML 1 roads) to ML 2 roads managed as motorized trail. Of these, seven present a low risk of contributing to noxious weed introduction and spread, one presents a medium risk, and no routes present a high risk (Appendices A and B, Table 134).

Table 138 Number of current ML 1 roads proposed for conversion to ML 2 roads under Modified Alternative 5 with low, medium, and high noxious weed risk ratings

	Risk Rating		
Risk Rating Basis	**Low Risk**	**Medium Risk**	**High Risk**
CDFA A-rated weeds within 100 ft. of route	--	--	0
CDFA B-, C-, or non-rated weed within 100 ft. of route	--	1	--
Route surveyed, no weeds found	7	--	--
Route not surveyed	--	--	0
Total	7	1	0

Source: GIS query, November 2009 (Appendix B)

No noxious weeds were found along seven roads that have been recently surveyed for weeds. These routes present a low risk of contributing to the introduction and spread of noxious weeds. The one medium risk routes pass within 100 feet of three occurrences of CDFA C-rated noxious weed species (Table 139). No CDFA A-rated noxious weeds are known to occur within 100 feet of these eight roads.

Table 139 Weed occurrences within 100 feet of current ML 1 roads proposed for conversion to ML 2 roads under Modified Alternative 5

Species	CDFA Rating	Site ID	Proposed Route	Route intersects occurrence?
Centaurea solstitialis	C	CESO3-038	28N29H	yes
Centaurea solstitialis	C	CESO3-057	28N29H	yes
Taeniatherum caput-medusae	C	TACA8-017	28N29H	yes

Source: GIS query, November 2009 (Appendix B)

Centaurea solstitialis *(yellow starthistle, CESO3-038)*

Yellow starthistle is widespread on the western, low-elevation portions of the Lassen NF, and has been documented as occurring throughout the geographic feature known as Middle Ridge (Occurrence #38). Inventories within this area are incomplete, and the 2,208 acres that this species is estimated to occupy within the project area is likely a significant underestimate. The proposed motorized trail 28N29H passes through Occurrence #38, which was estimated in 1999 to cover nearly 200 acres. Treatment priority for yellow starthistle is given to new, small infestations in higher elevation portions of the Lassen NF. There is no active eradication program for yellow starthistle in this portion of the Lassen NF because the infestation is widespread and beyond manual control. In addition, the Mill and Antelope wildfires that burned through nearby large portions of the Forest in 2008 have likely spread the infestation even further since last surveyed. Converting road 28N29H to a motorized trail may slightly increase the risk of motorized vehicle traffic spreading yellow starthistle, but as the species is so widespread in the area this incremental risk is minor relative to other factors that have contributed to the widespread distribution and high abundances of yellow starthistle in this part of the Forest. No mitigation measures are therefore proposed.

Centaurea solstitialis *(yellow starthistle, CESO3-057)*

In a 2000 survey, yellow starthistle was mapped as occurring intermittently along 3.5 miles of NFTS road 28N29 and noted as likely extending well beyond the road into adjacent terrain. One of the mapped suboccurrences is at the junction of road 28N29 and the proposed motorized trail 28N29H. This occurrence is within the heavily infested western, low-elevation portion of the Lassen NF described above, and as with Occurrence #38, no treatment for Occurrence #57 is proposed. The effects of designating route 28N29 as a motorized trail may slightly increase the risk of motorized vehicle traffic spreading yellow starthistle, but as the species is so widespread in the area this incremental risk is minor relative to other factors that have contributed to the widespread distribution and high abundances of yellow starthistle in this part of the Forest. No mitigation measures are therefore proposed.

Taeniatherum caput-medusae *(medusahead, TACA8-017)*

Medusahead, as with yellow starthistle, occurs widely throughout the western, low-elevation portions of the Lassen NF and is likely significantly underreported in this area. Medusahead was documented as occurring across approximately 19 acres in the Middle Ridge area in 1999. The proposed motorized trail 28N29H bisects one documented suboccurrence. As with yellow starthistle, treatment priority for medusahead on the Forest is given to new, small infestations that can effectively be manually treated. In addition, wildfire that burned through nearby portions of the Forest in 2008 have likely spread the infestation even further. The effects of designating route 28N29 as a motorized trail may slightly increase the risk of motorized vehicle traffic spreading medusahead, but as the species is so widespread in the

area this incremental risk is minor relative to other factors that have contributed to the widespread distribution and high abundances of medusahead in this portion of the Forest. No mitigation measures are therefore proposed.

Cumulative Effects

The current NFTS includes 3,340 miles available for motorized vehicle use within the project area. The addition of 56 miles of currently unauthorized routes (207 routes) to the NFTS and conversion of 6 miles of current ML 1 roads to ML 2 roads managed as motorized trail (8 roads) would add cumulatively to impacts associated with the current NFTS and bring the total number of miles available for motorized vehicle traffic to 3,399. While Integrated Design Features can be effective in reducing cumulative impacts for most projects, they are not all viable mitigations for ongoing and future motorized vehicle traffic. Public education can encourage motorized vehicle users to clean their vehicles prior to entry into Lassen NF, but there is no practicable way to ensure this is done. Of the eleven noxious weed occurrences at increased risk for spread under Alternative 5, three will be treated and monitored; while eight are infestations of lower priority weeds for which no mitigations are proposed. The prohibition of cross-country motorized vehicle traffic would have a substantial beneficial effect on noxious weed risk management by eliminating most unauthorized routes as vectors for the introduction and spread of noxious weed species and decreasing the connectivity between occurrences along current NFTS routes where motorized vehicles travel.

The effects of other ongoing and reasonably foreseeable future actions on noxious weeds are as discussed under General Types of Impacts. Ground-disturbing actions will be mitigated through Integrated Design Features incorporated within each proposed action. Implementation of these IDFs as discussed under General Types of Impacts will minimize the risk of noxious weed introduction and spread associated with future foreseeable actions.

Summary of Effects Analysis Across All Alternatives

The noxious weeds risk assessment may be found in Table 140. Of all alternatives, Alternative 1 presents the greatest risk for noxious weed introduction and spread. Continued cross-country travel under this alternative would facilitate weed spread along a network of unauthorized routes that are expected to persist over the next 20 years. Under this alternative motor vehicles may continue to translocate weed seeds or propagules from home areas or other forest locations. Unauthorized routes are within 100 feet of 137 known noxious weed occurrences, 24 of which are CDFA A-rated noxious weeds. Without a prohibition on cross-country motorized vehicle travel these weed occurrences may act as both source occurrences for new infestations and unauthorized routes may function as zones of soil disturbance that promote the establishment of noxious weeds. There is no practicable way to mitigate for continued motorized vehicle traffic in and near these known weed sites. Alternatives 2, 3, 4, 5, and Modified 5 all prohibit motorized cross-country travel,

which eliminates motorized vehicle traffic as vectors for weed spread and decreases the connectivity between occurrences along current NFTS routes where motorized vehicles travel. This prohibition greatly reduces the risk of noxious weed introduction and spread under these alternatives and constitutes a substantial beneficial effect to noxious weed risk management.

Table 140 Noxious weed risk assessment: number of routes at low, medium and high risk for noxious weed spread by action

		Risk of Noxious Weed Spread		
Action Analyzed	**Total # of Routes**	**low**	**medium**	**high**
Prohibition of Cross-Country Travel (analysis of continued cross-country travel under Alternative 1)				
All Alternatives	4,542	1,564	233	2,745 (24 near A-rated weeds)
Additions to the NFTS				
Alternative 2	78	71	3	4 (0 near A-rated weeds)
Alternative 4	44	42	2	0
Alternative 5	203	196	7	0
Modified Alternative 5	207	200	7	0
Conversion of ML 1 roads to ML 2 roads				
Alternative 5	8	7	1	0
Modified Alternative 5	8	7	1	0

Source: GIS query, November 2009 (Appendix B)

Alternative 3, which would not add any currently unauthorized routes to the NFTS nor convert any current ML 1 roads to ML 2 roads, presents the lowest risk of noxious weed introduction and spread. The effects of this alternative are limited to the beneficial effects of prohibiting motorized cross-country travel. Alternative 2, Alternative 4, Alternative 5, and Modified Alternative 5 would each add a subset of currently unauthorized routes to the NFTS. Alternative 5 and Modified Alternative 5 would also convert eight roads from ML 1 roads to motorized trails. In sum, these project actions (prohibition of cross-country travel, additions to the NFTS, and changes to the NFTS) would result in a slightly higher risk of noxious weed introduction and spread relative to Alternative 3, but a substantially lower risk relative to Alternative 1. Alternative 2, Alternative 4, Alternative 5, and Modified Alternative 5 differ minimally in noxious weed risk, as all these alternatives would eliminate most unauthorized routes as vectors for the introduction and spread of noxious weed species and zones of soil disturbance through the prohibition of cross-country travel. In addition, no routes proposed for addition to the NFTS or conversion from ML 1 roads to ML 2 roads under these alternatives are near infestations of CDFA A-rated weeds. The number of these routes near known occurrences of B-rated, C-rated or other noxious weeds ranges from two under Alternative 4 to eleven under Alternative 5 and Modified Alternative 5 (Table 141). These infestations would be treated where feasible and monitored where appropriate based upon forest priorities, thus reducing the noxious weed risk associated with project actions.

Under Alternative 2, routes and motorized trails given a high risk rating due to lack of surveys would not be added to the MVUM prior to the completion of noxious weed surveys (Appendix E). If noxious weed infestations are found during surveys, they would be treated according to the species present. If the infestation were a CDFA A-rated weed for which no feasible mitigation could be implemented, addition to the MVUM would be re-evaluated.

Table 141 Summary of known noxious weed occurrences within 100 feet of currently unauthorized routes proposed addition to the NFTS or roads currently managed as ML 1 proposed for conversion to motorized trails

Species	Occurrence	Route(s)	Alt 2	Alt 4	Alt 5	ModifiedAlt 5
Centuarea solstitialis	CESO3-038	28N29H			x	x
Centaurea solstitialis	CESO3-057	28N29H			x	x
Centaurea solstitialis	CESO3-116	UNO216	x		x	x
Cirsium vulgare	CIVU-011	ULA 187	x		x	x
Hypericum perforatum	HYPE-056	340327UC01		x	x	x
Lepidium latifolium	LELA2-044	ULA 488-1	x	x	x	x
Leucanthemum vulgare	LEVU-018	ULA 187	x		x	x
Leucanthemum vulgare	LEVU-020	ULA174, UBB865			x	x
Taeniatherum caput-medusae	TACA8-017	28N29H			x	x
Taeniatherum caput-medusae	TACA8-144	UNO216	x		x	x
Taeniatherum caput-medusae	TACA8-145	UNC181			x	x
Total # Occurrences within 100 ft. of routes:			**5**	**2**	**11**	**11**

Source: GIS query, November 2009 (Appendix B)

The cumulative effects of continuing and future foreseeable ground-disturbing projects do not vary by alternative. Ongoing activities such as vegetation management and associated road construction, prescribed fire activities, routine route maintenance, mineral material extraction, grazing in active range allotments, special use permits, recreation, personal use woodcutting, and noxious weed management occur across the affected environment. Future project-specific impacts to noxious weeds will be addressed through Integrated Design Features that will be incorporated into project proposed actions. These IDFs will minimize or reduce noxious weed risks associated with future actions.

Of all the alternatives, Alternative 1, under which motorized cross-country travel would continue presents a high overall risk of noxious weed introduction and spread. Alternative 3 (under which motorized cross-country travel would be prohibited, no currently unauthorized routes would be added to the NFTS and no current ML 1 roads would be converted to ML 2 roads) presents the lowest comparative risk of noxious weed introduction and spread.

Alternative 2, Alternative 4, Alternative 5, and Modified Alternative 5 would all result in a greatly reduced risk of noxious weed spread relative to Alternative 1, though a higher risk than Alternative 3. Under these alternatives, known high priority weed occurrences near routes to be added to the NFTS or converted from ML 1 roads to ML 2 roads would be treated and monitored, thus minimizing the noxious weed risks associated with project actions under these alternatives. In a comparison of alternatives for this resource, rankings are assigned as follows: a score of 5 indicates substantial beneficial effects for noxious weed risk management, a score of 4 indicates lesser beneficial effects, and score of 1 indicates substantial adverse effects (Table 142).

Table 142 Comparison of alternatives for noxious weeds: rankings by risk of noxious weed introduction and spread

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Risk of Noxious Weed Introduction and Spread	1	4	5	4	4

Compliance with the Forest Plan and Other Direction

Alternative 1 does not prohibit cross-country travel and presents a high risk of noxious weed introduction and spread that cannot be practicably mitigated. This alternative is not consistent with Forest Service Manual direction (FSM 1995), which requires the identification of noxious weed control measures in areas of moderate to high risk.

Alternative 2, Alternative 3, Alternative 4, Alternative 5 and Modified Alternative 5 are consistent with the Forest Plan and other direction. A noxious weed risk assessment has been completed for each alternative as required (FSM 1995, USDA FS PSW Region 2004); the public has been informed of the risk and effects to noxious weeds from motorized vehicle travel (USDA FS PSW Region 2004), and under these alternatives noxious weed control measures have been identified in areas of moderate to high risk (FSM 1995, USDA FS PSW Region 2004).

3.13 Wildlife Resources

Changes Between the DEIS and the FEIS

Additional analysis and/or discussion has been provided regarding the Migratory Bird Treaty Act, Critical Habitat for northern spotted owl, effects at specific routes as described on the route cards found in Appendix A, and substantive public comments to the wildlife resources analysis. An update is provided to the cumulative effects based on revised list of ongoing and reasonably foreseeable future actions found in Appendix C. Minor corrections were made to various tables regarding miles of route or acres affected based on computer rounding errors, field verification etc. All other discussions and conclusions remained the same.

Introduction

Management of terrestrial species and habitat, and maintenance of a diversity of animal communities, is an important part of the mission of the Forest Service per statutes in the Resource Planning Act of 1974 and National Forest Management Act of 1976. Management activities on NFS lands are planned and implemented so that they do not jeopardize the continued existence of federally 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 to the degree consistent with multiple-use objectives established in each Forest Plan.

Analysis Framework: Statutes, Regulations, Forest Plan Direction

Direction relevant to the proposed action as it affects terrestrial 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 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. Analysis is documented in a Biological Assessment (BA) and is referenced in this Chapter.

Forest Service Manual 2670 (FSM 2005a) Forest Service Sensitive (FSS) species are plant 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.

Lassen NF Land and Resource Management Direction (Forest Plan 1993): The Lassen Forest Plan (FP), as amended by the Northwest Forest Plan (USDA FS and USDI BLM 1994; as amended 2004, 2007), Herger-Feinstein Quincy Library Group Recovery Act (HFQLG ROD; USDA FS 1999), and Sierra Nevada Forest Plan Amendment (SNFPA) (USDA FS PSW Region 2001, 2004). The following standards and guidelines applicable to motorized travel management and terrestrial biota will be considered during the analysis process:

Habitat Connectivity for Old Forest Associated Species

SNFPA #27 Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest associated species (particularly fisher and marten) in biological evaluations.

SNFPA #28 Assess the potential impact of projects on the connectivity of habitat for old forest associated species.

SNFPA #29 Consider retaining forested linkages (with canopy cover greater than 40 percent) that are interconnected via riparian areas and ridge top saddles during project-level analysis.

SNFPA #32 Detection of a wolverine or Sierra Nevada red fox will be validated by a forest carnivore specialist. When verified sightings occur, conduct an analysis to determine if activities within 5 miles of the detection have a potential to affect the species. If necessary, apply a limited operating period from January 1 to June 30 to avoid adverse impacts to potential breeding. Evaluate activities for a 2-year period for detections not associated with a den site.

Willow Flycatchers

SNFPA #60 For historically occupied willow flycatcher sites, assess willow flycatcher habitat suitability within the meadow. If habitat is degraded, develop restoration objectives and take appropriate actions (such as physical restoration of hydrological components, limiting or re-directing grazing activity, and so forth) to move the meadow toward desired conditions.

Wheeled Vehicles

SNFPA #69 Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle (OHV) use areas. Unless otherwise restricted by current forest plans or other specific area standards and guidelines, cross-country travel by over-snow vehicles would continue.

Road construction, Reconstruction, and Relocation

SNFPA #70 To protect watershed resources, meet the following standards for road construction, road reconstruction, and road relocation: … (4) avoid wetlands or minimize effects to natural flow patterns in wetlands; (5) avoid road construction in meadows.

CA Spotted Owl and Northern Goshawk Protected Activity Centers (PACs)

SNFPA #82 Mitigate impacts where there is documented evidence of disturbance to the nest site from existing recreation, off highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb nest sites.

Great Gray Owl Protected Activity Centers (PACs)

SNFPA #83 Apply a limited operating period, prohibiting vegetation treatments and road construction within ¼ mile of an active great gray owl nest stand, during the nesting period (typically March 1 to August 15). The Limited Operating Period (**LOP**) may be waived for vegetation treatments of limited scope and duration, when a biological evaluation determines that such projects are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location. Where a biological evaluation concludes that a nest site would be shielded from planned activities by topographic features that would minimize disturbance, the LOP buffer distance may be reduced.

Fisher and Marten Den Sites

SNFPA #87 and #89 Mitigate impacts where there is documented evidence of disturbance to the den site from existing recreations, off highway vehicle routes, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb den sites.

Riparian Conservation Areas

SNFPA #92 Evaluate new proposed management activities within Critical Aquatic Refuges (CARs) and Riparian Conservation Areas (RCAs) during environmental analysis to determine consistency with the riparian conservation objectives at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2) minimize impacts to habitat for aquatic- or riparian-depended plant and animal species.

Facilities

FP 4-17 Areas with road densities of 2 miles per square mile or higher will be evaluated for habitat effectiveness. Roads and travel networks will be assessed for existing and future needs. Roads no longer needed for administrative purposes will be closed to enhance wildlife habitat, and to protect water quality and soil productivity. Some roads may be obliterated and the land restored to a near natural gradient

Wildlife Prescription – HFQLG

Limited Operating Periods

Bald eagle	within designated territories	11/01-08/31
Bald eagle	winter roosts	11/01-03/01
Sandhill crane	within ½ mile of nesting sites	04/01-08/-01

Non-timber Wildlife Prescription

FP 4-40 The purpose of this prescription is to maintain or improve habitat for species that are at least partially dependent on non-forest or non-commercial forests. The prescription will provide high habitat capability for deer, black bear, pronghorn antelope, hairy woodpecker, and ground squirrel. The prescription is based on active habitat manipulation and modification of other resource activities to enhance the habitat quality for wildlife and fish. Snag, riparian, and hardwood habitat will be managed to produce medium to high habitat capability. Where conflicts occur over forage, wildlife will have priority over livestock. No timber harvest will be scheduled under this prescription.

FP 4-40 Relocate roads where necessary to protect significant wildlife habitat.

FP 4-40 Seasonally close roads where necessary to protect wildlife during critical periods.

FP 4-41 Provide opportunities for viewing wildlife, hunting, gathering forest products, and vehicle camping.

FP 4-41 Maximize the sustainable carrying capacity of winter deer range by directly improving habitat and coordinating resource use activities. Where feasible, provide a continual supply of forage, and maintain at least 40 percent of the area as cover.

FP 4-48 Emphasize screening of important forage areas, resting and escape cover, water sources, and travel routes for deer when locating and designing roads.

FP 4-48 Close roads to motorized vehicles as appropriate to meet the needs of deer, black bear, and other emphasized species listed in the Management Area direction.

FP 4-54 In cooperation with the California Department of Fish and Game, close roads to motorized vehicles as appropriate. Coordinate road closure and motorized vehicle access needs with the Department to meet the needs of deer, black bear, and other wildlife emphasis species listed in the Management Area direction.

FP 4-58 Locate and design roads to avoid important wildlife hiding and escape cover, watering sources, travel routes, nesting sites and foraging areas.

FP 4-59 Provide “high” habitat capability for harvest species and other species that have a relatively low tolerance to human activity.

Eagle Management Area 14 – Wildlife Standards and Guidelines

FP 4-140 (1) Enhance habitat within the Eagle Lake basin for breeding and wintering bald eagles. Close nesting and wintering areas to vehicles, as needed, to protect the eagles. (2) Continue to implement the 1971 management plan for the Eagle Lake Osprey Management Area and the lands allocated to the Non-Timber Wildlife Prescription (A), and (3) Protect and enhance nesting habitat for sandhill cranes, particularly Papoose Meadows.

The Northwest Forest Plan (USDA FS and USDI BLM 1994; as amended 2004, 2007) includes specific requirements and management for special habitats such as aquatic conservation areas. However, no routes are being considered for addition to the National Forest Transportation System (NFTS) in those habitats under any alternative. Therefore applicable standards and guides are not listed.

Effects Analysis Methodology

Area of Effect for Wildlife Resources for Additions to the NFTS

Two levels of analysis have been conducted: 1) species-specific habitat analysis for the four types of actions (prohibition of cross-country travel, additions to the NFTS, changes to the NFTS by vehicle class or motorized mixed-use, and changes to the NFTS by Season of Use; and 2) analysis of each alternative in whole, across Lassen NF. Generally, this analysis considered the proximity of each route to known locations of special-status species. The

detailed analysis, by route, is found in Table A-2 of Appendix A. The analysis of each alternative as a whole relative to the project scale has been informed by the site-specific route analysis and other supplemental information.

Analysis Process

A discussion of the direct, indirect, and cumulative effects of each alternative is provided in a summary form. The effects of each action alternative are described for four discreet proposed activities including: 1) prohibition of cross-country motor vehicle travel, 2) addition of unauthorized routes to the NFTS, 3) changes to the existing NFTS by vehicle class such as changing ML-1 roads to motorized trails or motorized mixed use, and 4) changes to the existing NFTS seasons of use. Relative to these four discreet proposed activities, the analysis process consists of four steps: 1) identification and assessment of wildlife species and groups, 2) identification and assessment of road- and trail-associated "disturbance" factors for each group, 3) development and application of assessment processes using GIS models to evaluate the influence of road- and trail-associated factors on each group, and 4) analyze the effects of the alternatives based on the model outputs and analyses.

Step 1: Identify wildlife species and groups for assessment: Existing information and knowledge about the distribution of the terrestrial species on Lassen NF were used to develop the list of species, which were placed in species groups. Special-status species found within the project area are listed in Table 143.

Table 143 Terrestrial wildlife TES species considered within this project analysis

Common Name	Scientific Name	Status	Species Group
American marten	***Martes americana***	FSS	Late-successional forest group p491
Bald eagle	***Haliaeetus leucocephalus***	FSS	Wetland/riparian species group p527
California spotted owl	***Strix occidentalis occ.***	FSS	Late-successional forest group p477
California wolverine	***Gulo gulo luteus***	FSS	Wide-rangeing carnivore group p506
Great gray owl	***Strix nebulosa***	FSS	See Summary of Effects p570
Greater Sandhill crane	***Grus canadensis tabida***	FSS	Wetland/riparian species group p534
Northern goshawk	***Accipiter gentilis***	FSS	Late-successional forest group p487
Northern spotted owl	***Strix occidentalis caurina***	FT	Late-successional forest group p477
Northwestern pond turtle	***Clemmys marmorata mar.***	FSS	Wetland/riparian species group p538
Pacific fisher	***Martes pennanti pacifica***	FC/FSS	Late-successional forest group p491
Pallid bat	***Antrozous pallidus***	FSS	See Summary of Effects p570
Shasta hesperian snail	***Vespericola shasta***	FSS	See Summary of Effects p570
Sierra Nevada red fox	***Vulpes vulpes necator***	FSS	Wide-rangeing carnivore group p506
Townsend's big-eared bat	***Corynorhinus townsendii***	FSS	See Summary of Effects p570
Valley elderberry longhorn beetle	***Desmocerus californicus dimorphus***	FT	See Summary of Effects p570
Willow flycatcher	***Empidonax traillii***	FSS	Wetland/riparian species group
Western red bat	***Lasiurus blossevillii***	FSS	See Summary of Effects p570

FT = Federally listed as Threatened; FC= Federal candidate for listing; FSS = Forest Service Sensitive

Sources: USDI FWS 2009, USDA Forest Service PSW Region 2007c, Frolli 2009.

Special-status species, Forest Plan emphasis species and species of local interest were selected and placed into groups based on potential for these species or their habitats to be affected by motor vehicle use.

A total of 25 species (Table 144) were included in the species group assessment. Additional special-status species were not considered for detailed analysis here because: 1) we have no confirmed recent occurrences on Lassen NF; and/or 2) the species and its habitat are outside the affected area of the project. Analysis and discussion of these additional species can also be found in the Biological Assessment and Evaluation for wildlife species (Frolli 2009) located in the project record.

For those species identified by group in Table 144, the assessments presented below follow the approach described by Gaines et al. (2003) who categorized species into groups based on a combination of their biology and interactions with road- and motorized trail-associated risk factors. The groups listed below appear to be applicable to management of motorized routes on Lassen NF.

Table 144 Wildlife groups and species represented within groups

Wildlife group	Species
Late-successional forest species	American marten, California spotted owl, northern flying squirrel, northern goshawk, northern spotted owl, Pacific fisher, sooty grouse
Wide-ranging carnivore species	Black bear, California wolverine, Sierra Nevada red fox
Ungulate species	mule deer, pronghorn, elk
Wetland and riparian species	Bald eagle, bufflehead, greater Sandhill crane, mallard, northwestern pond turtle, willow flycatcher, yellow warbler
Early and mid-successional forest and chaparral species	Fox sparrow, mountain quail, mule deer
Cavity-dependent species	Hairy woodpecker, black-backed woodpecker

Source: Gaines et al. 2003.

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, presence of food, 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, dismissed habitat

connectivity or increased fragmentation, and pathways or vectors for competitors, predators or disease which effect survivorship. Disturbance type 3, referred to hereafter as harvest, includes mortality or take of individual animals. Risk factors include hunting, trapping, collecting, poaching, malicious shooting or chasing, and accidental vehicle collision. Based on a review of literature and local knowledge of selected species on Lassen NF, disturbance factors were used for the assessment of each species group. A detailed analysis and discussion of risk factors described in Gaines et al. (2003) are included in the Biological Assessment and Evaluation for wildlife species (Frolli 2009) located in the project record.

Step 3: Processes and models: The assessment process to analyze the effects of motorized travel routes (road and trails) on Lassen NF has been done in a three primary steps: 1) road density has been derived within specific wildlife habitats, 2) the cumulative effects of travel routes to species groups were assessed based on a similar process completed by Gaines et al. (2003), and 3) the relative environmental risk of roads and trails to terrestrial habitats was determined.

The term “route” is used in this section, as described in the glossary, and can refer to any local road or motorized trail, authorized or unauthorized, being considered for addition to the NFTS under each alternative. Unless otherwise stated, roads, motorized trails and routes being analyzed here are local and not arterial or collector roads.

Assumptions Specific to the Wildlife Resources Analysis

All vehicle types or classes result in the same amount of disturbance effect to wildlife. Therefore, a separate analysis addressing proposed changes to vehicle class or motorized mixed use was not conducted.

The location of a route is equal to disturbance effects from that route. Assumption was made that all routes, including open ML 2 roads or motorized NFTS trails, provide the same level of disturbance unless local data or knowledge indicated otherwise.

Habitat is already impacted in the short-term. In the long-term, habitat will remain the same when associated with routes added to the NFTS. However, habitat will increase in quantity and/or quality from passive restoration when unauthorized routes are not added to the NFTS and cross-country travel is prohibited.

The road-effect zone (aka zone of influence) of any given route is equal distance on either side from center. Actual road-effect zones which vary on either side based upon slope, vegetation density, habitat suitability, prevailing winds, traffic volume, and numerous other mechanisms (Forman et al. 2002) cannot be readily factored in for this analysis.

Maintenance Level 1 (ML 1) roads, retained on the NFTS for limited administrative use and also restricted from motorized access by the public, are assumed to have no

measurable adverse effect to wildlife or associated habitat. This assumption is also applied to public access non-motorized NFTS trails.

No route is scheduled for road decommissioning under any alternative. Decommissioning of routes does occur under the vegetation management program at an average rate of 5.1 miles per year (see Introduction Section).

The spatial boundaries of the analysis are across the entire project area and account for the exclusion of wilderness, private lands, other State or Federal non-NFTS lands, and large perennial water bodies (e.g., Eagle Lake).

Winter activities using snowmobiles or other over-snow vehicles are outside the scope of this project analysis. The effects of cross-country use by snowmobiles were not analyzed.

Special events, such as enduro races or poker-runs, are outside the scope of this analysis. Those types of events could cause elevated sight and sound level disturbances to wildlife both in frequency and duration, as compared to typical use of the NFTS by individual recreational forest users.

Annual winter restrictions of motorized travel on 271 miles of groomed NFTS roads for snowmobile and cross-country skiing from December 26 to March 31 were common to all alternatives, and were therefore not analyzed.

Harvest of wildlife, legal or otherwise, is likely to increase with increased opportunity for human–animal encounters for areas having higher road density, increased access into remote areas, or concentrated recreational use (Gucinski et al. 2001). However, dispersed recreation activities (i.e., activities that occur after the motor vehicle stops, such as camping, hunting, fishing, hiking, etc.) are not part of the scope of the proposed action. The action alternatives and the analysis focus on motor vehicle use.

Vehicle collisions with terrestrial wildlife are very unlikely on local ML 1 & 2 roads, motorized NFTS trails or unauthorized routes. Exception is noted for some reptile species such as the northwestern pond turtle. The vehicle rate of speed on a ML 2 road is typically less than 25 mph; Average Daily Traffic (**ADT**) is minor, much less than the average of 15 vehicles/day ADT experienced on ML 3 roads (USDA FS PSW Region 1993: chapter 7: F-1, G-1); and ML 2 road is intended for high-clearance vehicles on native road surface. This assumption is supported by literature review and conclusions presented in Forman et al. (2002).

Data Sources

GIS layers for NFTS roads and motorized trails, routes additions to the NFTS, potential suitable reproductive habitats, and designated land allocations e.g. critical habitats.

Site-specific surveys and/or assessment for sensitive wildlife occurrences and habitats associated with route additions to the NFTS.

Route inventories collected initially for Travel Management to develop associated tabular data sets, as well as subsequent additions or deletions to the NFTS inventory database.

California Wildlife Habitat Relationship habitat layers for specific species associated with the 1999 forest vegetation layer.

Local studies, monitoring, or reports currently in progress or in wildlife program files.

Published literature

Wildlife Resources Indicators and Methods

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, Trombulek and Frissell 2000, Brown and Archuleta 2000). For each alternative, wildlife resources are analyzed for direct and indirect short-term impacts (1 year) and cumulative long-term impacts (20 years). The following indicator measures related to motorized routes located in or near special interest wildlife occurrences or habitats were used to assess the impacts of the alternatives:

e. Acres open to cross-country motorized travel;

f. Number of sensitive sites for Threatened, Endangered, and Sensitive (TES) species that occur within ¼ mile (0.4 km) of route additions to the NFTS;

g. Miles of route additions to NFTS within selected species habitats;

h. Proportion of a species group's habitat affected by routes additions to the NFTS.

i. Road density in project area from all unauthorized routes, NFTS ML 2–5 roads and motorized trails;

Each indicator is designed to be calculated in GIS queries based upon the sources of information described above.

Wildlife Resources Methodology by Action

Effects from Prohibition of Cross-country Motorized Travel

Indicator Measure #1: acres open to motorized use

Methodology: GIS analysis of existing unauthorized routes under Alternative 1 in relation to habitat.

Indicator Measure #2: miles of unauthorized routes within habitat for special-status species.

Methodology: Acreage provided for each alternative in Ch. 2 Summary Comparison of Alternatives table.

Effects from Additions to NFTS and Changes of ML-1 Roads to Motorized Trails

Indicator Measure #1: number of sensitive sites for TES species within one-quarter mile of an added route.

Methodology: GIS analysis of routes in relation to habitat and important or sensitive wildlife areas. Analysis focuses on potential suitable habitat and assumes occupancy unless it has been surveyed to protocol and found to be absent of the species.

Indicator Measure #2: miles of routes for addition to the NFTS and miles of ML 1 roads to be changed to motorized NFTS trails.

Methodology: GIS analysis of routes in relation to habitat and important or sensitive wildlife areas. Analysis focuses on potential suitable habitat and assumes occupancy unless it has been surveyed to protocol and found to be absent of the species.

Indicator Measure #3: proportion of a species group's habitat that is affected by route additions to the NFTS or changing from ML 1 to motorized trails.

Methodology: GIS analysis of routes in relation to habitat and important or sensitive wildlife areas. Analysis focuses on potential suitable habitat and assumes occupancy unless it has been surveyed to protocol and found to be absent of the species.

Effects of Changes to Existing NFTS

Indicator Measure #1: Changes to Seasons of Use – New Seasonal Restrictions

Methodology: Spatial proximity and temporal use of added routes relative to high value habitats such as nesting or fawning habitats or deer winter range.

Cumulative Effects

Area of Cumulative Effects: The project area as described in Chapter 1 is used as the area of cumulative effects.

Indicator Measure #1: miles of all motorized routes

Methodology: GIS analysis of past/current, added, and future routes in relation to habitat and important or sensitive wildlife areas, in context to other past or current and future management activities that have or may affect terrestrial habitats.

Indicator Measure #2: number of sensitive sites for TES species within one-quarter mile of all motorized routes.

Methodology: GIS analysis of past/current, added, and future routes in relation to habitat and important or sensitive wildlife areas, in context to other past or current and future management activities that have or may affect terrestrial habitats.

Indicator Measure #3: density of all motorized routes

Methodology: GIS analysis of past/current, added, and future routes in relation to habitat and important or sensitive wildlife areas, in context to other past or current and future management activities that have or may affect terrestrial habitats.

Indicator Measure #4: proportion of a 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 or sensitive wildlife areas, in context to other past or current and future management activities that have or may affect terrestrial habitats.

Affected Environment and Environmental Consequences

As described in the Botanical Resources affected environment section (Chapter 3), Lassen NF encompasses a diverse range of floristic provinces, including the Modoc Plateau, Southern Cascades, Cascade Range Foothills, and Northern Sierra Provinces. As a result, terrestrial wildlife habitats vary greatly across Lassen NF and provide for over 325 terrestrial wildlife species (USDA FS PSW Region 1993: chapter 7: appendix R). There are currently two terrestrial wildlife species listed as Threatened under the ESA and 14 listed as Forest Service Sensitive. These species and their habitats on Lassen NF are described in detail in the Biological Assessment and Evaluation for wildlife species (Frolli 2009) which can be found in the project record and is hereby incorporated by reference. In addition, there are 10 Management Indicator Species (MIS) on Lassen NF. These species and their habitats will be described in the sections below.

As shown under existing conditions for Alternative 1 in Table 145, there are 1,072,488 acres of terrestrial habitat currently available for cross-country travel. At present approximately 21.30% of the project area has very low road density and therefore is assumed to have very low probability of disturbances and high levels of solitude. This analysis provides a look at the road network effect, or the relative mesh or patch size of undisturbed habitats between open roads. A fine-meshed landscape, with smaller, numerous habitat patches and fewer large and contiguous habitat patches, is indicative of habitat fragmentation. These landscapes with high density road networks are often thought to be likely biological sinks with low wildlife biodiversity. Forman et al. (2002) suggest that road networks having the smallest ecological impact are those that maintain large roadless areas, concentrate traffic onto a small number of large roads with longer road lengths, and have less overall edge effect per mile of road traveled. Route densities for Lassen NF, as reflected by all routes, authorized or unauthorized, are predominately in the 2–4 miles per

square mile class. This moderate density class is followed by very low and low density classes.

The difference in road densities, resulting from prohibition of cross-country travel, is best reflected in comparing Alternative 1, No Action with Alternative 3, Cross-County Travel Prohibition Only – No Additions to the Existing NFTS. As shown in Table 145 at 48.91%, Alternative 3 has 8.23% more terrestrial habitat in the very low to low road density classes then Alternative 1 when cross-country prohibitions are considered. The other alternatives vary from 48.33% for Alterative 5 Modified to 48.74% for Alternative 2 in the very low to low road density classes when also accounting for routes added to the NFTS by alternative.

Across Lassen NF, important habitat attributes such as large snags and downed woody debris are generally highest in areas of very low road density and lowest in areas of moderate to high road density. Though this is due in large-part to site potential within each respective forest type, it is recognized in the Forest Plan that easily accessible areas on Lassen NF in close proximity to neighboring communities have low recruitment levels of large snags and large downed wood as shown in Figure 9 (USDA FS 2006a).

Table 145 Acres of cross-country prohibition and road density classes on terrestrial habitats under existing conditions and by each alternative

Measure		Existing Conditions	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Acres of NFS land available to cross-country travel		1,072,488 ac	0 ac	0 ac	0 ac	0 ac	0 ac
Total miles unauthorized route available to motorized vehicles		1,089 mi	0 mi	0 mi	0 mi	0 mi	0 mi
Status of cross-country travel (acres under prohibition)		No Change	1,072,440 ac	1,072,488 ac	1,072,464 ac	1,072,345 ac	1,072,364 ac
Total miles of route added to NFTS		0 mi	21 mi	0 mi	10 mi	53 mi	56 mi
Proportions of lands by road density class on NFS lands within project area.	**Road Density Classes (mi/mi²)**	**Proportion of Project Area**					
	0	21.30%	25.77%,	25.85%	25.82%	25.63%	25.60%
	0–2	19.38%	22.97%	23.06%	23.02%	22.74%	22.73%
	Very low - Low	40.68%	48.74%	48.91%	48.84%	48.37%	48.33%
	2–4	31.49%	34.34%	34.38%	34.31%	34.25%	34.27%
	4–6	19.42%	14.25%	14.15%	14.26%	14.55%	14.56%
	>6	8.41%	2.67%	2.56%	2.59%	2.83%	2.84%
	Mod – Very High	59.32%	51.26%	51.09%	51.16%	51.63%	51.67%
	Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Source: GIS query, 29 October 2009.

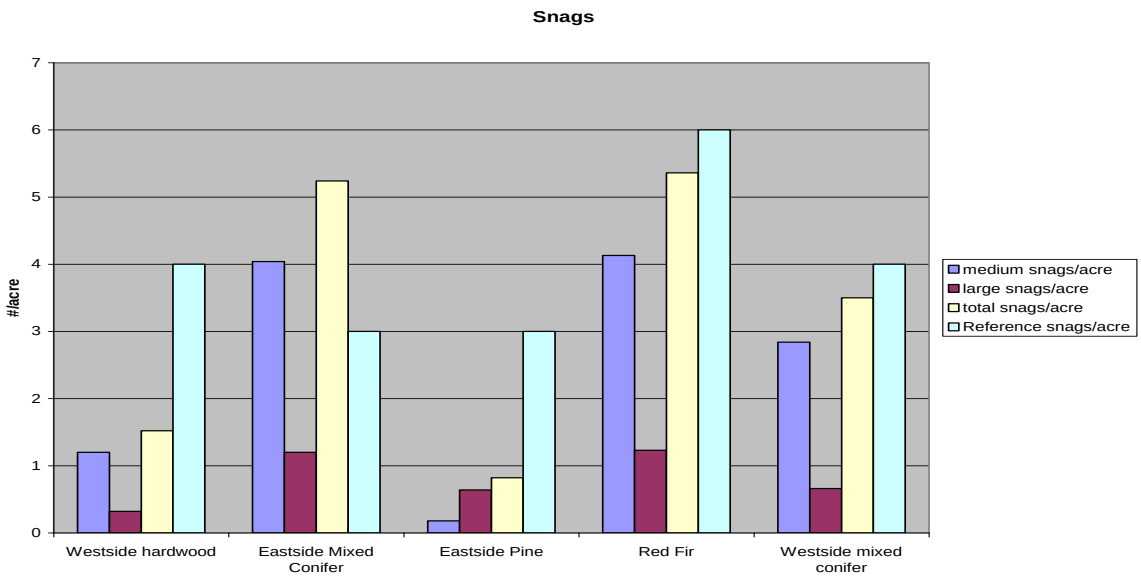


Figure 9. Average medium (15–30" dbh), large (>30" dbh), and total snag density (# snags/acre) compared with recommended snag density for each forest type identified in current snag guidelines (USDA FS PSW Region 2004)

The annual harvest of fuelwood by the public on Lassen NF has averaged 13,684 cords from 1995 to 2007. Average annual Christmas tree collection for the same period was 12,023 trees. As described in the SNFPA (USDA FS PSW Region 2004: 320), under current management for the Sierra Nevada national forests, commercial timber harvest is expected to only capture 21 percent of predicted growth. This amount of harvest amounts to less than two percent of the entire forest timber inventory.

Existing Motorized Travel Restrictions for Protection of Wildlife

Seasonal restrictions of motor vehicles within the travel management system have generally been implemented to protect watershed resources, as the primary concern. Limited Operating Periods (**LOP**) for vegetation and fuels projects are used on a regular basis to protect a number of sensitive wildlife species and their breeding habitats. Likewise, commercial grazing LOPs have been implemented in recent years for several species (e.g., Sandhill crane and willow flycatcher) that depend on meadows as breeding habitats. With the exception of the Osprey Management Area, there are no designated areas that seasonally restrict motor vehicle use for the primary purpose of providing habitat protection. The LRMP (USDA FS PSW Region 1993) recognized that the restriction of motor vehicle access within certain deer habitat areas is important to deer and other wildlife. The Record of Decision delineated about 3,900 acres in Antelope Creek Management Area (**MA**) and 1,800 acres in Brushy Mountain MA as semi-*primitive non-motorized for deer winter range. Though, efforts to enforce these* restrictions have never been implemented by forest order or other means.

The use of travel restrictions within the Osprey Management Area has been a successful management tool for protection of osprey, bald eagles, waterfowl, and shorebirds since 1971. There is public support for continuation of this travel restriction. Eagle Lake has been listed as a California Wildlife Viewing Area since establishment of the partnership initiated in the early 1990s (Clark 1992).

General Direct and Indirect Effects by Action

Effects from Prohibition of Cross-country Motorized Travel

As shown in Table 145, under Alternative 1, No Action, there would be 1,072,488 acres available for cross-country travel if the Temporary Forest Order LAS 07-35 prohibiting cross-country travel were discontinued. All action alternatives would implement a permanent prohibition on all cross-country travel except as allowed by permits or other authorizations. The total acres, across the project area, that would be under prohibition vary slightly by each action alternative: Alternative 2 at 1,072,440 acres; Alternative 3 at 1,072,488 acres; Alternative 4 at 1,072,464 acres, Alternative 5 at 1,072,345 acres; and Alternative 5 Modified at 1,072,345 acres. This variation of 0 to 124 acres is attributed to the area associated with additive width of each road prism from routes added to the NFTS or Level 1 roads changed to NFTS trails.

As stated in the biological assessment (Frolli 2009) of Temporary Forest Order LAS 07-35, “Implementation of the Order should reduce further cross country motorized wheeled vehicle travel and associated potential for soil compaction, erosion and impacts to both terrestrial and aquatic habitats in new areas. The Forest Order would not initiate or result in any ground disturbing activities. The order’s primary effect would be to deter off-road use in previously undisturbed areas. Terrestrial and aquatic wildlife habitats and associated resource conditions are expected to remain in their current condition over the short-term period that this Order is in effect. No direct, indirect, or cumulative [adverse] effects to TEP or sensitive wildlife species would occur from the administrative action of prohibiting cross country motorized wheeled use across the Forest.” A permanent prohibition, under any of the action alternatives would not cause change from that 2006 determination.

Effects from Additions to NFTS and Changes of ML-1 Roads to Motorized Trails

Effects from additions to NFTS and changes of ML-1 roads to motorized trails are analyzed in detail, in the remainder of this Wildlife Section for each wildlife group and identified species listed in Table 144. For this Wildlife Section, changes of NFTS ML-1 roads to motorized trails, is analyzed together with to route additions to NFTS; there is no distinction made between effects from either action.

Effects of Changes to Existing NFTS

As noted under assumptions, all vehicle types or classes result in the same amount of disturbance effect to wildlife. Therefore, a separate analysis addressing changes to vehicle class or motorized mixed use has not been conducted in this Wildlife Section. Other assumptions that relate to these actions are that no route is scheduled for road decommissioning under any alternative. Also, consideration special event, such as enduro races or poker-runs, are outside the scope of this analysis. Those types of events could cause elevated sight and sound level disturbances to wildlife both in frequency and duration, as compared to typical use of the NFTS by individual recreational forest users. Such events would likely require mitigations or design features during event planning.

Changes to the existing NFTS for Seasons of Use (aka New Seasonal Restrictions), are analyzed for each species by species group. New seasonal restrictions are specific to Alternatives 4, 5 and Modified 5. This proposed action has not been analyzed under the MIS section which is focused only on effects to habitat at the project level. Also, as identified under assumptions, annual winter restrictions of motorized travel on 271 miles of groomed NFTS roads for snowmobile and cross-country skiing from December 26 to March 31 were common to all alternatives, and were therefore not analyzed.

Late-successional Forest Species

The late-successional forest group is comprised of northern spotted owl, California spotted owl, northern goshawk, American marten (marten), Pacific fisher (fisher), northern flying squirrel, and sooty grouse (note: Analysis of northern flying squirrel and sooty grouse and associated habitats are provided in the *Management Indicator Species and Associated Habitats* subsection). These species are associated with late-successional forests that can be impacted by activities associated with routes. Refer to Map 26 in the Map Package for known detections. Gaines et al. (2003) conducted a literature review of 71 late-successional-forest-associated wildlife species and identified negative effects on these species that can result from route-associated factors. These impacts include direct loss of habitat from type conversion, diminished quality of habitat attributes or fragmentation, and road avoidance or displacement resulting from direct harassment or noise disturbance. Growing concern over habitat fragmentation for late-successional–forest-associated species has been expressed by individuals, environmental groups, and agency biologists. Various studies have shown that this species group is vulnerable to disturbance, changes in habitat, or displacement by habitat generalists.

As found in the Sierra Nevada Forest Plan Amendment (USDA FS PSW Region 2004), habitat types important for late-successional forest include stands typed as 4M, 4D, 5M, 5D, and 6 by California Wildlife Habitat Relationship (CWHR), which are all stands of trees greater than 11 inches dbh with greater than 40 percent canopy cover. The SNFPA provides management direction for Old Forest Emphasis Areas to maintain or develop old forest

habitat in areas containing the best remaining large blocks or landscape concentrations of old forest. Direction also includes providing for old forest functions, such as connectivity of habitat over a range of elevations to allow migration of wide-ranging old-forest-associated species.

Road- and trail-associated risk factors within late-successional-forest habitats can have the following potential effects to individuals or their habitat (Gaines et al. 2003):

Direct Effects - Site Disturbance:

- Displacement of populations or individual animals from a route, related to human activities.
- Disturbance and displacement of individuals from breeding or rearing habitats.
- Physiological response to disturbance, resulting in changes in heart rate or level of stress hormones.

Disturbances to northern spotted owl, California spotted owl, and northern goshawk were measured by determining the miles of route additions within ¼ mile of known activity centers (nest site and roost stand locations). Denning sites for marten have not been documented on Lassen NF. Therefore, site disturbance for marten has been based upon cumulative observation points from 1992 to 2005 based on a combination of systematic surveys, project surveys and anecdotal sightings. The sum of these observation points is intended for use for comparing relative effects between the alternatives and not as an estimate of marten population abundance. There have been no confirmed detections of fisher on Lassen NF in recent years; therefore, site disturbance analysis was not conducted for this species.

Indirect Effects - Habitat Modification:

- Altered or dispersed movement as caused by a route or human activities on or near a route.
- Loss or fragmentation of habitat from establishment of routes and associated human activities.
- Changes to habitat microclimates associated with the edge effect from routes.
- Reduced density of snags and down logs from fuelwood gathering facilitated by road access.
- Creation of a vector pathway for invasive species, competitors, or predators.

Analysis of indirect effects from habitat modification was based upon the road-effect zone (Forman et al. 2002) applied to the miles of road under each alternative to estimate acres of habitat removed or added to protected activity centers (PACs) or movement corridors and quality of habitat diminished or improved. Measurements of effects from route additions is measured by defining one or several road-effect zones in which habitat is physically changed or altered by noise disturbance, avoidance, edge effects, mortality, etc. Based on literature review for this group, a 60-meter (197 ft) zone (both sides of route for 120m (394 ft) total width) was selected for effects to snags, down logs, and hazard trees. A zone of 200 meters (656 ft) was used to assess potential noise disturbance.

Cumulative Effects:

Displacement of populations or individual animals from existing NFTS plus established routes, related to human activities

Loss or fragmentation of habitat from existing NFTS plus established routes and associated human activities.

Road density analysis was conducted at a project-wide scale, as shown in Table 146, to give an approximate coarse measure of habitat effectiveness for all late-successional species represented in this group. The type of impacts to these species depends on the type of route, amount and type of use, and season of use (Gaines et al. 2003). Ouren and Watts (2005) concluded that proximity of secondary routes to arterial roads, highways, and population centers has a large influence on the intensity of use on these routes; the utility of road density analysis at the low-use end of the spectrum diminishes. Although route density thresholds for late-successional-forest-associated species are not well understood, route densities are presented to compare relative effects between the alternatives.

The difference in road densities for late-successional habitats, resulting from prohibition of cross-country travel, is reflected by comparison of Alternative 1 with Alternative 3. Alternative 3 has 5.43% more habitat in the very low to low road density classes then Alternative 1 when cross-country prohibitions are considered. The other alternatives differ from Alternative 1 by 4.98% for Alterative 5 Modified to 5.37% for Alternative 4 in the very low to low road density classes which reflects the routes added by alternative.

The following criteria were used in development of a GIS query within this habitat: 1) combined CWHR vegetation types 4M, 4D, 5M, 5D, and 6 for High-capability reproductive habitats for California spotted owl, northern goshawk, and marten; 2) analysis using 100 square meters (1,076 sq ft) cells and 500-meter (1,640 ft) radius line density calculation (ESRI 2009); 3) open ML 2, 3, 4, and 5 roads, motorized NFTS trails, and route additions under each alternative; 4) exclusion of ML 1 roads restricted from to motor vehicle access; and 5) exclusion of NFS wilderness or non-NFS lands within the project boundary.

Northern Spotted Owl (NSO) and California Spotted Owl (CSO)

Spotted Owl: Affected Environment

The spotted owl (*Strix occidentalis*) occurs as a resident breeder in western North America from British Columbia south through Washington, Oregon, California, Utah, Colorado, Arizona, New Mexico, and southwest Texas to central Mexico (AOU 1998). The northern spotted owl (NSO) subspecies (*S. occidentalis* ssp. *caurina*) occurs along the Pacific Coast Range from Santa Cruz north and along the southern Cascade Range extending northward into British Columbia. As noted by Gutiérrez and Barrowclough (2005), Highway 299 is the arbitrary State of California boundary for the subspecies. Northern spotted owl is federally listed by USFWS as a threatened species. The 1990 listing decision by USFWS described

the NSO range as extending through Klamath Physiographic Province and into part of California Cascades Physiographic Province.

Table 146 Road density class proportions for late-successional forest habitats

Road Density (mi/mi²)	Percentage of NFS Lands in Project Area					
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
0	18.98	21.76	21.81	21.80	21.71	21.65
0–2	20.64	23.16	23.24	23.19	22.94	22.95
Very low – Low Subtotal	**39.62**	**44.92**	**45.05**	**44.99**	**44.65**	**44.60**
2–4	31.88	34.60	34.67	34.57	34.42	34.44
4–6	19.90	16.68	16.62	16.74	16.92	16.94
>6	8.60	3.80	3.66	3.70	4.01	4.02
Mod – Very High Subtotal	**60.38**	**55.08**	**54.95**	**55.01**	**55.35**	**55.40**
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: GIS query, 29 October 2009.

Based on genetic sampling and location data of the two subspecies, Gutiérrez and Barrowclough (2005) suggest that California spotted owl (*S. occidentalis* ssp. *occidentalis*) range should start at the Pit River, in California Cascades Physiographic Province and extend through the Sierra Nevada Physiographic Province to Kern County. The California spotted owl (CSO) also inhabits the southern part of the Coast Ranges from Monterey County to Santa Barbara County; and in the Transverse and Peninsular Ranges of southern California south to Baja (Grinnell and Miller 1944, Gould 1974, Gutiérrez et al. 1995, Verner et al. 1992). Gutiérrez and Barrowclough (2005) also reported that 82% of spotted owls sampled from the vicinity of Mount Lassen are California spotted owls based on mitochondria DNA sequencing, which is within the guidelines of the “seventy-five percent rule” for the subspecies.

The spotted owl is a forest-dwelling owl strongly associated with late-successional forests that have a complex multi-layered structure, large-diameter trees, and high overstory tree canopy (Bias and Gutiérrez 1992, Gutiérrez et al. 1995). Nest stands often have a well-developed hardwood understory (e.g., canyon live oak (*Quercus chrysolepsis*)) and a conifer overstory. However, nests on Lassen NF generally consist primarily or solely of conifers. Spotted owl habitats are consistently characterized by greater structural complexity compared to available forest habitat.

For the NSO, critical habitat area designation, totaling 12,019 acres, was established by USFWS in 1992 (USDI FWS 1992); most of which was recently removed in 2008 (USDI FWS 2008). Currently there are 448 acres of critical habitat area on Shasta-Trinity National Forest lands administered by the Lassen National Forest; most all of the actual habitat within this defined critical habitat area delineation is classified as unsuitable NSO nesting or foraging habitat. Lassen NF has 17 recorded NSO observation points from which there are

three designated NSO activity centers. The existing Late Successional Reserve (LSR) land allocations, within the established critical habitat area, define suitable nesting and foraging habitat on Lassen NF. The LSR has an area of 6,986 acres. A distribution map of NSO observations and the LSR boundary are illustrated by Map 26.

California spotted owl is a Forest Service Sensitive species and also a management indicator species for the Sierra Nevada bioregion. Lassen NF has 127 designated California spotted owl Protected Activity Centers (csoPAC) totaling 40,291 acres. A distribution map of CSO observations is illustrated by Map 26. The csoPAC is considered to be suitable for nesting and foraging. Pure eastside pine types are not considered suitable for California spotted owls. Though mostly comprised of eastside pine, several eastside mixed confer sites do occur on Eagle Lake Ranger District. There are 127,340 acres of high-capability reproduction habitat on Lassen NF (USDA FS 2006a).

Spotted Owl: Environmental Consequences

The Forest Service considers activities greater than one-quarter mile (400 meters) from a spotted owl nest site to have little potential to affect spotted owl nesting. In addition, Delaney et al. (1999) found that Mexican spotted owls were found to show an alert response to chainsaws at distances less than one-quarter mile. Results on a NSO study on the Mendocino National Forest northern California indicated that spotted owls did not flush from nest or roost sites when motorcycles were greater than 70 meters (230 ft) away and sound levels were less that 76 owl-weighted decibels (dBO) (Delaney and Grubb 2003). These findings were consistent with earlier predictions by Delaney and Grubb (2001) that spotted owls are unlikely to flush from roosts/nests when motorcycles are greater than 180m (590 ft) away. Delaney and Grubb (2003) also found that spotted owl responses to motorcycle noise depended upon an array of complex factors, including sound level and frequency distribution, stimulus distance and 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, the study results were considered insufficient to make strong conclusions or to establish reliable sound dose-response relationships or thresholds for motorcycle noise.

Spotted owls may be affected by edge effects from roads and trails when they fragment suitable habitat. Several studies indicate spotted owls are sensitive to changes in forest overstory tree canopy and habitat fragmentation (Seamans 2005, Blakesley 2003, Verner et al. 1992) that could result from a network of roads. Presence of 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 and down logs are important habitat components for spotted owls, as well as for many other species associated with old forest conditions. Forest routes can contribute to the fragmentation of old forest habitat components through the reduction of

snags and logs. Snags along local routes are prone to harvest by the public or subject to hazard tree removal by the Forest Service. Hazard trees are those trees that pose a risk of falling on a road or recreational facilities such as campgrounds and trailheads.

Northern Spotted Owl: Direct Effects of Additions to NFTS

NSO observation points and activity centers in Table 147 reflect a cumulative count of both observations and known nest sites over time for survey efforts since 1982 as reported in Lassen NF MIS report (USDA FS 2006a). Under Alternative 1, a total of five NSO observation points are within ¼ mile of an existing unauthorized route and could be at risk of disturbance if occupied. There would be potential for more frequent access and disturbance with no prohibitions to cross-country travel.

Table 147 Northern spotted owl activity centers within ¼ mile of added routes and miles of added routes that intersect NSO Critical Habitat

NSO	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Activity Centers	5	0	0	0	0	0
Route miles	1.24	0	0	0	0	0

Source: GIS query, 11Nov2009.

Under Alternative 1 and existing conditions, 1.24 miles of unauthorized route intersect critical habitat. None of the action alternatives have added routes that come within ¼ mile of an activity center or that intersect Critical Habitat.

Northern Spotted Owl: Indirect Effects of Additions to NFTS

Gaines et al. (2003) suggest a human influence scale where less than 30 percent influence in high-value habitat is rated low, 30 to 50 percent influence is rated moderate, and greater than 50 percent influence is rated high.

Based on GIS analysis summarized in Table 147 and using a road-effect zone of 60 meters (197 ft) for downed wood available to fuelwood collection, Alternative 1 would affect 59.12 acres of suitable nesting and foraging habitat for NSO. There would be no road effect to suitable NSO habitat under Alternatives 2, 3, 4, 5 and Modified 5.

As listed in Table 148 and Appendix A, the proposed action (Alternative 2),Alternative 5 and Modified Alternative 5 propose the addition on routes, totaling 4.27, 5.03 and 5.03 miles respectively, which fall within Matrix land allocations as described in the NWFP (USDA FS 1994). These routes are within the range of the NSO.

The reader should note that the Lassen NF was not included in the programmatic consultation for NSO developed under consultation between the PSW Regional Forester and USFWS (USDA FS PSW 2007). Nevertheless each route has been screened using against Project Design Criteria (PDC) from that Regional consultation in addition to analyzing effects to suitable habitat, Critical Habitat, Late Seral Reserves, and known NSO locations, although The PDCs for NSO are: 1) Staging areas are farther than ¼ mile from

northern spotted owl nests. Or, 2) staging areas within ¼ mile of occupied northern spotted owl nests are closed during the nesting season (Feb. 1 thru June 9).

Table 148 Routes additions within range of Northern spotted owl

Route	Alt 2	Alt 5	Mod 5	Comment
UNO170	0.82	0.82	0.82	No effect on designated or former Critical Habitat or existing Late Seral Reserves; No suitable habitat; No proposed OHV staging areas in action alternatives; Potential OHV noise effect to NSO individuals would not elevate existing ambient noise @ a distance greater than or equal to 10 miles.
UNO171	0.53	0.53	0.53	
UNO180	0.00	0.76	0.76	
UNO216	0.36	0.36	0.36	
UNO220	0.11	0.11	0.11	
UNO222	1.16	1.16	1.16	
UNO229	1.18	1.18	1.18	
UNO230	0.11	0.11	0.11	
Totals	**4.27**	**5.03**	**5.03**	

Under Alternative 1 for NSO, road-effect zone from noise and sight disturbance (200m; 656 ft) would affect 197.06 of 6,986 acres of habitat which at 2.8% is a low human influence rating. Under Alternatives 2, 3 and 4 area of influence is zero. For Alternatives 5 and Modified 5, area of influence is 30.20 acres. Route additions under Alternative 5 and Modified 5 are located outside of the Late Seral Reserve in the general forest matrix. Upon field review of these proposed route additions, they were determined to be: (a) Approximately 10 air miles southeast of any known occurrence of NSO. Based on findings from existing studies (Delaney and Grubb 2007, 2003, 2001) there would be no measurable elevation of ambient noise levels resulting from OHV activities across that distance to activity centers. (b) These proposed route additions are outside of former and current Critical Habitat Area. (c) These proposed routes are outside the Late Seral Reserve land allocation for NSO. (d) There is no suitable habitat - vegetation found along these routes was found to lack habitat continuity, large trees or mix of tree sizes, vertical structure or stand decadence.

Northern Spotted Owl: Direct/Indirect Effects of New Seasonal Restrictions

As illustrated on Map 12 – Alternatives 4 and 5 Seasonal Restrictions (Map Package) and listed in Appendix G, Road Use Category Tables and Appendix E, Mitigation Measures, there are no new seasonal restrictions under any alternative within the range of the northern spotted owl. Therefore, there are no direct, indirect or cumulative effects from these administrative actions to the species or its habitat.

Northern Spotted Owl: Cumulative Effects

Cumulative Effects from Action Alternatives

There are no cumulative adverse effects from any action alternative to this species.

Cumulative Effects from All Other Foreseeable Actions

As listed in Appendix C, Lassen NF is scheduled to treat a total of 38,848 acres in 2009. Additional, foreseeable fuels and vegetation treatments amount to an estimated 48,392 acres. Other activities include ongoing commercial cattle grazing (35,998 permitted AUMs;

Map 23); wildlife habitat enhancement projects (457 ac); and recreational site development (63 ac); and recreational planning (44,600 ac).

Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These projects are usually excluded from spotted owl reproductive habitat (i.e. Late Seral Reserves). Management prescriptions have emphasized recruitment of large snags and logs, as well as retention of oaks, large pines, and aspen clones, over a twenty year period. These are all important habitat attributes for spotted owl foraging habitat.

Suitable habitat for NSO falls under rigorous management guidelines identified in the Northwest Forest Plan amendment. Management activities have generally been limited to the matrix portion of that planning unit. Likewise, high-value reproductive habitat for CSO is restricted from mechanical treatments in vegetation projects.

Livestock grazing is an activity that has been discontinued within the Late Seral Reserve. Therefore there would be no effects to NSO foraging habitat.

Wildlife habitat enhancement projects are primarily fenced exclosures of riparian or meadow habitat having woody riparian species such as aspen, cottonwood, or willow. These projects would typically enhance foraging habitat and would have no effect on reproductive habitat.

Recreational site development is focused areas that have existing recreational sites. Any necessary mitigation for spotted owl has already been implemented at these sites. There would be no additional effects to individual NSO or suitable habitat.

Recreation Area planning is an administrative procedure which, in and of itself, does not have a direct effect to individual spotted owls or owl habitat.

When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires, and recreation, Alternative 1 poses the greatest risk to NSO, though the influence is low. There would be a cumulative effect to habitat fragmentation through potential loss of snags and down logs that may be removed for public safety along motorized and non-motorized routes. In addition, Alternative 1 would contribute to risk of activity center disturbance from unmanaged cross-country motorized travel.

The action alternatives diminish the cumulative effects on NSO and habitat fragmentation as reflected by reducing route densities 4.98% or more within high-value habitats. They also lower the potential risk of noise disturbance to NSO on 17 observation points and 3,530 acres of suitable habitat.

Northern Spotted Owl: Determination

It has been determined in the Biological Assessment (Frolli 2009) that Alternatives 2, 3, 4, 5 and Modified 5 would have no effect to individuals or critical habitat (either existing 2008 or former 1992 USFWS CH designations); there would be no effect to suitable habitats within Late Seral Reserve lands.

California Spotted Owl: Direct Effects of Additions to NFTS

There are 127 known CSO activity centers that could potentially be accessed and disturbed by cross-country travel. As shown in Table 149 under Alternative 1, 53 CSO activity centers are located within one-quarter mile of an existing unauthorized route and could be at risk of disturbance if occupied. Under Alternative 1, 56.58 miles of routes intersect Protected Activity Centers (PACs).

Table 149 California spotted owl activity centers within ¼ mile of added routes and miles of route that intersect CSO protected activity centers (csoPACs)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Activity Centers	53	1	0	1	8	8
Route intersect miles	56.58	0	0	0.15	1.70	2.39

Source: GIS query, 11 November 2009.

As shown in Table 149, Alternative 4, 5 and Modified 5 have 0.15, 1.70, and 2.39 miles of added routes that intersect csoPACs. Alternatives 2 and 3 do not intersect any csoPACs. Analysis summary of those csoPACs affected is described as follows:

29N21Y - Under Alternatives 5 and Modified 5, this motorized trail would intersect 0.69 miles of csoPAC TEH0128. The route would spur off of 31N17 and come within 1/8 mile to three CSO activity centers. If used year around, this motorized trail would be a moderate to high risk of noise disturbance to the activity center during breeding season. Therefore a seasonal restriction (limited operating period) from March 1 to August 15 would be applied to mitigate the potential noise disturbance down to a low risk level. Monitoring would be applied to assure compliance with the seasonal restriction, identify effects to the activity center, or allow for adjustments to the seasonal restriction.

290606UC01 - Under Alternatives 5 and Modified 5, this route intersects 0.21 miles of csoPAC PLU0059. The route would extend off of 29N14 away from the CSO activity center to a dispersed camp. This route would be a low risk of noise disturbance to the activity center. There would be no mitigations required for addition of this route.

290606UC04 - Under Alternatives 5 and Modified 5, this route intersects 0.06 miles of csoPAC PLU0059. The route would extend off of 29N14 and spur off 290606UC01 away from the CSO activity center to a dispersed camp. This route would be a low risk of noise disturbance to the activity center. There would be no mitigations required for addition of this route.

340327UC01 - Under Alternatives 4, 5 and Modified 5, this route intersects 0.07 miles of csoPAC SHA0004. This route would spur off existing 34N19 away from the CSO activity center for private land access. This route would be a low risk of noise disturbance to the activity center. There would be no mitigations required for addition of this route.

UBB889 - Under Alternatives 4, 5 and Modified 5, this route intersects 0.08 miles of csoPAC TEH0067. The route would spur off existing 34N19 away from the CSO activity

center to a dispersed camp. This route would be a low risk of noise disturbance to the activity center. There would be no mitigations required for addition of this route.

ULA059 - Under Alternatives 5 and Modified 5, this route intersects 0.06 miles of csoPAC PLU0309. The route spurs off of 26N26 to a dispersed camp. There are no identified activity centers. This route would be a low risk of noise disturbance to the activity center. There would be no mitigations required for addition of this route.

ULA061 - Under Alternatives 5 and Modified 5, this route intersects 0.11 miles of csoPAC PLU0068. The route spurs off of 26N26 to a dispersed camp. The route is greater than 0.75 miles distance from one activity center. This route would be a low risk of noise disturbance to the activity center. There would be no mitigations required for addition of this route.

ULA084 - Under Alternatives 5 and Modified 5, this route intersects 0.21 miles of csoPAC BUT0083. The route spurs off of 25N27 to a dispersed camp; this is a historic road. There are no identified activity centers. This route would be a low risk of noise disturbance. There would be no mitigations required for addition of this route.

ULA095 - Under Alternatives 5 and Modified 5, this route intersects 0.08 miles of new Butte Co-Philbrook csoPAC. The route spurs off of 25N27 to a dispersed camp; this is a historic road. There are no identified activity centers. This route would be a low risk of noise disturbance. There would be no mitigations required for addition of this route.

ULA098 - Under Alternatives 5 and Modified 5, this route intersects 0.10 miles of csoPAC BUT0035. The route spurs off of 25N08 to a dispersed camp; this is a historic road. There are no identified activity centers. This route would be a low risk of noise disturbance. There would be no mitigations required for addition of this route.

ULA219 - Under Alternatives 5 and Modified 5, this route intersects 0.72 miles of csoPAC BUT0083. The route spurs off of 25N27 to a dispersed camp; this is a historic road. There are no identified activity centers. This route would be a low risk of noise disturbance. There would be no mitigations required for addition of this route.

ULA557 - Under Alternatives 5 and Modified 5, this route is used as the northwest boundary of csoPAC LAS0025. It connects 29N46G with 29N84YA. It is approximately ¼ mile from four activity centers. This route would be a low risk of noise disturbance. There would be no mitigations required for addition of this route.

California Spotted Owl: Indirect Effects of Additions to NFTS

Based on GIS analysis summarized in Table 149 and using a road-effect zone of 60 meters (197 ft) for downed wood available to fuelwood collection, Alternative 1 would affect 2,698.34 acres of high-value habitat. Alternatives 2 and 3 would affect 0 acres. Alternative 4 would affect 7.15 acres; Alternatives 5 would affect 81.07 acres and Alternative 5 Modified would affect 113.98 acres.

Gaines et al. (2003) suggest a human influence scale where less than 30 percent influence in high-value habitat is rated low, 30 to 50 percent influence is rated moderate, and greater than 50 percent influence is rated high. Under Alternative 1, road-effect zone

from noise and sight disturbance (200m; 656 ft) to CSO habitat would affect 8994.48 of 127,340 acres which at 7.6% is a low human influence rating. Under Alternatives 2 and 3 effects would be rated as none. Under Alternative 4, area of influence would be 23.85 acres or 0.02% of high-value CSO habitat. Under Alternatives 5 area of influence would be 270.25 acres or 0.21% of high-value CSO habitat. Under Alternatives 5 Modified area of influence would be 379.93 acres or 0.30% of high-value CSO habitat. Effects from Alternatives 4, 5, and Modified 5 would be rated very low.

California Spotted Owl: Direct/Indirect Effects of New Seasonal Restrictions

As illustrated on Map 12 – Alternatives 4 and 5 Seasonal Restrictions (Map Package) and listed in Appendix G, Road Use Category Tables and Appendix E, Mitigation Measures, some of the new seasonal restrictions under Alternatives 4, 5, and Modified 5 are within suitable CSO habitat. Several of these NFTS roads either intersect established CSO PACs or are within ¼ mile of a PAC. The wet season restriction, which amounts to a 30-day extension of the winter recreation restriction, is an administrative action that would have no adverse direct or indirect effects and may have beneficial effects by further reducing risk of disturbance during the breeding season.

The restricted Season of Use to Hunting Season (August 1 to October 31) which provides access to ten NFTS roads (Table G-2) roads during the deer hunting season, is adjacent to one csoPAC (LAS0005 Chaparral Hill). Chaparral Hill csoPAC was surveyed and found active in 1990, 1991, 1992, 1993, and 1996. There is no more recent information on this csoPAC therefore it is assumed to be occupied. This hunting season road restriction is near the end of the nesting season limited operating period for vegetation management activities (March 1 through August 15). This seasonal hunter access may have direct effect to individual CSO or indirect effects to their nesting and foraging habitats, though the risk is low.

California Spotted Owl: Cumulative Effects

Cumulative Effects from Action Alternatives

Alternative 3 would have no route additions and therefore, no indirect effects. The other alternatives would each have varying degrees of indirect effects from additions to the NFTS. As shown in Table 146, when considering the existing NFTS and additions, Alternative 1 provides desirable very low to low road densities on 39.62% of late-successional forest habitats; Alternative 2 provides 44.92%; Alternative 3 provides 45.05%; Alternative 4 provides 44.99%; Alternative 5 provides 44.65%; and Alternative 5 Modified provides 44.60%. Alternative 1 poses the greatest overall risk of habitat fragmentation from cumulative effects, where the other alternatives would each have varying degrees of cumulative effects.

For the new seasonal restrictions there are no anticipated adverse direct, indirect or cumulative adverse effects from these administrative actions to California spotted owls or

their habitats. Alternatives 2 and 5 have very low cumulative risk to CSO activity centers or high value habitat; the cumulative risk under Alternatives 5 and Modified 5 are slightly higher. There is no cumulative risk under Alternative 3.

Cumulative Effects from All Other Foreseeable Actions

As listed in Appendix C, Lassen NF is scheduled to treat a total of 38,848 acres in 2009. Additional, foreseeable fuels and vegetation treatments amount to an estimated 48,392 acres. Other activities include ongoing commercial cattle grazing (35,998 permitted AUMs; Map 23); wildlife habitat enhancement projects (457 ac); and recreational site development (63 ac); and recreational planning (44,600 ac).

Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These projects are usually excluded from spotted owl reproductive habitat (i.e. csoPACs). Management prescriptions have emphasized recruitment of large snags and logs, as well as retention of oaks, large pines, and aspen clones, over a twenty year period. These are all important habitat attributes for spotted owl foraging habitat.

Suitable habitat for CSO falls under rigorous management guidelines identified in the Sierra Nevada Forest Plan amendment. High-value reproductive habitat for CSO is restricted from mechanical treatments in vegetation projects.

Livestock grazing is an ongoing activity that would have little or no effects to spotted owl foraging habitat.

Wildlife habitat enhancement projects are primarily fenced exclosures of riparian or meadow habitat having woody riparian species such as aspen, cottonwood, or willow. These projects would typically enhance foraging habitat and would have no effect on reproductive habitat.

Recreational site development is focused areas that have existing recreational sites. Any necessary mitigation for spotted owl has already been implemented at these sites. There would be no additional effects to individual owls or suitable habitat.

Recreation Area planning is an administrative procedure which, in and of itself, does not have a direct effect to individual spotted owls or owl habitat. Potato Buttes OHV riding Area and Front Country OHV Area do have suitable spotted owl habitat or any known occurrences of spotted owl. High Lakes OHV Area may have potential suitable habitat and unknown occurrences of spotted owl.

When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires, and recreation, Alternative 1 poses the greatest risk to California spotted owls, though the influence is low. In addition, Alternative 1 would contribute to risk of activity center disturbance from unmanaged cross-country motorized travel.

California Spotted Owl: Determination

Alternatives 2 and 4 would have very low risk to CSO from direct effects to 1 activity center, and indirect and/or cumulative effects to high value habitat. Alternatives 5 and Modified 5 would have slightly more risk from direct, indirect and cumulative effects. It has been determined in the Biological Evaluation (Frolli 2009) that Alternatives 2, 4, 5 and Modified 5 may affect individuals, though not likely to lead to a trend towards Federal listing; Alternative 3 would have no adverse effects.

Northern Goshawk

Northern Goshawk: Affected Environment

The northern goshawk (*Accipiter gentilis*) is designated as Forest Service Sensitive in the Pacific Southwest Region. Currently, there are 480,581 acres high-value reproduction habitats on Lassen NF (USDA FS 2006a). Goshawk territories are managed on Lassen NF as Protected Activity Centers (ngoPAC) under direction prescribed by the SNFPA (USDA FS PSW Region 2004). As reported in 2006, there are 170 designated ngoPACs on Lassen NF totaling 32,676 acres (USDA FS 2006a). A distribution map of NGO observations is illustrated by Map 26. The SNFPA (USDA FS PSW Region 2004) requires that goshawk surveys be conducted for any new vegetation management activities. Ongoing surveys have occurred since 1993 and much of the suitable habitat, within roaded, commercial forest areas has been surveyed multiple times.

Human disturbance has the potential to cause goshawks to abandon nests during the nesting and post fledging period (February 15 through September 15). Goshawks initiate breeding when the ground is still covered in snow. 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 routes are used by people. Hamann et al. (1999) recommend maintaining low road densities to minimize disturbance to goshawk. Grubb et al. (1998) reported that goshawk were found to react negatively by flushing when noise associated with logging trucks as less than 400 meters (0.25 miles) from nests. Grubb et al. (1998) also reported that vehicle traffic from roads did not elicit any discernable behavioral response from goshawk at distances exceeding 400 meters (0.25 miles) from nests.

Northern Goshawk: Environmental Consequences

Northern Goshawk: Direct Effects of Additions to NFTS Direct Effects

There are 170 known goshawk activity centers locations in the project area that could potentially be accessed and disturbed by cross-country travel. As shown in Table 150, there are currently 121 activity centers, within ¼ mile of an unauthorized route, which would be at risk of collection or disturbance if occupied.

A network of roads and trails can fragment goshawk habitat by reducing overstory tree canopy (Beier and Drennan 1997, Daw and DeStefano 2001) and by reducing forest interior

patch size. However, how habitat fragmentation from routes affects goshawk habitat suitability is not well understood. Alternative 1 intersects 364.31 miles of designated ngoPACs. Alternatives 2 and 3 do not intersect any ngoPACs. Alternative 4, 5 and Modified 5 have 0.42, 0.92, and 1.02 miles of added routes that intersect ngoPACs. Analysis summary of those ngoPACs affected is described as follows:

Table 150 Northern goshawk activity centers within 1/4 mile of added routes and miles of added routes that intersect NGO protected activity centers (ngoPACs)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Activity Centers	121	1	0	0	4	9
Route intersect miles	23.64	0	0	0.42	0.92	1.02

Source: GIS query, 11Nov2009.

340327UC03 - Under Alternatives 4, 5 and Modified 5, this route intersects 0.06 miles of Burney Spring gPAC. The route would spur off of 34N19 which is the north boundary of the PAC. This route goes to dispersed camp. No activity center has been identified. This route would be a low risk of noise disturbance. There would be no mitigation required for addition of this route.

ULA061 - Under Alternatives 5 and Modified 5, this route intersects 0.11 miles of Cottonwood Creek gPAC. The route would spur off of 26N26 which is the west boundary of the PAC. This route goes to dispersed camp. Approximately 0.08 miles of this route are within ¼ mile of one activity center and further from three other activity centers. This route would be a low risk of noise disturbance. There would be no mitigation required for addition of this route.

ULA557 - Under Alternatives 5 and Modified 5, this route intersects 0.29 miles of Fredonyer Pass gPAC. The route would connect 29N84YA with 29N46G. This route is greater than ¼ mi from the activity center; the route travels away from that activity centers. This route would be a low risk of noise disturbance. There would be no mitigation required for addition of this route.

UNC513 - Under Alternatives 4, 5 and Modified 5, this route intersects 0.27 miles of Jelly Spring gPAC. The route would spur off of 36N01 which is the south boundary of the PAC. This route goes to dispersed camp. This route is more than ½ mi from activity center. This route would be a low risk of noise disturbance. There would be no mitigation required for addition of this route.

UNW509 - Under Alternatives 4, 5 and Modified 5, this route intersects 0.09 miles of Cornaz Lake gPAC. The route would spur off of 35N35 to private property access. No activity center has been identified. This route would be a low risk of noise disturbance. There would be no mitigation required for addition of this route.

UNE436 - Under Alternative Modified 5, this route intersects 0.10 miles of Russell Dairy Spring gPAC. The route would connect 34N93 to 34N41. The route is the west boundary of

the PAC. This route goes to dispersed camp approximately ¼ mi from one activity center and further from nine other activity centers; the route travels away from all ten activity centers. This route would be a low risk of noise disturbance. There would be no mitigation required for addition of this route.

UNE643 - Under Alternatives 5 and Modified 5, this route intersects 0.10 miles of Ashurst Mountain gPAC. The route would spur off of 33N05 and is used as is the northeast boundary of the PAC. This route goes to dispersed camp greater that ½ mile from seven activity centers. This route would be a low risk of noise disturbance. There would be no mitigation required for addition of this route.

Northern Goshawk: Indirect Effects of Additions to NFTS

Under Alternative 1, ngoPACs (high-value habitat) would be reduced by 1,127.41 acres (3.45% of 32,676 acres) based upon a potential loss of snags and logs within a 60-meter (197-foot) road-effect zone for late-successional forest species. Alternatives 2 and 3 would affect zero acres, Alternative 4 would affect 20.03 acres (0.06%) of ngoPACs, Alternative 5 would affect 43.88 acres (0.13%) of ngoPACs, and Modified 5 would affect 48.64 acres (0.15%).

Using a 200-meter (656-foot) road-effect zone of noise disturbance, under Alternative 1, high-value habitat within designated ngoPACs could be diminished on 3,758 acres (11.50%) of ngoPACs. Alternatives 2 and 3 would affect zero acres; Alternative 4 would affect 66.77 acres (0.20%) of ngoPACs; Alternative 5 would affect 146.25 acres (0.45%) of ngoPACs; and Modified 5 would affect 162.15 acres (0.50%).

Potential negative impacts, within the 200-meter (656-foot) road-effect zone, include habitat avoidance due to noise disturbance, fragmented foraging habitats, and microclimate changes. Gaines et al. (2003) suggest a human influence scale where less than 30 percent influence in high-value habitat is rated low, 30 to 50 percent influence is rated moderate, and greater than 50 percent influence is rated high. Under Alternative 1, human influence is rated low for site disturbance and habitat modification. Under Alternatives 2 and 3 human influence would be rated none and all other alternatives would be rated very low.

Northern Goshawk: Direct/Indirect Effects of New Seasonal Restrictions

As illustrated on Map 12 – Alternatives 4 and 5 Seasonal Restrictions (Map Package) and listed in Appendix G, Road Use Category Tables and Appendix E, Mitigation Measures, some of the new seasonal restrictions under Alternatives 4, 5, and Modified 5 are within suitable goshawk habitat. Several of these NFTS roads either border or intersect established goshawk PACs or are within ¼ mile of a PAC. The wet season restriction, which amounts to a 30-day extension of the winter recreation restriction, is an administrative action that would have no adverse direct or indirect effects and may have beneficial effects by further reducing risk of disturbance during the breeding season.

The restricted Season of Use to Hunting Season (August 1 to October 31) provides access to ten NFTS roads (Table G-2) roads during the deer hunting season. Six of those

roads are in or near two ngoPACs (Isaac aka Susan River and Chaparral Hill). Isaac ngoPAC only has approximately 13 acres of suitable habitat remaining due to tree mortality. There have been no goshawk detects since 2000. Chaparral Hill ngoPAC had active nest sites in 187, 1988, and 1999. There is no more recent information on this ngoPAC therefore it is assumed to be occupied. The hunting season road restriction would be near the end of the nesting season limited operating period used in vegetation management (February 15 to September 15). This seasonal hunter access may have direct effect to individual goshawk or indirect effects to their nesting and foraging habitats, though the risk is low.

Northern Goshawk: Cumulative Effects

Cumulative Effects from Action Alternatives

Alternative 3 has no route additions and therefore no indirect effects. The other alternatives would each have varying degrees of indirect effects from additions to the NFTS. As shown in Table 146, when considering the existing NFTS and additions, Alternative 1 provides desirable very low to low road densities on 39.62% of late-successional forest habitats; Alternative 2 provides 44.92%; Alternative 3 provides 45.05%; Alternative 4 provides 44.99%; Alternative 5 provides 44.65%; and Alternative 5 Modified provides 44.60%. Alternative 1 poses the greatest overall risk of habitat fragmentation from cumulative effects, where the other alternatives would each have varying degrees of cumulative effects.

For the new seasonal restrictions there are no anticipated adverse direct, indirect or cumulative adverse effects from these administrative actions to northern goshawks or their habitats. Alternatives 4, 5 and Modified 5 have very low cumulative risk to ngoPACs or activity centers. There is no cumulative risk under Alternative 3.

Cumulative Effects from All Other Foreseeable Actions

As listed in Appendix C, Lassen NF is scheduled to treat a total of 38,848 acres in 2009. Additional, foreseeable fuels and vegetation treatments amount to an estimated 48,392 acres. Other activities include ongoing commercial cattle grazing (35,998 permitted AUMs; map 23); wildlife habitat enhancement projects (457 ac); and recreational site development (63 ac); and recreational planning (44,600 ac).

Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These projects are usually excluded from goshawk reproductive habitat (i.e. ngoPACs). Management prescriptions have emphasized recruitment of large snags and logs, as well as retention of oaks, large pines, and aspen clones, over a twenty year period. These are all important habitat attributes for goshawk foraging habitat.

Livestock grazing is an ongoing activity that has some effect to goshawk foraging habitat where herbaceous vegetation provides for goshawk prey species.

Wildlife habitat enhancement projects are primarily fenced exclosures of riparian or meadow habitat having woody riparian species such as aspen, cottonwood, or willow. These projects would typically enhance both reproductive and foraging habitat for goshawk.

Recreational site development is focused areas that have existing recreational sites. Any necessary mitigation for goshawk has already been implemented at these sites. There would be no additional effects to individual owls or suitable habitat.

Recreation Area planning is an administrative procedure which, in and of itself, does not have a direct effect to individual goshawks or goshawk habitat. Potato Buttes OHV riding area does not contain and Front Country OHV Area do not have any known occurrences of spotted owl or suitable habitat. High Lakes OHV Area may have unknown occurrence of spotted owl and potential suitable habitat.

When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires, and recreation, Alternative 1 poses the greatest risk to goshawk, though the human influence rating is low. There would be a cumulative effect to habitat fragmentation through potential loss of snags and down logs that may be removed for public safety along motorized and non-motorized routes. In addition, Alternative 1 would contribute to risk of activity center disturbance from unmanaged cross-country motorized travel.

Northern Goshawk: Determination

It has been determined in the Biological Evaluation (Frolli 2009) that Alternatives 2, 4, 5 and Modified 5 may affect individuals, though not likely to lead to a trend towards Federal listing; Alternative 3 would have no adverse effects.

American Marten and Pacific Fisher

Marten and Fisher: Affected Environment

Marten (*Martes americana*) prefers coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high overstory tree canopy, and an interspersion of riparian areas and meadows. Important habitat attributes are: vegetative diversity, with predominately mature forest; snags; dispersal cover; and large woody debris (Allen 1987). Spencer et al. (1983) found that martens select stands with 40 to 60 percent overstory tree canopy for both resting and foraging and avoided stands with less than 30 percent overstory tree canopy. Martens generally avoid habitats that lack overhead cover (Allen 1984), presumably because these areas do not provide protection from predators (Buskirk and Powell 1994, Spencer et al. 1983). Predation on marten by coyotes, red foxes, and great-horned owls has been documented (Ruggiero et al. 1994).

Roads and trails can fragment habitat, thus affecting the ability of marten to use otherwise suitable habitat on either side of the route. The loss and fragmentation of suitable habitat by roads and development is thought to have played a substantial role in both the loss of fishers from the central Sierra Nevada and its failure to re-colonize this area (USDI FWS 2004). Campbell (2004) found that sample units within the central and southern Sierra Nevada region occupied by fishers were negatively associated with road density. This relationship was statistically significant at multiple spatial scales (from 494 to 7,413 acres).

Dark (1997) found that fishers in the Shasta-Trinity National Forest used landscapes with more contiguous forests and less human activity.

Activities that remove large logs are therefore likely to degrade marten and fisher habitat (Buskirk and Powell 1994). Hazard tree removal along roads would reduce numbers of snags (future down logs) within a distance of about 60 meters (197 ft) alongside roads. Motor vehicle routes provide access for fuelwood gathering which can also contribute to decreased levels of snags and downed wood within route corridors.

Robitaille and Aubry (2000) studied marten in areas of low road density and found that marten use of habitat was measurably less when within 300 to 400 meters (984 to 1,312 ft) of active traffic roads than habitat use at 700 to 800 meter (2,296 to 2,624 ft) distance. Martens avoid habitats that lack overhead cover presumably because these areas do not provide protection from avian predators. Roads that are driven during the winter months provide travel corridors for coyotes to enter into marten winter habitat, affecting marten through competition or direct predation. Competition by coyotes has been identified as an important threat within lynx habitats. Since both lynx and marten have unique morphologies that allow them to occupy deep snow habitats where they have a competitive advantage over carnivores, such as coyotes and bobcats, human modifications of this habitat, such as winter road use, over-the-snow travel, and snowmobile trails, can eliminate this advantage and increase access for predators and competitors. Perrine et al. (2008) report in the Sierra Nevada Red fox conservation assessment that coyotes appear to be expanding their winter season range and identify this as a risk factor to the endemic red fox, needing further investigation; a similar risk may be present for marten.

At a landscape scale, patches of preferred habitat and the distribution of openings with respect to habitat patches may be critical to the distribution and abundance of martens (Buskirk and Powell 1994). While marten use small openings, and particularly meadows for foraging, these openings must occupy a small percent of the landscape. Martens have not been found in landscapes with greater than 25 percent of the area composed of openings (Hargis et al. 1999, Potvin et al. 2000). As landscapes become fragmented, the combination of increasing isolation and decreasing patch size of suitable habitat compounds the results of simple habitat loss (Andren 1994). For species like marten and fisher this is likely to result in a decrease of greater magnitude than can be explained solely by the loss of suitable habitat. Marten may be a species that demonstrate exponential population declines at relatively low levels of fragmentation (Hargis et al. 1999).

Potential suitable habitat for the fisher occurs primarily on the lower elevation steep slopes having an oak component typed as montane hardwood or montane hardwood-conifer habitat. As with marten habitat at the higher elevations, forest management practices and resulting roads have contributed to habitat fragmentation. Fisher generally avoids entering open areas that have no overstory or shrub covers, and also avoids roads associated with

the presence of vehicles and humans. Fishers are known to modify their behavior near active roads (USDA FS PSW Region 2001).

Marten: Environmental Consequences

The marten is designated by the Regional Forester as a Sensitive species and Management Indicator Species within the Sierra Nevada bioregion. For surveys from 1992 to 2004, 72 marten have been detected on Lassen NF. A distribution map of martin detections is illustrated by Map 26. Current ongoing marten studies being conducted by Forest Service Pacific Southwest Research have made additional detections in Lassen Volcanic National Park (LVNP), Swain Mountain Experimental Forest, and Humboldt Peak areas. Systematic surveys conducted by PSW Research suggest that persistent marten occurrences are primarily associated with late-successional habitats in and near LVNP (Zielinski et al. 2005). Based on CWHR habitat types, currently, there are 110,916 acres of high-capability reproduction habitat on Lassen NF. Existing high-capability habitat appears patchy at the forest scale (USDA FS 2006a).

Marten: Direct Effects of Additions to NFTS

Human disturbance can potentially cause marten to avoid areas. Because marten are typically associated with high-elevation, remote, and wilderness conditions, they have been considered susceptible to noise disturbance (Zielinski et al. 2007). As shown in Table 151, under Alternative 1, there are 46 observation points within one-quarter mile of existing unauthorized routes. This is a cumulative count of observations, between 1992 and 2005, not intended to make inference to population abundance. As reported in SNFPA (USDA FS PSW Region 2001), mean home range sizes in northern Sierra Nevada average 801 acres for females and 960 acres for males based on work by Spencer (1981) and Simon (1980). Spencer et al. (1983) also noted that marten activity generally occurred no more than 1267 feet from meadows and there was a strong preference for lodgepole-associated riparian areas. There is no data specific to natal den site locations; collection of such data is generally problematic and cost prohibitive. For this assessment, the assumption has been made that detection sites could be within a marten's home range and potentially cause noise disturbance to den sites.

Table 151 Marten observations within 1/4 mile of added routes

Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
46	3	0	2	9	9

Source: GIS query, 29Oct2009

As listed in Table 152, Alternative 2, 4 and 5 have 0.38, 0.37 and 1.36 miles of route within ¼ mile of a marten detection or observation point; no breeding den sites have been verified or recorded on the Lassen NF.

Table 152 Route additions within ¼ mile of American marten observation.

Route	Alt 2	Alt 4	Alt 5	Mod 5	Comment
UBB858	0.00	0.00	0.02	0.02	No den sites have been verified or recorded within the vicinity of any proposed route. Given short distances, frequency and duration of noise disturbance is anticipated to be absent or of short duration when natal or maternal dens would be occupied (Feb-July).
UBB860	0.05	0.00	0.05	0.05	
UBB861	0.08	0.00	0.00	0.00	
UBB867	0.00	0.00	0.08	0.08	
UBC021	0.10	0.00	0.10	0.10	
ULA079	0.00	0.04	0.04	0.04	
ULA158	0.08	0.00	0.08	0.08	
ULA234	0.00	0.33	0.33	0.33	
ULA461	0.00	0.00	0.59	0.59	
UNE394	0.07	0.00	0.07	0.07	
Totals	**0.38**	**0.37**	**1.36**	**1.36**	

Source: GIS query, 29Oct2009.

Marten: Indirect Effects of Additions to NFTS

Using a 60-meter (197-foot) road-effect zone, diverse forest stand structure with an abundance of large woody debris such as snags, downed logs, and root masses is an essential component of marten habitat. This structure is especially important during the winter months when marten use subnivian structures for cover and hunting opportunities. Large logs with cavities provide rest and den sites for marten. Under Alternative 1, routes intersect 69.65 miles (Table 153) of high-value reproductive habitat for marten. High-capability habitat for marten is possibly reduced by 3,322 acres (3.0% of 110,916 ac) based upon a potential loss of snags and logs within a 60-meter (197-foot) road-effect zone for late-successional forest species. This acre amount could increase over time with continued cross-country travel and possible route proliferation. However, a rate of habitat conversion is not known and may be overshadowed by other processes such as stand-replacement wild fires.

Table 153 Miles of routes within marten highly-suitable reproductive habitat.

Habitat Attribute	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Highly suitable	69.65	1.75	0	1.09	3.65	3.95

Source: GIS query, 29Oct2009.

Based on information from Table 153 and using a road-effect zone of 60 meters (197 ft) for downed wood available to fuelwood collection, Alternative 1 would affect 3,322 acres of moderate- to high-value marten habitat. Alternative 2 would affect 84 acres; zero acres would be affected under Alternative 3; 52 acres under Alternative 4; 174 acres under Alternative 5, and 188 acres under Alternative 5 Modified.

Under Alternative 1 for marten, the road-effect zone from noise and sight disturbance (200 meters; 656 ft) would affect 11,072 of 110,916 acres (USDA FS 2006a) which, at 10%, is a low human influence rating. Under Alternative 2, the area of influence would be 278 acres or 0.25% of high-value marten habitat. No acres would be affected under Alternative 3. Under Alternative 4, the area of influence would be 52 acres or 0.05% of high-value marten habitat. Under Alternative 4, the area of influence would be 174 acres or 0.16% of high-value marten habitat.

As part of an ongoing effort to study marten on Lassen NF, connectivity analysis is being conducted by Kirk and Zielinski (n.d.) using the least-cost pathway concept described, among others, by Crooks and Sanjayan (2006). This Kirk analysis indicates the habitat corridor between reserve patches where reproductive habitat is most prevalent. The width of the corridor could support what is thought to be an effective home range for the Lassen areas if high-capability reproductive habitats were to increase along the delineated pathway. Currently the corridor is dominated by moderately suitable habitat. Mean home range sizes in the northern Sierra Nevada average 801 acres for females and 960 acres for males (USDA FS PSW Region 2001) based on work by Spencer (1981) and Simon (1980). As shown in Table 154, forty-two miles intersect the predictive corridor for marten between habitat reserves from Thousand Lakes Wilderness to LVNP to Bucks Lake Wilderness. It is anticipated that this level of route miles would remain static or decrease slightly over time with road decommissioning related to vegetation and fuels projects.

Table 154 Miles of routes within the top 25 percent least-cost pathways corridor from habitat reserve to habitat reserve for marten

Habitat Attribute	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Least-cost Corridor	42.26	0.08	0	0.66	0.99	0.99

Source: GIS query, 29Oct 2009.

Under Alternative 1 using a 200-meter (656-ft) road-effect zone, the quality of High-capability habitat for marten would be diminished on 11,072 acres (10.0% of 110,916 ac). Potential negative impacts within the 200-meter (656-ft) road-effect zone include habitat avoidance due to noise disturbance and increased risk of encounters with predators.

Marten: Direct/Indirect Effects of New Seasonal Restrictions

As illustrated on Map 12 – Alternatives 4 and 5 Seasonal Restrictions (Map Package) and listed in Appendix G, Road Use Category Tables and Appendix E, Mitigation Measures, all of the new seasonal restrictions under Alternatives 4, 5, and Modified 5 are within suitable marten habitat. The wet season restriction, which amounts to a 30-day extension of the winter recreation restriction, is at the higher elevations of Almanor District where marten detections have occurred. This administrative action would have no adverse direct or

indirect effects and may have beneficial effects by further reducing risk of disturbance during the breeding season.

The restricted Season of Use to Hunting Season (August 1 to October 31) which provides access to 10 NFTS roads (Table G-2) roads during the deer hunting season, is in low suitability marten habitat. There have been no marten detections within 10 air miles of those NFTS roads. This seasonal hunter access may have direct effect to individual marten or their foraging habitats, though the risk is very low.

Marten: Cumulative Effects

Cumulative Effects from Action Alternatives

High route density classes on Lassen NF are found to overlap moderate to low capability reproductive marten habitats. Route densities that exceed two miles per square mile account for 51 percent of late-successional habitat within the project areas (Table 146). Lower route densities correlate strongly with least-cost corridor analysis from Thousand Lakes Wilderness down through LVNP, and south to Bucks Lake Wilderness on Plumas NF. Alternative 3 has no route additions and therefore no indirect effects. The other alternatives would each have varying degrees of indirect effects from additions to the NFTS, ranging from 1.75 miles under Alternative 2 to 3.95 miles under Alternative 5 Modified (Table 153). Likewise, miles of added route within a modeled least-cost pathway corridor show less than a mile of route under Alternative 5 and Modified 5 and less for the other alternatives (Table 154).

As shown in Table 146, when considering the existing NFTS and additions, Alternative 1 provides desirable very low to low road densities on 39.62% of late-successional forest habitats; Alternative 2 provides 44.92%; Alternative 3 provides 45.05%; Alternative 4 provides 44.99%; Alternative 5 provides 44.65%; and Alternative 5 Modified provides 44.60%. Alternative 1 poses the greatest overall risk of habitat fragmentation from cumulative effects, where the other alternatives would each have varying degrees of cumulative effects.

For the new seasonal restrictions there are no anticipated adverse direct, indirect or cumulative adverse effects from these administrative actions to marten or their habitats. Alternatives 4, 5 and Modified 5 have very low cumulative risk to marten. There is no cumulative risk under Alternative 3.

Cumulative Effects from All Other Foreseeable Actions

As listed in Appendix C, Lassen NF is scheduled to treat a total of 38,848 acres in 2009. Additional, foreseeable fuels and vegetation treatments amount to an estimated 48,392 acres. Other activities include ongoing commercial cattle grazing (35,998 permitted AUMs; Map 23); wildlife habitat enhancement projects (457 ac); and recreational site development (63 ac); and recreational planning (44,600 ac).

Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic

wildfires. These projects are usually excluded from suitable marten reproductive habitat (i.e. late seral reserves). Management prescriptions have emphasized recruitment of large snags and logs, as well as retention of oaks, large pines, and aspen clones, over a twenty year period. These are all important reproductive and foraging habitat attributes for marten.

Livestock grazing have some effects to interspersed forest riparian areas and meadows that are important marten foraging habitat. There are currently 11 active cattle grazing allotment on Lassen NF that have high-value habitat for marten. The grazing seasons range from June 15 to October 31. Grazing permits are required to adhere to range readiness and utilization standards on montane meadows and riparian areas. Residual forage standards are also used to assure adequate cover for meadow voles, pocket gophers, and ground squirrels.

Wildlife habitat enhancement projects, at the higher elevations, are primarily fenced exclosures of riparian or meadow habitat having woody riparian species such as aspen, cottonwood, or willow. These projects would typically enhance both reproductive and foraging habitat for marten.

Recreational site development is focused areas that have existing recreational sites. Ongoing human activity and noise at these sites have likely rendered any historic marten habitat as unsuitable. There would be no significant expansion of these sites or anticipated additional effects to individual marten or suitable habitat in proximity to these recreation sites.

Recreation Area planning is an administrative procedure which, in and of itself, does not have a direct effect to individual marten and associated habitats. Potato Buttes OHV Riding Area and Front Country OHV Area do not have suitable marten habitat or known occurrences of marten. High Lakes OHV Area has potential suitable habitat and likely has occurrence of marten.

Marten: Determination

When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from vegetation/fuels projects, grazing, wildfires, and recreation, Alternatives 2, 4, 5 and Modified 5 would have almost no level of risk to marten with levels of influence on less than 0.1% of the high suitability habitat. It has been determined in the Biological Evaluation (Frolli 2009) that Alternatives 2, 4, 5 and Modified 5 may affect individuals, but are not likely to lead to a trend towards Federal listing. There would be no effect to either species under Alternative 3.

Fisher: Environmental Consequences

The Pacific fisher (*Martes pennanti pacifica*) is designated by the Regional Forester as a Forest Service Sensitive species. U.S. Fish and Wildlife Service (USFWS) has classified fisher as a Candidate Species for consideration to federally list. Between 1992 and 2004, no fishers have been detected from survey efforts by Lassen NF personnel or systematic surveys conducted in 2002 by PSW Research (Zielinski et al. 2005). However, two recent

confirmed fisher detections have been made, one in Malinda Gulch on Chalk Mountain (Shasta-Trinity NF) approximately five miles southwest of the administrative boundary and ten miles west of Lake Britton (Garcia and Associates 2009) and the other north of Goose Mountain within the 2009 Goose Fire perimeter two miles southeast of the administrative boundary (Burton pers. Comm.). Other known occurrences on Shasta-Trinity NF approximately 30 miles northwest of Lake Britton. It has been concluded by Zielinski et al. (2005) that Lassen NF falls within an area considered a distribution gap within the range of the fisher. Based on CWHR habitat types, there are 336,790 acres of high-capability reproduction habitats for fisher on Lassen NF (USDA FS 2006a). However, this acreage figure is in contrast to habitat predictive models developed by Carroll (2005) and Davis et al. (2007). Using the Klamath/Shasta predictive model as recommended by personal communication with the co-author, William Zielinski, and a probability of detection greater than 60 percent, 25,278 total acres of high-capability reproduction habitats were calculated to be within the project area. This acreage is fragmented and discontinuous across the landscape. It is uncertain whether fisher could persist in this habitat matrix under the current conditions. The assessment of fisher habitat in this document has been be based on the predictive model acreage, which best fits actual habitat conditions on Lassen NF.

Areas on Lassen NF having a combination of fewer roads, higher canopy cover, and physical structure are typically more abundant in steep slopes and canyons on the Sierran portion of Lassen NF (e.g., North Fork Feather River) and Rock Creek—Srewdriver Creek, draining east off of Chalk Mountain into the Pit River west of Lake Britton.

Fisher: Direct Effects of Additions to NFTS

As with marten, human disturbance can potentially cause fisher to avoid areas. However, fishers are typically associated with relatively lower elevation. As shown in Table 155, under all alternatives there are no verified observation points within one-quarter mile of existing unauthorized routes; likewise, no breeding den sites have been verified or recorded on the Lassen NF.

Table 155 Fisher observations within 1/4 mile of added routes

Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
0	0	0	0	0	0

Source: GIS query, 29Oct2009.

Given the absence of any recent fisher detections within the project area, it is presumed that there would be no direct effects to the species from any action alternative.

Fisher: Indirect Effects of Additions to NFTS

In 2008 Sierra Pacific Industries (SPI) entered into a *Candidate Conservation Agreement with Assurances* with USFWS for release of fisher in the Stirling Management Area (SPI 2008). U.S. Fish and Wildlife Service has informed the Forest Service that releases are scheduled for December 2009 (Macfarlane pers comm.). As part of an ongoing effort to

anticipate fisher re-occupation of habitats on Lassen NF, connectivity analysis is being conducted by Kirk and Zielinski (n.d.) using predicted fisher habitat suitability modeling and the least-cost pathway concept described, among others, by Crooks and Sanjayan (2006). This Kirk analysis indicates the habitat corridor between suitable habitat patches where future occupation would most likely be successful. The width of the corridor could support what is thought to be an effective home range for the Lassen areas if high-capability reproductive habitats were to increase along the delineated pathway. Currently the corridor is dominated by low suitability habitat.

Under Alternative 1, routes intersect 4.38 miles (Table 156) of high-value habitat for fishers. High-value habitat acreages were derived from habitat predictive modeling adapted from Davis et al (2007) for the Klamath/Shasta region. The road-effect zone from noise and sight disturbance (200 meters; 656 ft) would affect 697 of 25,278 acres which, at 2.8%, is a very low human influence rating. Under Alternative 2, the area of influence would be 18 acres or 0.07% of high-value fisher habitat. No acres would be affected under Alternative 3. Under Alternative 4, the area of influence would be 1.67 acres or 0.007% of high-value fisher habitat. Under Alternative 5 and Modified 5, the area of influence would be 42 acres or 0.017% of high-value fisher habitat.

Table 156 Miles of routes within Pacific fisher high-suitable habitat as modeled at a home-range scale of 10 km sq and a probability of fisher detection at greater than or equal to 60 percent.

Habitat	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Highly suitable	4.38	0.12	0	0.01	0.27	0.27

Source: GIS query, 29Oct2009

Fisher: Direct/Indirect Effects of New Seasonal Restrictions

As illustrated on Map 12 – Alternatives 4 and 5 Seasonal Restrictions (Map Package) and listed in Appendix G, Road Use Category Tables and Appendix E, Mitigation Measures, there are no new seasonal restrictions under any alternative within suitable habitat for fisher; nor have there been any confirmed detections of fisher on the forest. Therefore, there are no direct, indirect or cumulative effects from these administrative actions to the species or its habitat.

Fisher: Cumulative Effects

Cumulative Effects from Action Alternatives

High route density classes on Lassen NF are found to overlap moderate to low capability reproductive fisher habitats. Route densities that exceed two miles per square mile account for 51 percent of late-successional habitat within the project areas (Table 146). Lower route densities correlate strongly with least-cost corridor analysis from Feather River Canyon on Plumas NF, north to Chalk Mountain and Pit River Canyon on the Shasta-Trinity NF. Habitat

connectivity for fisher is an important consideration and limitation within the project area. Delineated least-cost pathway corridors have yet to be completed for this species.

Alternative 3 has no route additions and therefore no indirect effects. The other alternatives would each have varying degrees of indirect effects from additions to the NFTS, ranging from 0.01 miles under Alternative 4 to 0.27 miles under Alternative 5 Modified (Table 156). As shown in Table 146, when considering the existing NFTS and additions, Alternative 1 provides desirable very low to low road densities on 39.62% of late-successional forest habitats; Alternative 2 provides 44.92%; Alternative 3 provides 45.05%; Alternative 4 provides 44.99%; Alternative 5 provides 44.65%; and Alternative 5 Modified provides 44.60%. Alternative 1 poses the greatest overall risk of habitat fragmentation from cumulative effects, where the other alternatives would each have varying degrees of cumulative effects. Adverse or beneficial effects to fisher habitat, under any action alternative, would be very minor.

For the new seasonal restrictions there are no anticipated adverse direct, indirect or cumulative adverse effects from these administrative actions to fisher or their habitats. Alternatives 4, 5 and Modified 5 have very low cumulative risk to fisher. There is no cumulative risk under Alternative 3.

Cumulative Effects from All Other Foreseeable Actions

Livestock grazing have some effects to interspersed forest riparian areas and meadows that are important fisher foraging habitat. High-value fisher habitats analyzed here are within off-base or deferred areas not subject to vegetation projects. Of primary concern at these lower elevations and steep topography is the risk of fire, as is evident this fire season (2008). There are currently 3 active cattle grazing allotment on Lassen NF that have high-value habitat for fisher. The grazing seasons range from June 15 to October 31. Grazing permits are required to adhere to range readiness and utilization standards on montane meadows and riparian areas. Residual forage standards are also used to assure adequate cover for meadow voles, pocket gophers, and ground squirrels.

Wildlife habitat enhancement projects, at the lower elevations, are primarily black oak release or enhancement, or management of chaparral types to create more heterogeneity in the vegetative structure. These projects would typically enhance reproductive, resting and foraging habitat for fisher.

Recreation Area planning is an administrative procedure which, in and of itself, does not have a direct effect to individual fisher and associated habitats. Front Country OHV Area has limited suitable fisher habitat which may become occupied when fishers are released on private lands in the Sterling City area in December 2009.

Fisher: Determination

When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from vegetation/fuels projects, grazing, wildfires, and recreation, Alternatives 2, 4, 5 and Modified 5 would have almost no level of risk to future introduced fisher with

levels of influence on less than 0.1% of the high suitability habitat. It has been determined in the Biological Evaluation (Frolli 2009) that Alternatives 2, 4, 5 and Modified 5 may affect individuals, but are not likely to lead to a trend towards Federal listing. There would be no effect to either species under Alternative 3.

Wide-Ranging Carnivores

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). Black bear is noted as a management emphasis species in the LRMP (USDA FS PSW Region 1993), with guidelines for road densities. Sierra Nevada red fox (*Vulpes vulpes necator*) and California wolverine (*Gulo gulo luteus*) are considered sensitive to the presence of humans and human activities (Claar et al. 1999, Grinnell et al. 1937). Black bear (*Ursus americanus*) is a habitat generalist, relatively common on Lassen NF and across the Sierra Nevada bioregion. Carnivore surveys indicate that black bear are well-distributed across potential suitable habitat within Lassen NF (USDA FS 2006a). In 2002, a first round of systematic carnivore surveys (Zielinski et al. 2005) was completed across the Sierra Nevada. Black bear had frequencies of detection that exceeded the sample units. Sierra Nevada red fox are known to occur on Lassen NF and are considered to be very rare across the Sierra Nevada. In contrast to black bear, there were no detections of red fox in the systematic survey across the Sierra Nevada. The only recent detections of red fox are in and around the perimeter of Lassen Volcanic National Park (NP) (Perrine 2005). Likewise, wolverines have not been detected in the Sierra Nevada systematic survey. As a result, Zielinski et al. (2005) conclude that these two species may be extirpated or occur in extremely low numbers in areas that were sampled. However, in February 2008, a single male wolverine was detected on Tahoe NF (McKelvey et al. 2008). The same animal was detected about 15 miles from the first detection site in December 2008 (Sierra Pacific Industries 2009). Follow-up genetics analysis indicates that the animal is not a native wolverine but belongs to the genetic group which inhabits the Rocky Mountains, Canada, and Alaska. The origin of the animal is uncertain from this genetic evidence.

Route-associated risk factors within habitats for wide-ranging carnivores can have the following potential effects to individuals or their habitat (Gaines et al. 2003):

Direct Effect - Site Disturbance:

- Displacement or avoidance away from human activity on or near roads.
- Displacement of individual animals from breeding or rearing habitat.
- Physiological response to disturbance resulting in changes in heart rate or level of stress hormones.

Indirect Effect - Habitat Modification:

- Habitat loss and fragmentation.

Reduction in density of snags and down logs due to removal near roads.

Increased access for predators or competitors that would not have existed otherwise.

Cumulative Effects:

Displacement of populations or individual animals from existing NFTS plus established routes, related to human activities

Loss or fragmentation of habitat from existing NFTS plus established routes and associated human activities.

As with the late-successional forest species group, low route density areas appear to correlate with areas having high-capability reproductive habitat for these three carnivores. Road density analysis indicates that densities exceeding two miles per square mile account for 53.82% of combined black bear, red fox, and wolverine high-reproduction habitat types within the project areas (Table 157). Lower route densities correlate strongly with the islands of high elevation, montane and subalpine habitats between Thousand Lakes Wilderness to the north, through Lassen Volcanic NP and south to Bucks Lake Wilderness on Plumas NF. High-quality habitats peripheral to the park have had SN red fox and black bear detections, in Caribou Wilderness to the west, Eskimo Hill to the northwest, and Mineral to the southwest (Kirk and Zielinski, n.d.).

The difference in road densities for wide-ranging carnivore habitats, resulting from prohibition of cross-country travel, is reflected by comparison of Alternative 1 with Alternatives 2 and 3. Alternatives 2 and 3 have 4.47% more habitat in the very low to low road density classes then Alternative 1 when cross-country prohibitions are considered. The other alternatives differ from Alternative 1 by 4.37% for Alternatives 5 and Modified 5 to 4.46% for Alternative 4 in the very low to low road density classes, which reflects the routes added by alternative.

Table 157 Road density class proportion for wide-ranging carnivore habitats

Road Density (mi/mi²)	Percentage of NFS Lands in Project Area					
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
0	23.32%	26.40%	26.40%	26.38%	26.38%	26.38%
0–2	22.85%	24.24%	24.24%	24.25%	24.16%	24.16%
Very Low – Low Subtotal	**46.17%**	**50.64%**	**50.64%**	**50.63%**	**50.54%**	**50.54%**
2–4	29.88%	31.23%	31.28%	32.27%	31.16%	31.16%
4–6	18.24%	14.86%	14.85%	13.85%	15.05%	15.05%
>6	5.71%	3.27%	3.23%	3.25%	3.25%	3.25%
Mod – Very High Subtotal	**53.83%**	**49.36%**	**49.36%**	**49.37%**	**49.46%**	**49.46%**
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00 %**

Source: GIS query, 29Oct2009.

Black Bear

Black Bear: Affected Environment

The black bear is an emphasis species on Lassen NF for 20 specified management areas which have related road management guidelines as recommended by CDFG biologist Tim Burton (Shimamoto and Airola 1981). California Wildlife Habitat Relationships (CDFG 2008b) describes black bear habitats as dense, mature stands of forest habitats, and black bears feed in a variety of habitats including brushy stands of forest, valley foothill riparian areas, and wet meadows. Habitat requirements include large trees and various cavities, hollows in trees, snags, stumps, logs, uprooted trees, talus slopes, or earth dens. Large undeveloped blocks of habitat, where bears would encounter few humans in the core areas within these blocks, are assumed to be important for black bear. On Lassen NF there are 25,617 acres of high-capability habitat as illustrated on Map 27. Moderate reproductive habitats are much more prevalent at 730,851 acres (USDA FS 2006a).

Very little research has been conducted on the impacts to black bears from low-volume motorized routes. Therefore, impacts to black bears from activities on local roads and motorized NFTS trails are not well understood. Effects concluded from road studies vary considerably. In Idaho, black bears are reported to respond to increases in road density by shifting their home ranges to areas of lower road densities (Young and Beecham 1986). In Montana, Kasworm and Manley (1990) found that black bears avoided habitat within 274 meters (899 ft) distance of active roads; bears were more likely to be displaced by open roads than by trails. Beecham and Rohlman (1994) reported that bears overall preferred to stay more than 50 yards (150 ft) away from roads in Idaho. A study in North Carolina indicated that road density had no affect in bear movement within their home ranges (Brody and Pelton 1989). Increased road density likely has an indirect impact on bears by increasing bear–human interaction, such as providing increased access to hunters. Bear harvest varies by habitat and accessibility to bear habitat.

Route density thresholds for black bear are not readily available in literature. However, Lassen NF habitat capability model for black bear is based on recommendations by CDFG (Shimamoto and Airola 1981) where preferred black bear habitat (high capability) has road densities below 0.5 miles per square mile, and moderate habitat capability has road densities below five miles per square mile. Gaines et al. (2003) reported various groups using a high–medium–low level of human influence on core grizzly bear management units using a 500-meter (1,640-foot) road-effect zone. Less than 55 percent of core habitat unaffected equates to high effect; 55 to 70 percent of core habitat unaffected equates to moderate effect, and greater that 70 percent core habitat unaffected equates to low effect.

Black Bear: Environmental Consequences

Black Bear: Direct Effects of Additions to NFTS

During survey for forest carnivores, black bear have been commonly detected at nearly all camera bait stations, within forested habitats, across the Lassen NF (USFS FS 2006a).

Using a systematic sampling of 344 sampling units across the Southern Cascade and Sierra Nevada (including Lassen NF), Zielinski et al (2005) had 55.8% detections of black bear. Given the ubiquitous nature of black bear detections, an analysis added routes to bear observation points was not conducted for this assessment.

In general terms, as human access increases, the potential for negative human interactions with bears also increases. Negative bear–human interactions have primarily occurred at campgrounds, ski resorts, developed recreational facilities, etc. As bear populations across the Sierra Nevada continue to increase, bear–human interactions on Lassen NF are also expected to increase. Bear mortalities may result from repeated negative bear–human interactions. Overall, the number of bear killed as a result of these negative encounters, regulated hunting, and illegal poaching is not expected to affect the overall bear populations in the Sierra Nevada (CDFG 2004a).

Black bear: Indirect Effects of Additions to NFTS

As shown in Table 158, 9.87 miles potentially affect black bear habitat. Under Alternative 1, using the road-effect zone of 500-meter (1,640 ft), noise and sight disturbance would affect 3,922 of 119,916 acres (USDA FS 2006a) which, at three percent, is a low human influence rating. There would be no area of influence under Alternatives 2 and 3. Alternative 4 would influence 32 acres, and Alternatives 5 and Modified 5 would influence 163 acres which are all very low disturbance levels.

Table 158 Miles of routes within high-value reproductive habitat for black bear

Habitat Attribute	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Highly suitable	9.87	0	0	0.08	0.41	0.41

Source: GIS query, 02Apr2009.

Using a road-effect zone of 60 meters (197 ft) for downed wood available to fuelwood collection, Alternative 1 would affect 471 acres of high-value bear habitat. Under Alternatives 2 and 3, zero acres would be affected within the 60 meters; under Alternative 4, there would be 3.8 acres of road effect; and under Alternatives 5 and Modified 5, there would be 19.6 acres of road effect.

Black Bear: Direct/Indirect Effects of New Seasonal Restrictions

As illustrated on Map 12 – Alternatives 4 and 5 Seasonal Restrictions (Map Package) and listed in Appendix G, Road Use Category Tables and Appendix E, Mitigation Measures, all of the new seasonal restrictions under Alternatives 4, 5, and Modified 5 are within suitable black bear habitat. The wet season restriction, which amounts to a 30-day extension of the winter recreation restriction, is at the higher elevations of Almanor District where black bear are common. This administrative action would have no adverse direct or indirect effects and may have beneficial effects by further reducing risk of disturbance during the breeding season.

The restricted Season of Use to Hunting Season (August 1 to October 31) provides access to 10 existing system roads during the deer hunting season. This seasonal hunter access, on 12 miles of road within moderate suitability black bear habitat, would have negligible effect to black bear, during legal pursuit of game by bear/deer hunters afoot.

Black Bear: Cumulative Effects

Cumulative Effects from Action Alternatives

Under Alternative 1, continued use of current routes and cross-country travel would facilitate higher hunter access during bear season, though the season is closely regulated for bear harvest quotas.

When cross-country prohibitions are accounted, Alternatives 2 and 3 have 4.47% more high value habitat in the very low to low road density classes then Alternative 1. When accounting for the routes added by alternative, Alternatives 5 and Modified 5 would move 4.37% of high-value habitat to low density levels; Alternative 5 would move 4.46% of high-value habitats to low road density levels.

Cumulative Effects from All Other Foreseeable Actions

As listed in Appendix C, Lassen NF is scheduled to treat a total of 38,848 acres in 2009. Additional, foreseeable fuels and vegetation treatments amount to an estimated 48,392 acres. Other activities include ongoing commercial cattle grazing (35,998 permitted AUMs, Map 23); wildlife habitat enhancement projects (457 ac); recreational site development (63 ac); and recreational planning (44,600 ac).

Across the Sierra Nevada, black bear populations have increased and the range of black bear has expanded. Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. Management prescriptions have emphasized recruitment of large snags and logs, as well as retention of oaks, large pines, and aspen clones, all important habitat attributes for bears.

Livestock grazing would have minor effects to bear foraging in meadow and riparian habitats. Opportunity for depredation conflicts have been low and infrequent, given that the calving period is usually completed at the base ranch before coming onto the allotment with cow/calf pairs.

Wildlife habitat enhancement projects are primarily fenced exclosures of riparian or meadow habitat having woody riparian species such as aspen, cottonwood, or willow. These projects would typically enhance foraging habitat for black bear.

Recreational site development is focused areas that have existing recreational sites. Ongoing human activity and noise at these sites have likely attracted black bear. There would be no significant expansion of these sites or anticipated additional effects to individual black bears or suitable habitat in proximity to these recreation sites.

Recreation Area planning is an administrative procedure which, in and of itself, does not have a direct effect to individual marten or fisher and associated habitats. All three OHV

areas, Potato Buttes, Front Country, and High Lakes have potential suitable habitat and known occurrence of black bear.

When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from grazing, vegetation/fuels projects, wildfires, and recreation, Alternative 1 poses the greatest risk to bear, though the risk from human disturbance is relatively low. All action alternatives have very low risk from human disturbance to this species.

Sierra Nevada Red Fox and California Wolverine

Sierra Nevada Red Fox and Wolverine: Affected Environment

SN red fox and wolverine are wide-ranging carnivores that use a variety of vegetation types; SN red fox and wolverines are known to use dense forest cover for travel and rest, though both species use openings to a greater extent than marten or fisher (USDA FS PSW Region 2001). Both species appear to select high elevation areas that are relatively free from human disturbance. Both species have regional Forest Service Sensitive status. The current distribution, population status, and origin of SN red fox remain uncertain (Lewis et al. 1993, Perrine et al. 2007b). However, genetic analysis provides strong evidence that the small population of SN red fox in the vicinity of Lassen Volcanic NP is the indigenous Sierra Nevada subspecies and not related to the lower elevation red fox populations in the San Francisco Bay area, San Joaquin Valley, and in Southern California (Perrine et al. 2007b). SN red fox require a composite of habitats that include open forest, montane meadows, fell field/talus slopes, meadows, and riparian areas in a conifer forest matrix. They use log or rock structures adjacent to meadows as denning habitat. At high elevations, historic and present grazing has affected fox foraging habitat. Low prey availability is thought to cause larger territory size, low-density distribution, low reproductive success and low survival rates (USDA FS PSW Region 2001).

The population densities of SN red fox can vary by several orders of magnitude depending upon abundance of food resources. Densities are thought to range from one fox per hectare (2.47 acres) in good habitats to one fox per 4,000 hectares (9,884 acres) in poor habitats (Lloyd 1980). The home range of SN red fox is unknown. Other subspecies are reported to have home ranges that vary from 1,700 to 4,000 acres; this subspecies of red fox is assumed to have larger home ranges, given the limitation of its prey base at these high elevations.

In the Sierra Nevada, wolverine has been known to occupy habitats from 4,000 to over 10,000 feet elevation. As mentioned above, until just recently, no verified sightings of wolverine have been documented within the State of California since the 1920’s. Incidental, unconfirmed sightings of wolverine have been reported throughout the Sierra Nevada including Lassen NF. Habitat for this species occurs in subalpine conifer habitats interspersed with meadows. Studies indicate that home ranges in North America may vary from less than 38.6 square miles to over 347.5 square miles.

As described by Perrine et al. (2008), SN red fox are thought to be very susceptible to indirect effects of human activities in their high elevation habitats. Higher road densities and increased human activity could potentially facilitate dispersal of non-native red foxes into historic SN red fox range. Such conditions are also thought to favor coyote expansion into remote areas; non-native fox and coyotes are known to thrive in human-altered environments. Risks from recreation are associated primarily with likelihood of scrap food and trash which cause fox to develop begging habitats and thereby increasing the probability of conflict with humans, pet dogs, etc.

Wolverines are known to be sensitive to humans and road-associated factors, but are not necessarily affected by summer recreation trails. Gaines et al. (2003) reported that wolverines may be displaced from natal dens in subalpine cirques as a result of winter recreation activities. Road- and trail-associated factors that may affect wolverine include reduction in down logs, trapping, disturbance at a specific site, and vehicle collisions. Road density can be used as a relative measure of human influence on the wolverine.

Because there is considerable uncertainty about effects to these two species, current direction requires project analysis within a 5-mile radius of any verified detection of red fox or wolverine.

Road construction and increased human settlement in the Sierra Nevada has the potential to facilitate the dispersal of non-native red foxes into the historic range of the red fox, by providing access to areas previously unavailable to the exotic foxes. Roads provide a potential travel corridor for valley foxes to move into SN red fox habitat. Although the tolerance of Sierra Nevada red fox to the presence of humans is an unknown, it is evident that the non-native red foxes thrive in human-altered environments (Lewis et al. 1999, Kamler and Ballard 2002). Route density thresholds for SN red fox have not been established, and are hard to determine because of the rarity of this species and its elusive behavior patterns. Wolverine is known to avoid areas having a concentrated human presence; security habitat is best provided where route densities are the lowest.

Sierra Nevada Red Fox and Wolverine: Environmental Consequences

Sierra Nevada Red Fox: Direct Effects of Additions to NFTS

SN red fox den sites locations have not been found or documented on Lassen NF; discovering or locating dens is problematic. A summary count of 25 detections has occurred between 1980 and 2008 within 1/4 mile of any route as listed under Alternative 1 in Table 159. This amounts to 5.68 miles of route within ¼ mile of a detection and 345 mile of route within 5 miles of any detection.

As listed in Table 160 , Alternative 2, 4, 5 and Modified 5 would add 0.13, 0.07 and 0.07 miles of route, respectively, within ¼ mile of a historic SN red fox detection site. No den sites have been detected within the vicinity of any of these added routes so the actual affects to denning SN red fox is speculative. However, given very short distances for each of these routes, the time of year they would likely be used (mid-summer through fall seasons), and

anticipated low frequency and duration of vehicle traffic, it is assumed that noise disturbance would be absent or very minimal duration during breeding period (January 1 through June 30).

Table 159 SN red fox observations within 1/4 miles added routes and miles of added routes within ¼ mile and 5 miles of an observation

Sierra Nevada red fox	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Observations within ¼ mile	25	2	0	0	2	2
Route miles within ¼ mile	5.68	0.12	0.00	0.00	0.07	0.07
Route miles within 5 miles	345	7.31	0.00	2.00	18.94	20.55

Source: GIS query, 12Nov2009.

Table 160 Route additions within ¼ mile of SN red fox observation

Route	Alt 2	Alt 5	Mod 5	Comment
UBB858	N/A	0.02	0.02	Short spur off 32n19 to access dispersed camp. Within ½ mile of Hwy 44.
UBB860	0.05	0.05	0.05	Short spur off 31N25A to access dispersed camp. Near Stephens Camp.
UBB861	0.08	N/A	N/A	Short spur off 31N25A to access dispersed camp. Near Stephens Camp.
Totals	0.13	0.07	0.07	

Source: GIS query, 12Nov 2009

Sierra Nevada Red Fox: Indirect Effects of Additions to NFTS

For this analysis a total of 7,519 acres of high-value habitat is found within the project area as illustrated on Map 27. Habitat modification was measured using a 60-meter (197-foot) road-effect zone. Analyzing for habitat fragmentation pertains to loss of snags and down logs along routes within mature and late-successional lodge pole, red fir, and subalpine habitat classified as 5D CWHR types. Snags and down logs are important habitat components for wolverine and red fox. Habitat fragmentation, as measured by potential impacts to snags and down logs that may be removed for fuel wood collection or public safety, is determined by estimating the road-effect zone within 60 meters (197 ft) of motorized routes open to vehicular travel. Under existing conditions, 1.62 miles of motorized routes are within high-suitability red fox and wolverine habitat (Table 161). This mileage of unauthorized routes equates to habitat lost in the amount of 77 acres.

Table 161 Miles of route within highly suitable habitat for red fox and wolverine

Habitat Attribute	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Highly suitable	1.62	0	0	0	0	0

Source: GIS query, 29Oct2009

A 200-meter (656-foot) road-effect zone was used as a measure for analyzing noise disturbance, displacement from competitors, or increased risk of predation. Under existing conditions, 258 acres of high-suitability reproductive habitat would be at risk of displacement from breeding or rearing habitat from noise disturbance or vulnerability to coyote predation.

The addition of unauthorized routes to be included as part of the NFTS is evaluated by each alternative as it relates to habitat fragmentation for wolverine and red fox. From a landscape perspective, Alternative 1 would contribute to the highest amount of potential habitat fragmentation though loss of snags and down logs is very low at 0.01% of 7,519 acres of subalpine late-successional forest habitat.

Sierra Nevada Red Fox: Direct/Indirect Effects of New Seasonal Restrictions

As illustrated on Map 12 – Alternatives 4 and 5 Seasonal Restrictions (Map Package) and listed in Appendix G, Road Use Category Tables and Appendix E, Mitigation Measures, all of the new seasonal restrictions under Alternatives 4, 5, and Modified 5 are within suitable SN red fox habitat. These wet season restrictions, in effect, make 30-day extension of the winter recreation restriction. This administrative action would have no adverse direct or indirect effects and may have beneficial effects by further reducing risk of disturbance during the breeding season.

The restricted Season of Use to Hunting Season (August 1 to October 31) which provides access to 10 NFTS roads (Table G-2) roads during the deer hunting season, is in low suitability SN red fox habitat. There have been no SN red fox detections within 5 miles of those NFTS roads. This seasonal hunter access may have direct effect to individual SN red foxes or their foraging habitats, though the risk is very low.

Sierra Nevada Red Fox: Cumulative Effects

Cumulative Effects from Action Alternatives

Given the remote nature of this species, road densities are found to be lowest in high elevation habitat areas. Much of the suitable habitat on Lassen NF is outside the project area and is within wilderness or roadless areas of Lassen Volcanic NP. Only two SN red fox and no wolverine detection sites are found within ¼ mile of any route addition under Alternatives 2, 5 and Modified 5; there are no observations within ¼ mile of route additions under Alternatives 3 and 4 (Table 159). Under Alternative 1, there was 1.62 miles of routes in high-value habitat. That amounts to a habitat modification on about 77 acres and potential noise disturbance on 258 acres (Table 161). Under all action alternatives, there would be no road-influence within high-value suitable habitat.

Cumulative Effects from All Other Foreseeable Actions

As listed in Appendix C, Lassen NF is scheduled to treat a total of 38,848 acres in 2009. Additional, foreseeable fuels and vegetation treatments amount to an estimated 48,392 acres. Other activities include ongoing commercial cattle grazing (35,998 permitted AUMs, Map 23); wildlife habitat enhancement projects (457 ac); and recreational site development (63 ac); and recreational planning (44,600 ac).

The cumulative effects to red fox include activities from vegetation and fuels management, livestock grazing, developed recreation sites, winter over-snow vehicle program, and future development the High Lakes Recreation Area travel management plan.

Given the high elevations in which preferred habitat occurs, current vegetation and fuels projects are generally limited in scope. Most high-value habitat is in off-base or deferred lands or areas unsuitable for timber production. Approximately 2,296 gross acres of vegetation and fuels projects include some suitable habitat for SN red fox.

There are currently seven active cattle grazing allotments on Lassen NF that have moderate- to high-value habitat for red fox. The grazing seasons range from June 15 to October 31; outside the breeding season for this species. Grazing permits are required to adhere to range readiness and utilization standards on montane meadows and riparian areas. Residual forage standards are also used to assure adequate cover for meadow voles, pocket gophers, mice, and ground squirrels.

Wildlife habitat enhancement projects are primarily fenced exclosures of riparian or meadow habitat having woody riparian species such as aspen, cottonwood, or willow. These projects would typically enhance foraging habitat for red fox.

Recreational site development is focused on areas that have existing recreational sites. Ongoing human activity and noise at these sites have likely rendered any historic SN red fox or wolverine habitat as unsuitable; or conversely these sites may attract red fox a risk development of habitual begging behavior. There would be no significant expansion of these sites or anticipated additional effects to individual red fox and associated suitable habitat in proximity to these recreation sites.

Potato Buttes OHV Riding Area and Front Country OHV Area do not have suitable SN red fox habitat, or known occurrences of the species. Further analysis of the High Lakes Recreation Area for recreational OHV opportunities would require careful consideration for staging areas and dispersed campsites. Though systematic surveys have not detected either species in the High Lakes Recreation Area, renewed survey efforts using a more strategic grid pattern may prove beneficial in finding new detections of SN red fox. Wet season restrictions, if applied to the High Lakes area, would help minimize any noise disturbance during the breeding season.

When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from vegetation/fuels projects, grazing and recreation, Alternative 1 poses the greatest risk to SN red fox; though the risk from human disturbance is relatively low, any risk to an individual may be significant given the rarity of this species. Continued use of current routes and cross-country travel could facilitate noise disturbance into remote areas which are important for security habitat. For Alternatives 2, 4, 5 and Modified 5, the increased risk of noise disturbance or habitat modification in high- and moderate-value SN red fox and wolverine habitats is very low.

Sierra Nevada Red Fox: Determination

Under all action alternatives, the risk to individuals or their habitat would be very low or nonexistent. There would be no road-influence, under any action alternative, within high-value suitable habitat. It has been determined in the Biological Evaluation (Frolli 2009) that

Alternatives 2, 4, 5 and Modified 5 may affect individuals, though not likely to lead to a trend towards Federal listing. Alternative 3 would have no effect on this species.

Wolverine: Direct Effects of Additions to NFTS

There are no verified detections of wolverine within ¼ mile or a 5-mile radius of any route additions to the NFTS or ML-1 roads proposed for change to motorized trail (Table 162). Excepting for the anomaly of one recent wolverine detection on the Tahoe NF, the species is thought to be extirpated from the Sierra Nevada. The likelihood that noise disturbance from any route addition, under the action alternatives, would disturb a transient wolverine is possible, though very low.

Table 162 Wolverine observations within 1/4 mile and five miles of added routes

Wolverine	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Within ¼ mile (400m)	0	0	0	0	0	0
Within 5 miles (8045m)	0	0	0	0	0	0

Source: GIS query, 29Oct2009.

Wolverine: Indirect Effects of Additions to NFTS

Refer to the above subsection on Indirect Effects to Sierra Nevada red fox.

Wolverine: Direct/Indirect Effects of New Seasonal Restrictions

Refer to the above subsection on SN Red Fox: Direct/Indirect Effects of New Seasonal Restrictions.

Wolverine: Cumulative Effects

Cumulative Effects from Action Alternatives

Given the remote nature of this species, road densities are found to be lowest in high elevation habitat areas. Much of the suitable habitat on Lassen NF is outside the project area and is within wilderness or roadless areas of Lassen Volcanic NP. No wolverine detection sites are found within the project area. Under Alternative 1, there was 1.62 miles of routes in high-value habitat. That amounts to a habitat modification on about 77 acres and potential noise disturbance on 258 acres (Table 161). Under all action alternatives, there would be no road-influence within high-value suitable habitat.

Cumulative Effects from All Other Foreseeable Actions

Refer to the above subsection on Cumulative Effects to Sierra Nevada red fox. In addition, the use of snowmobiles, especially during late winter and early spring, is of particular concern for any re-establishment of wolverine populations in the Sierra Nevada. Of particular note, in the SNFPA (USDA FS PSW Region 2001) is the need to maintain or improve connectivity between the northern Sierra Nevada to the Cascades and Klamath Mountains. This portion of the range lacks the alpine habitats found in the central and southern portions of the range. These lower elevations have more overall year-round human activity.

Wolverine: Determination

Under all action alternatives, the risk to individuals or their habitat would be very low or nonexistent. There would be no road-influence, under any action alternative, within high-value suitable habitat. It has been determined in the Biological Evaluation (Frolli 2009) that Alternatives 2, 4, 5 and Modified 5 may affect individuals, though not likely to lead to a trend towards Federal listing. Alternative 3 would have no effect on this species.

Ungulates

Both the black-tailed and Rocky Mountain mule deer, referred to collectively here as mule deer (*Odocoileus hemionus*) are included in the ungulate group. Pronghorn (*Antilocapra americana*) and Rocky Mountain elk (*Cervus elaphus* ssp. *nelsoni*) also occur on Lassen NF in small numbers. Rocky Mountain elk from Montana were introduced Shasta County circa 1913; migration may also occur from Oregon, Idaho and Nevada (Meredith et al. 2007). Elk inhabits parts of the northern portions of Lassen NF, in small numbers, in Siskiyou, Shasta, Modoc, and Lassen Counties and is a potential hybrid zone for the Roosevelt and Rocky Mountain subspecies (ibid 2007). Elk currently occupy habitat primarily within McCloud Flats Deer Herd area with small satellite herds moving into Cow Creek and West Lassen Deer Herd areas. The California Department of Fish and Game's Northeastern California Rocky Mountain elk hunt zone includes Lassen NF lands north of Highway 299 (CDFG 2008a). Effects or benefits of route management to elk is be discussed in common with management of these deer herd areas.

Pronghorn is an inhabitant of sagebrush-scrub, sagebrush-grass, pinyon-juniper, and ponderosa pine-bitterbrush communities. Agricultural habitats include perennial pasture, alfalfa, and grain fields. Optimal habitat is roughly 40–60 percent grass, 10–30 percent forbs, and 5–20 percent shrub cover; low vegetation of up to 38 centimeters (15 inches) is preferred (CDFG 2008b, Sundstrom et al. 1973, Autenrieth 1983, Yoakum 1978). Pronghorn migrate to areas with minimal snow accumulation during the fall and early winter. In California, pronghorn seasonally migrate between summer and winter ranges up to 93 miles. Pronghorn rely on speed, keen eyesight, and the ability to detect moving predators at long distances, to escape to open habitats. They use shrubs and rolling topography for hiding cover (Yoakum 1978).

Direct Effects - Site Disturbance:

- Physical interference in dispersal or movement as posed by a route or by human activities on a route.
- Spatial shifts in populations or individuals away from human activities on or near a route.
- Displacement of individuals from a specific location being used for reproduction and rearing young.

Physiological response to disturbance, resulting in changes to heart rate or levels of stress hormones.

As adopted from Gaines et al. (2003), ungulates respond to recreation activities by avoiding areas near roads and other human activities. Human disturbance can be of particular concern when it occurs on ungulate winter range or in spring rearing areas. Route-associated risk factors within habitats for ungulates can have the following potential effects to individuals or their habitat:

In general, mule deer move away, or flight response, from an approaching person and usually allow a person in or on a vehicle to get closer than a person on foot (Freddy et al. 1986). One study found that ATVs altered deer feeding and use patterns, and these deer produced fewer young the following year (Yarmaloy et al. 1988). 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 arterial, surfaced roads more than secondary roads, and also avoid roads at greater distances in open habitats as opposed to areas with vegetative or topographic cover (deVos 2003). Various studies have shown that mule deer displace at distances ranging from 200 to 800 meters (one-eighth to one-half miles), depending upon the road type, traffic levels, and surrounding habitats (Perry and Overly 1977, deVos 2003).

Pronghorn have similar, if not more sensitive, flight response than mule deer. In Utah, Taylor and Knight (2003) found that pronghorn exhibited a 70% probability of flushing from recreationists within 100 meters from trails either hiking or biking; pronghorn exhibited a greater response than mule deer or bison. The response was measurable out to 400 meters; they suggest a 200-meter road influence off of trails to assess disturbance effects (100-meters either side of road). In Alberta, Gavin and Komers (2006) reported that pronghorn show a higher level of vigilance near high traffic roads (> 200 vehicles/week). They suggested that pronghorn may perceive lower traffic roads and distances > 300 meters from roads as habitats with lower predation risks. Gavin and Komers also found that pronghorn, in closer relative proximity to roads, were in higher relative shrub cover.

Indirect Effects - Habitat Modification:

Loss and fragmentation of habitat due to establishment of routes and associated human activities.

Physical barriers such as livestock fences, cattleguards, road railings, and other barriers associated with travel corridors not designed to allow easy passage for deer or pronghorn.

Fences, arterial roads, highways, railings and other barriers associated with travel corridors that are not designed to allow easy passage for deer or pronghorn can be detrimental to both. Large die-offs can occur during severe winters, especially if barriers to migration

routes prevent deer and pronghorn from moving into snow-free areas. These road design features generally are not associated with local routes.

Cumulative Effects:

Displacement of populations or individual animals from existing NFTS plus established routes, related to human activities

Loss or fragmentation of habitat from existing NFTS plus established routes and associated human activities.

Road density has traditionally been used as an indicator for habitat effectiveness models for ungulates (Perry and Overly 1977, Thomas 1979). These models indicate that as open road density increases deer, elk, and pronghorn use declines (Thomas 1979, Witmer and deCalesta 1985, Salwasser 1980).

Thomas (1979) used data from Perry and Overly (1977) to develop a deer habitat effectiveness model based on road densities. The model indicated that a 20 percent loss in habitat effectiveness occurred when road densities were about 2 mi/mi² on deer summer range. At road densities of 6 mi/mi², habitat effectiveness declined by 50 to 95 percent depending on the road types. Increased exposure to vehicle sight and noise disturbances are likely to relate directly to displacement of populations or individual animals. These road-effects are especially problematic when they occur on deer winter range, migration corridors, or summer fawning and rearing habitats. The Western Association of Fish and Wildlife Agencies (WAFWA) recommends that road densities in forested habitats be limited to less than or equal to 1.9 mi/mi² and less on deer winter range (Hayden et al. 2008). As mentioned in other sections, the type of impacts to these species depends on the type of route, amount and type of use, and season of use (Gaines et al. 2003). Proximity of secondary routes to arterial roads and population centers has a large influence on their intensity of use; utility of road density analysis at the low-use end of the spectrum diminishes (Ouren and Watts 2005).

The difference in road densities for ungulate habitats, resulting from prohibition of cross-country travel, is reflected by comparison of Alternative 1 with Alternative 3. Alternative 3 has 12.94% more habitat in the very low to low road density classes then Alternative 1 when cross-country prohibitions are considered. The other alternatives differ from Alternative 1 by 12.18% for Alternative 5 Modified to 12.8% for Alternative 4 in the very low to low road density classes which reflects the routes added by alternative.

Mule Deer

Mule Deer: Affected Environment

Direction for mule deer is given for 43 of 48 management areas in the LRMP, a reflection of the local biological and socio-economic importance of this keystone species. Lassen NF occupies three mule deer ecoregions as delineated in the North American Mule Deer Conservation Plan developed by the Western Association of Fish and Wildlife Agencies

(MDWG 2004): (1) California woodland chaparral along the foothills of the Central Valley; (2) Northern Boreal Forest from the Sierra Nevada up through the California Cascades; and (3) Intermountain West from Pine Creek and Susan River drainages to the east. Mule deer is designated a Management Indicator Species, by the Forest Service, for the Sierra Nevada bioregion for oak-associated hardwood and hardwood/conifer habitats (see MIS section). Mule deer use a mix of all successional stages, though more important habitat types are characteristically early successional forests, oak woodland, and shrublands.

Table 163 Road density class proportions for ungulate habitats

Road Density (mi/mi²)	Percentage of NFS Lands in Project Area					
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
0	18.31%	25.09%	25.18%	25.07%	24.74%	24.74%
0–2	20.21%	26.20%	26.28%	26.25%	26.01%	25.96%
Very Low – Low Subtotal	**38.52%**	**51.29%**	**51.46%**	**51.32%**	**50.75%**	**50.70%**
2–4	33.15%	35.95%	35.88%	35.81%	35.95%	35.99%
4–6	19.08%	11.56%	11.51%	11.69%	12.00%	12.01%
>6	9.25%	1.20%	1.15%	1.18%	1.30%	1.30%
Mod – Very High Subtotal	**61.48%**	**48.71%**	**48.54%**	**48.68%**	**49.25%**	**49.30%**
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Source: GIS query, 29Oct2009

As illustrated on Map 28, Lassen NF is predominately higher elevation summer range, with notably important, low-elevation winter range for the East Tehama herd in Tehama County and the McCloud Flats herd around Lake Britton in Shasta County. The East Tehama herd is noted as having the longest migration distance in the state; management of roads in relation to migration corridors is an important consideration.

Lassen NF has portions four Deer Assessments Units (CDFG et al. 1998) and eight deer herds within its administrative boundary as listed in Table 164: Bucks Mountain, Cow Creek, Doyle, East Lassen, East Tehama, McCloud Flats, Sloat, and West Lassen (CDFG 1984a, 1983a, 1985, 1982, 1981, 1983b, 1984b, 1984c). Most of Lassen NF, 89 percent, is summer range for these herds. Preferred fawning areas have low road densities, adequate hiding cover within one-quarter mile (400m) of water and lightly grazed riparian areas (Shimamoto and Airola 1981). There are 358,267 acres of moderate-quality habitat on Lassen NF; there is much less highly suitable habitat at 60,266 acres. The combination of moderate- and high-quality habitats totals 418,533 acres (USDA FS 2006a). Lost Creek MA and Crater MA are noted in the LRMP (USDA FS PSW Region 1993) as critical fawning areas.

Table 164 High-value mule deer summer and winter range within project area

Herd Area	High Value Habitat Total Acres	High-Value Summer Range w/in Project	High-Value Winter Range w/in Project
Bucks Mtn.	40,600	36,976	3
Cow Creek	241,801	224,879	16,922
Doyle	8,295	7,738	557
East Lassen	89,299	89,299	0
East Tehama	339,385	301,058	38,327
McCloud Flats	87,231	58,986	28,245
Sloat	24,723	24,723	0
West Lassen	24,472	24,472	0
Totals	**852,185**	**768,131**	**84,054**

Source: USDA FS 2600 Deer files; CDFG GIS; CDFG Deer Herd Management Plans 1981–1985; GIS query, 11.3.09.

Generally, road densities on Lassen NF are at or below medium habitat requirements for deer (2.5-6.0 mi/mi²) and pronghorn (2.0-4.0 mi/mi²) as described in the LRMP (USDA FS PSW Region 1993); though above contemporary recommendations by WAFWA (< 1.9 mi/mi², Hayden et al. 2008). As shown in Table 163, sixty-one percent of ungulate habitats fall in the moderate to high densities classes. Areas of concern, as noted in the LRMP and illustrated on the road density map for Alternative 1 (Project Record), include the following management areas (MA): 5-Ladder, 10-Summit, and 6-Black Jack. Areas specified to keep densities at or below 2.0 mi/mi² include 11-Ebey MA, 12-Harvey MA, 13-Ashurst MA, and 23-Campbell MA.

Mule Deer: Environmental Consequences

For this project, site disturbance was analyzed based on the risk factor of noise disturbance to highly suitable deer fawning habitat. Given that the Lassen NF is predominately deer summer range.

Gaines et al. (2003) recommended analyzing road effects by applying a zone of influence distance at 900 meters (2,952 ft) on deer summer range for roads having less than or equal to one vehicle per day (< 1 vehicle/day). They recommended an increased zone of influence at 1,000 to 1,300 meters (3,280 – 4,264 ft) when average vehicle use exceeds two vehicles per day.

On deer summer range, Gaines et al. (2003) recommended analyzing road effects by applying a zone of influence distance at 300 meters (984 ft) for motorized trails and up to 900 meters (2,952 ft) on low traffic roads (< 1vehicle/day) depending on terrain and hiding cover; an 800 meter distance was suggested for deer winter range.

Mule Deer: Direct Effects of Additions to NFTS

To measure potential disturbance to deer during the fawn-rearing period, a 900-meter (2,952 ft) road-effect zone was used to determine the proportions of spring and summer

fawning habitat that could occur in or near Riparian Conservation Areas (RCAs) as shown by miles and acres of road-effect in Table 165.

Table 165 Miles of routes within RCAs in or near highly suitable fawning habitat

Habitat Type	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
All RCAs	191.91	3.70	0	2.51	11.18	11.29
Perennial Stream RCAs	37.54	0.37	0	0.87	2.33	2.33
Wet Meadow RCAs	29.92	0.12	0	0.35	1.66	1.66
Acres of highly suitable fawning habitat within 900-meter road effect zone						
All RCAs	137,285.01	2,646.84	0	1,795.56	7,997.74	8,076.73
Perennial Stream RCAs	26,854.67	264.68	0	622.36	1,666.79	1,666.79
Wet Meadow RCAs	21,403.61	85.84	0	250.38	1,187.50	1,187.50

Source: GIS query, 29Oct2009

For analysis of deer summer and winter range, a 800-meter (2,624 ft) zone of influence was applied to both deer summer and winter for all route additions to the NFTS based on the assumption that overall average vehicle use would be less than or equal to one vehicle per day on ML 2 roads or motorized trails. The proportion of each deer herd's winter and summer range habitats occurring within this road-effect zone was determined for each alternative. As shown in Table 166, unauthorized routes intersect 92.6 miles of deer winter range and 995.7 miles of deer summer range for a total of 1,088.3 miles.

In contrast to road-effect zones, areas less influenced by motorized route effects are considered security habitat. For alternative comparison purposes, a disturbance index to rank alternatives is described in Gaines et al. (2003), where: 1) greater than 70 percent of deer range outside the zone has a low level of influence; 2) 50 to 70 percent of deer range outside the zone has a moderate level of influence; and 3) less than 50 percent of deer range outside the zone would constitute a high level of influence.

As shown in Table 167, when considering high-value deer range with infrequent traffic (less than one vehicle per day) there is a high level of influence from unauthorized routes at 63.99% on summer range and 70.07% on winter range. If traffic volume were to increase to greater than one vehicle per day, level of influence would be even greater. Under all action alternatives, route additions have very low levels of influence on deer summer and winter range; Alternative 3 has no level of influence.

Table 166 Miles of added routes that occur on high suitability mule deer habitat

Deer Herd	Range	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Bucks Mtn	Summer	14.6	0	0	0	0.2	0.2
	Winter	0	0	0	0	0	0
Cow Ck.	Summer	298.9	11.6	0	3.5	20.0	20.0
	Winter	21.5	0	0	0	0.2	0.2
Doyle	Summer	3.1	0	0	0	0.3	0.3
	Winter	2.2	0	0	0.1	0.1	0.1
E. Lassen	Summer	112.0	1.6	0	1.9	9.0	9.0
	Winter	0	0	0	0	0	0
E. Tehama	Summer	237.2	4.5	0	1.5	18.1	19.8
	Winter	16.4	0	0	0.2	1.8	1.8
McCloud Flats	Summer	43.4	0.8	0	0	0.8	1.3
	Winter	52.5	0.5	0	0	1.3	1.3
Sloat	Summer	8.1	0	0	0	1.1	0.3
	Winter	0	0	0	0	0	0
W. Lassen	Summer	278.4	1.5	0	2.9	6.6	7.1
	Winter	0	0	0	0	0	0
Subtotal	Summer	995.7	20.0	0	9.7	56.1	58.8
	Winter	92.6	0.5	0	0.4	3.4	3.4
Total		**1088.3**	**20.5**	**0**	**10.1**	**59.4**	**62.1**

Source: GIS query, November 3, 2009.

Table 167 Road-effect acres on high-value mule deer range within project area

Range	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Summer deer range totaling 988,374 acres within project area						
Total road-effect acres	632,483	12,718	0	6,174	11,359	11,906
Percent Disturbance	63.99%	1.29%	0%	0.62%	1.15%	1.20%
Disturbance Rating	High	Very Low	None	Very Low	Very Low	Very Low
Winter deer range totaling 84,054 acres within project area						
Total road-effect acres	58,893	309	0 ac	247	2,228	2,228
Percent Disturbance	70.07%	0.37%	0%	0.29%	2.65%	2.65%
Disturbance Rating	High	Very Low	None	Very Low	Very Low	Very Low

Source: USDA FS 2600 Deer files; CDFG GIS; CDFG Deer Herd Management Plans 1981–1985; GIS query, 11.3.09.

The 1992 LRMP recognizes that the restriction of motor vehicle access within certain deer habitat areas is important to deer and other wildlife. The LRMP Record of Decision (USDA FS PSW Region 1993) delineated about 3,900 acres in Antelope Creek MA and 1,800 acres in Brushy Mountain areas as semi-primitive non-motorized (deer winter range), and other semi-primitive motorized areas. However efforts to enforce these restrictions have

never been implemented by forest order or other means. Other areas, notably Crater and Logan Mountains, and Lost Creek have important deer fawning areas, though no specific forest management direction or seasonal restrictions are in place to enhance or protect these habitats (Table 168).

Table 168 Existing wheeled motor vehicle restrictions by Management Area, LNF

Management Area	Deer Herd Area	Reason for Restriction	LRMP Direction
19-Crater	West Lassen Herd	Fawning area	Close selected roads on Crater and Logan Mountains to protect deer fawning
17-Lost Creek	Cow Creek Herd	Fawning area	Enhance critical deer fawning habitat

Source: USDA FS PSW Region 1993.

Mule Deer: Indirect Effects of Additions to NFTS

As shown in Table 165, Alternative 1 would have a high level of influence across winter and summer range, as well as, potential disturbance to 137,285 acres of high-suitability fawning habitat. If vehicle use levels were to rise from less than or equal to one vehicle per day to more than one vehicle per day, anticipated levels of influence would be even greater. As compared to Alternative 1, Alternatives 2, 4, 5 and Modified 5 rate at very low levels of influence. As shown in Table 165, these alternatives have some level of potential disturbance to high-suitability fawning habitat at 2,647, 1,796, 7,997, and 8,077 acres, respectively. Alternative 3 has no level of influence and no effect to high-suitability fawning habitat.

Mule Deer: Direct/Indirect Effects of New Seasonal Restrictions

At present there are no seasonal restrictions for motor vehicles with regard to mule deer habitat. Lassen NF annually institutes a seasonal forest restriction to wheeled vehicles for management of winter recreation trails from December 26 to March 31, totaling 271 miles (see Chapter 2, Alternative 1: No Action), though this action has no applicability to deer winter range.

As illustrated on Map 12 – Alternatives 4 and 5 Seasonal Restrictions (Map Package) and listed in Appendix G, Road Use Category Tables and Appendix E, Mitigation Measures, all of the new seasonal restrictions under Alternatives 4, 5, and Modified 5 are within suitable deer summer range. The wet season restriction, which amounts to a 30-day extension of the winter recreation restriction within the East Tehama Deer Unit (April 1 to April 30) would occur at the start of the annual deer migration. This administrative action would have no adverse direct or indirect effects and may have beneficial effects to deer as they migrate up onto summer range.

The restricted Season of Use to Hunting Season (August 1 to October 31) provides access to 10 existing system roads during the deer hunting season. This seasonal hunter

access, on 12 miles of road within the East Tehama unit, would have negligible effect to deer, over that which would be occurring during legal pursuit of game by deer hunters afoot.

Mule Deer: Cumulative Effects

Cumulative Effects from Action Alternatives

Under existing conditions there are over 191 miles of unauthorized route within Riparian Conservation Areas (RCAs) subject to continued use or further proliferation by cross-country travel in these important fawn rearing areas. When considering the beneficial effects of cross-country prohibitions, Alternative 2 would have 3.70 miles of added routes within all RCAs; Alternative 3 would have zero miles of added routes within RCAs; Alternative 4 would have 2.51 miles of added routes within all RCAs; Alternative 5 would have 11.18 miles of added routes within RCAs; and Modified 5 would have 11.29 miles of added routes within RCAs.

With exception for Alternative 3, none of the action alternatives appreciably improve fawning habitat in Crater and Lost Creek Management Areas as a compliance with LRMP direction (Table 168), though prohibition of cross-country travel would limit travel to the NFTS. Alternatives 2, 4, 5 and Modified 5 would add 2.2, 0.9, 3.64 and 3.64 miles of route respectively in these important deer management areas.

The difference in road densities is used as a relative indicator of habitat fragmentation to compare alternatives. Alternative 2 provides desirable very low to low road densities on 51.29% of ungulate habitats; Alternative 3 provides 51.46%; Alternative 4 provides 51.32%; Alternative 5 provides 50.75% and Modified 5 provides 50.70%. Alternative 1 poses the greatest overall risk to habitat fragmentation from cumulative effects, where the other alternatives would each have varying degrees of cumulative effects.

Cumulative Effects from All Other Foreseeable Actions

As listed in Appendix C, Lassen NF is scheduled to treat a total of 38,848 acres in 2009. Additional, foreseeable fuels and vegetation treatments amount to an estimated 48,392 acres. Other activities include ongoing commercial cattle grazing (35,998 permitted AUMs; Map 23); wildlife habitat enhancement projects (457 ac); and recreational site development (63 ac); and recreational planning (44,600 ac).

Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. Management prescriptions have emphasized recruitment of large snags and logs, as well as retention of oaks, large pines, and aspen clones. Mule deer, more than most species, can respond both favorably and adversely to the cumulative effects of forest activities associated with roads. Past and current cumulative effects to deer include current and historic grazing of deer habitat; loss or creation of habitat through catastrophic wildfires; loss of hiding cover from timber and fuels projects along with an increase in foraging values; and a general increase in noise and sight disturbance from recreational activities such as hunting, camping, and pleasure riding, including all forms of motor vehicle use.

Lassen NF currently has 46 active cattle grazing allotments. Forest Plan standards and guidelines for grazing have generally reduced the amount of grazing impacts on rangelands, montane meadows, and riparian vegetation. As discussed for the wetland and riparian group, roads can improve cattle dispersal across the landscape and also cause areas of concentrated use. Spatial grazing use patterns tend to be higher near water, as well as roads, trails, fence lines, utility corridors, etc. When roads are in close proximity to water, concentrated use from cattle can occur. Heavy concentration of cattle, during the early season can affect deer fawning habitat by diminished hiding and displacing deer from optimal foraging areas.

On highly suitable fawning habitat, all action alternatives would have prohibition on cross-country travel which would limit potentially road-effect noise and sight disturbance to 2,647 acres under Alternative 2; zero acres under Alternative 3; 1,976 acres under Alternative 4, 7,998 acres under Alternative 5 and 8,077 acres under Alternative 5 Modified. Natural revegetation of RCAs would vary from 137,285 acres under Alternative 3 to 129,208 acres under Alternative 5 Modified, which over time could lessen the access by cattle and effects from cattle on these fawning areas.

Deer population numbers were highest during active vegetation management efforts in the 1950s through the 1970s, the same period when there was a large influx of road development on Lassen NF. Vegetation and fuels management activities in recent years have included primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. Since the early 1990s these treatments generally have minor increases in forage condition for deer because they often do not result in reducing forest canopy cover below 40 percent where emphasis has been on managing habitat for late-successional forest species. Many vegetation and fuels reduction projects have emphasized habitat improvement for deer by removing competing small diameter conifers around individual oaks, large pines, and aspen clones.

When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from grazing, vegetation/fuels projects, wildfires, and recreation, Alternative 1 poses the greatest risk to the eight deer herds on Lassen NF, where as much as 82% of high-value habitats may be affected (Table 167). Alternatives 2, 3, 4, 5 and Modified 5 have very low cumulative effects on key deer habitat. With cross-country travel prohibitions, Alternative 3 would have moderate to high route densities 12.94% below existing conditions; similar moves towards low road densities in ungulate habitats would be expected under the other actions alternatives.

Pronghorn

Pronghorn: Affected Environment

Pronghorn spend spring, summer, and fall on Lassen NF, where they are restricted to sagebrush and eastside pine types in the eastern portion of Lassen NF, especially Pine and

Grays Valleys. Migration routes of pronghorn onto the Lassen NF are illustrated on Map 28. Lassen NF provides seven percent of the spring–summer range for the Lassen sub-herd (USDA FS PSW Region 1993). Winter range is located east of Lassen NF, primarily on private lands and lands managed by the Bureau of Land Management near the Nevada state line (USDA FS 2006a). The historic distribution extended across the Modoc Plateau and into Fall River Valley of Shasta County (CDFG 2004b). Forest Plan direction emphasizes management practices which would maintain and expand the current distribution of pronghorn across the Modoc Plateau to Hat Creek Rim. In Summit Management Area, along the rim, emphasis is placed on enhancing pronghorn habitat through vegetation manipulation, water development, and limiting road densities. The wildlife viewing of pronghorn on rangelands in California is a unique experience for most forest visitors. Hunter demand for pronghorn far exceeds available permits.

Compatibility of pronghorn and livestock is related to type of livestock, number of livestock using the same range, season of use, and forage condition (CDFG 2008b). Lassen NF grazing program is entirely comprised of cattle operations. Cattle, which are primarily grass consumers, are not thought to compete substantially with pronghorn for forage (CDFG 2008b). Competition for spring grasses and forbs can occur if a heavy cattle grazing occurs on pronghorn ranges prior to mid-May (Allen et al. 1984). A primary area of potential conflict is heavy cattle use of dry and wet meadows on summer ranges, since pronghorn rely on summer meadows for succulent forbs (Salwasser 1980).

Since publication of the 1993 LRMP, the quantity and quality of pronghorn habitat has been stable or improved. Although most vegetative manipulation projects applied on Lassen NF are in forested habitats unsuitable for pronghorn, some thinning and underburning has occurred along meadow and sage flat margins. These tree thinnings and underburns would likely serve to enhance pronghorn habitat by reducing the density of conifers and promoting understory vegetation. Due to current constraints on harvest, these thinnings typically would not be sufficient to create stands with open canopies having less than 20 percent cover, as recommended by the habitat capability model (USDA FS PSW Region 1993: appendix O-18). It has been assumed that ongoing and future forest thinning and underburns should be sufficient to allow improved travel by pronghorn through the treated stands and to achieve some increase in understory production (USDA FS 2006a).

Pronghorn: Environmental Consequences

Kindschy et al. (1982) indicate that off-road vehicles disturb pronghorn, especially during the fawning season. They recommend restricted open-road vehicle use between May 15 and June 15 on summer range. Seasonal restrictions of native-surfaced Maintenance Level 2 roads and NFTS trails are analyzed for the project alternatives. Road densities within the management areas in which pronghorn are emphasized are typically within the range considered to represent Medium habitat capability (two to four miles per square mile).

A review of the literature has found very little about concerns of habitat modification on pronghorn. The increased risk of human-caused fire and the resulting dramatic conversion of sage-steppe landscapes to annual grasslands by invasive exotic grasses, such as cheat grass (*Bromus tectorum*) and medusahead (*Taeniatherum caput-medusae*), is an increasing concern across the intermountain West. There are currently 2,118.9 acres (see 3.12 Noxious Weeds) of rangeland affected by medusahead in close proximity to pronghorn habitat.

Pronghorn: Direct Effects of Additions to NFTS

There are 51,132 acres of moderate and high-value pronghorn summer range on the Lassen NF (USDA FS 2006a) and within the project area. Analysis of effects to pronghorn summer range was based on a 800-meter (2,624 ft) zone of influence applied to all route additions to the NFTS that would intersect or come within a ¼ mile of pronghorn summer range. The proportion of pronghorn summer range within this road-effect zone was determined for each alternative. As shown in Table 169, unauthorized routes intersect 95 miles of pronghorn summer range.

In contrast to road-effect zones, areas less influenced by motorized route effects are considered security habitat. For alternative comparison purposes, a disturbance index to rank alternatives is described in Gaines et al. (2003) for mule deer and elk, where: 1) greater than 70 percent of summer range outside the zone has a low level of influence; 2) 50 to 70 percent of summer range outside the zone has a moderate level of influence; and 3) less than 50 percent of summer range outside the zone would constitute a high level of influence. Given that pronghorn have similar or even more sensitivity to sight disturbance in scrubland habitats, the same ratings are applied here in Table 169.

Table 169 Miles of added routes that occur on or near highly suitable pronghorn habitat

Range	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Route miles	95	1.1	0	1.3	4.2	4.2
Total road-effect acres	60,404 ac	699 ac	0 ac	827 ac	2,671 ac	2,671 ac
Percent Disturbance	118%	1.37%	0%	1.62%	5.22%	5.22%
Disturbance Rating	Very High	Very Low	None	Very Low	Very Low	Very Low

Source: GIS query, 16Nov2009.

As shown in Table 169 when considering high-value pronghorn range with infrequent traffic (less than one vehicle per day) there is a very high level of influence from unauthorized routes over the entire summer range acreage. This very high rating for existing conditions is a reflection of these open terrain landscapes which have been susceptible to cross-country travel and route proliferation. If traffic volume were to increase to greater than one vehicle

per day, level of influence would be even greater. Review of these route additions indicates that they are usually at or near the edge of these open habitats, along the tree line. Most are access spur roads to dispersed camps off of existing NFTS roads or connectors between existing NFTS roads. Under all action alternatives, route additions have a very low levels of influence on pronghorn summer range; Alternative 3 has no level of influence.

Pronghorn: Indirect Effects of Additions to NFTS

Given the open nature of these rangeland habitats, unauthorized routes tend to be more user-created then from timber management activities associated with forested areas. Areas of road density concern, as noted in the LRMP for management areas 5-Ladder, 10-Summit, and 6-Black Jack would have modest reductions. Prohibition of cross-country motor vehicle travel would have a positive effect in limiting and control proliferation of roads particularly in the sagebrush-scrub and sagebrush-grass pronghorn habitats.

Pronghorn: Direct/Indirect Effects of New Seasonal Restrictions

As illustrated on Map 12 – Alternatives 4 and 5 Seasonal Restrictions (Map Package) and listed in Appendix G, Road Use Category Tables and Appendix E, Mitigation Measures, there are several new seasonal restrictions under Alternatives 4, 5 and Modified 5 within or near suitable pronghorn habitats. There are no adverse direct, indirect effects from these administrative actions to the species or its habitat.

Pronghorn: Cumulative Effects

Cumulative Effects from Action Alternatives

Road densities on Lassen NF are at or below medium habitat requirements for pronghorn (2-4 mi/mi^2) as described in the LRMP (USDA FS PSW Region 1993). Moderate- to high-density classes constitute 61.48% of ungulate habitats. Alternative 2 provides desirable very low to low road densities on 51.29% of ungulate habitats; Alternative 3 provides 51.46%; Alternative 4 provides 51.32%; Alternative 5 provides 50.75% and Modified 5 provides 50.70%. Alternative 1 poses the greatest overall risk to habitat fragmentation from cumulative effects, where the other alternatives would each have varying degrees of cumulative effects.

Cumulative Effects from All Other Foreseeable Actions

Pronghorn also can respond both favorably and adversely to the cumulative effects of forest activities associated with roads. Pronghorn respond favorably to many of the vegetation and fuels management activities on Lassen NF that maintain or restore open shrublands or pine savannah. Roads across Lassen NF are often established to create and maintain stock watering facilities. Many borrow pits, associated with road construction and maintenance, become seasonal water catchments that provide available drinking water for wildlife and livestock.

Increasing tree densities, due to a 100-year history of livestock grazing and fire suppression, may be hindering the ability of pronghorn to access some summer range on

Lassen NF. For instance, many of the pronghorn that summer in the Grays Valley and Harvey Valley area on Eagle Lake RD migrate into the area from the north. Much of their migratory path is on NFTS roads through forested areas. These forested areas have become denser since the initiation of livestock grazing and fire suppression. While it is unknown to what degree this densification has hindered or reduced the ability of pronghorn to migrate through and access the Harvey Valley and Grays Valley areas, the fact that many of the animals travel along the road may indicate that the surrounding closed canopy forest is no longer suitable for travel (USDA FS 2006a).

Prescribed fires within sage flats have also occurred since implementation of the LRMP in 1993. These burns have typically resulted in a mosaic burn pattern, resulting in burned areas in juxtaposition with non-burned patches. When applied to flats dominated by sagebrush or bitterbrush, such burning creates pockets of herbaceous vegetation, and results in an increase of herbaceous vegetation relative to shrubs. Both bitterbrush and sagebrush are considered off-site colonizers. Typically, sagebrush and bitterbrush are seeded back into openings created by fires via rodents that harvest seed within unburned patches and then cache the seed into the fire-created opening. Observations indicate that such burning, and subsequent seeding of shrubs back into the openings, has created a diversity of age classes not present prior to the fires. Therefore, not only is herbaceous vegetation increased, but pronghorn also are provided seedling shrubs that are more nutritious than the older, decadent shrubs prior to the burn. Overall, field reviews of these projects indicate an improvement in pronghorn forage is achieved (USDA FS 2006a).

The grazing program has mitigated impacts from pasture fencing across pronghorn habitat by aggressively changing fence designs to ease the passage of pronghorn. Older fences that were not built to these current designs have, in many instances, been retrofitted by replacing the lowest barbed wire with a smooth wire at the 16-inch spacing. These fence designs and retrofitting have enhanced and ensured easy passage by pronghorn through cattle allotments (USDA FS 2006a).

Wetland and Riparian Species

The wetland and riparian group includes both terrestrial and aquatic wildlife species that spend a portion of their life cycle within or adjacent to riparian and aquatic habitats. Wetland and riparian areas provide habitats for seven special status species on Lassen NF (Table 190). Known detections and habitats for these species are illustrated on Map 29. This section provides general information on local road- and trail-associated impacts to bald eagles, waterfowl, greater Sandhill crane, osprey, northwestern pond turtle, and willow flycatcher and their habitats. Special status species not included here are addressed under *Management Indicator Species and Associated Habitats* or *Species Not Analyzed in Detail*.

Road- and trail-associated risk factors within wetland and riparian habitats can have the following potential effects on individuals or their habitat (Gaines et al. 2003):

Direct Effects - Site Disturbance:

Displacement or avoidance by populations or individual animals away from human activities.

Disturbance and displacement of individuals from breeding or rearing habitats.

Site disturbance was measured for those species which are known to be affected by noise or sight disturbance. Such disturbance is influenced by the road density and traffic volume on the road system. An increase in road densities within 500 meters (1,640 ft) of a wetland has been shown to result in a decrease in bird species richness (Forman et al. 2002).

Seasonal timing of the disturbance is an important consideration. For example, much of the wetland acres on Lassen NF, which are important to waterfowl and Sandhill crane, are ephemeral. Flooding occurs from snow melt. Waterfowl staging and breeding occurs in spring and early summer. Traffic volume during this period is very light.

Indirect Effects - Habitat Modification:

Loss or fragmentation of habitat from establishment of routes and associated human activities.

Interference with dispersal or other movements as posed by routes and associated human activities.

Changes to habitat microclimates associated with the edge effect from routes.

Reduced density of snags and down logs from fuelwood gathering facilitated by road access.

Creation of pathways for invasive species, competitors, or predators.

On Lassen NF, wetland and riparian habitats typically have low-profile emergent vegetation surrounded by open shrublands. Sight disturbance can alter wildlife movement patterns.

Alteration of wetland and riparian habitats is often associated with effects from roads (see Chapter 3: Aquatic Resources). Seasonal wetlands and vernal pools are especially susceptible to interception of ground surface waters and shortened duration of the hydroperiod (ibid.). Road networks that encircle wetland or riparian habitats tend to alter hydrologic and nutrient flows.

Cumulative Effects:

Displacement of populations or individual animals from existing NFTS plus established routes, related to human activities

Loss or fragmentation of habitat from existing NFTS plus established routes and associated human activities.

As noted elsewhere in this report, aquatic features on the landscape attract people who are recreating. Wetland and riparian habitats on Lassen NF have a higher percentage of road densities in the moderate- to high-density classes (Table 170; 67.67%) than any of the other wildlife habitats described in this section; more that 6% higher than that of the ungulate group at 61.48% (Table 163). User-created unauthorized routes found on the Lassen are

often associated with water or riparian destinations. The effects of roads and trails on aquatic habitat are considered to be wide-ranging and potentially serious at local levels.

The difference in road densities for wetland and riparian habitats, resulting from prohibition of cross-country travel, is reflected by comparison of Alternative 1 with Alternative 3. Alternative 3 has 11.40% more habitat in the very low to low road density classes then Alternative 1 when cross-country prohibitions are considered. The other alternatives differ from Alternative 1 by 10.55% for Alternative 5 Modified to 11.29% for Alternative 4 in the very low to low road density classes which reflects the routes added by alternative.

Table 170 Road density class proportions for wetland and riparian habitats

Road Density (mi/mi²)	Percentage of NFS Lands in Project Area					
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
0	14.93%	20.25%	20.44%	20.39%	20.07%	20.01%
0–2	17.40%	22.96%	23.29%	23.23%	22.81%	22.87%
Very Low – Low Subtotal	**32.33%**	**43.21%**	**43.73%**	**43.62%**	**42.88%**	**42.88%**
2–4	30.85%	35.24%	35.43%	35.38%	35.30%	35.30%
4–6	21.78%	17.09%	16.64%	16.77%	17.27%	17.27%
>6	15.04%	4.46%	4.20%	4.23%	4.55%	4.55%
Mod – Very High Subtotal	**67.67%**	**56.79%**	**56.26%**	**56.38%**	**57.12%**	**57.12%**
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Source: GIS query, 29Oct2009

Bald Eagle

Bald Eagle: Affected Environment

Bald eagles winter throughout California near lakes, reservoirs, riverine, and marsh habitats. They breed mainly in the northern portion of the state adjacent to large bodies of water. Bald eagles initiate breeding in January. Incubation begins in late February to mid-March with the nesting period extending as late as the end of June. Nest sites are typically large trees or snags with open branches, e.g., pine near water bodies having abundant fish and waterfowl. Lassen NF has some of the most productive bald eagle breeding habitat in California. Thirty-eight breeding territories have been identified within Lassen NF boundary; 28 sites occur on NFS lands and 10 sites occur on private or state lands (see Map 29). Most territories are located around Eagle Lake, Lake Britton, Big Jake Lake, Big Lake, and Lake Almanor (USDA FS 2006a). Since 1971, Eagle Lake Osprey Management Area has provided additional protection to eagles.

Bald Eagle: Environmental Consequences

Numerous studies have reported that eagles avoid or are adversely affected by human disturbance during the breeding period, which may result in nest abandonment and reproductive failure (Stalmaster and Newman 1978, Andrew and Mosher 1982, Fraser et al. 1985, Knight and Skagen 1988, Buehler et al. 1991, Grubb and King 1991, Chandler et al.

1995, Grubb et al. 1998). 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. Some studies report that bald eagles may be more sensitive to foot traffic than vehicle traffic (Grubb and King 1991, Hamann et al. 1999). Anthony and Isaacs (1989) found that the productivity of bald eagle nests was negatively correlated with their proximity to main logging roads; more recent nest sites were located farther from roads and recreational facilities when compared to older nest sites in the same territory. Disturbance effects are greatest during nest building, courtship, egg laying, and incubation. Lassen NF standards apply a one-quarter mile (400 meters) buffer to nest sites from January to August. The USFWS recently posted national bald eagle management guidelines with an assigned buffer of 100 meters (~330 ft) for non-motorized recreational activities, 100 meters (~330 ft) for off-highway vehicles in forested landscapes and/or variable terrain, and 200 meters (~660 ft) in open landscapes where line of sight to nest trees may be a concern (USDI FWS 2007a).

Bald Eagle: Direct Effects of Additions to NFTS

For this analysis, disturbance to nest sites was measured using the one-quarter mile (~400 meters) buffer. Under the existing conditions, 13 nest sites are located within the one-quarter mile buffer as shown in Table 171. None of the action alternatives would have potential to cause site disturbance to bald eagle.

Table 171 Bald eagle nest site locations within 1/4 mile of any route

Bald Eagle	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Within ¼ mile (400m)	13	0	0	0	0	0

Source: GIS query, 01Apr2009.

Bald Eagle: Indirect Effects of Additions to NFTS

Analysis of eagle habitat was based upon the miles of local road that intersected established eagle territories. Under each alternative, several road-effect zones were applied as show in Table 172. A primary management objective is to retain large snags within each territory and maintain adequate screening between tree stands and open routes.

A 60-meter (197 ft) buffer was applied to all local routes to measure the potential for reduced large snags (nest tree recruitment) from fuelwood gathering facilitated by road access, as suggested by Gaines et al. (2003) based on information presented by Hamann et al. (1999).

A 100-meter (328 ft) buffer was applied to all local routes within each territory to assess the potential to alter the screening from nest trees following USFWS national bald eagle management guidelines for off-highway vehicles in forested landscapes (USDI FWS 2007a).

A 250-meter (820 ft) buffer was applied to routes that intersected both a bald eagle territory and a water feature (e.g., perennial or seasonal wetlands, perennial stream, lake, or ponds), which reflects the riparian/wetland influence along a route within a territory, as suggested by Gaines et al. (2003) as a waterfowl and colonial nester habitat disturbance index.

Table 172 Road-effect zones within bald eagle territories and other suitable habitat

Road Effect	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Miles of road within habitat (miles)	26.25 mi	0	0	0	0	0
60m road-effect Reduced snags	1,037 ac	0	0	0	0	0
100m road effect Reduced screening.	1,621 ac	0	0	0	0	0
250m road-effect Disturbance to foraging area.	3,477 ac	0	0	0	0	0

Source: GIS query, 29Oct2009

Under Alternative 1, there are 26.25 miles of route within the bald eagle territories. The road-effects zone equates to a potential loss of recruitment snags over 1,037 acres; a diminished screening effect and increased likelihood of noise disturbance to eagles over 1,621 acres; and a potential increase in disturbance to waterfowl (eagle foraging habitat) on 3,477 acres. The mean average size of the 38 territories on or near Lassen NF is 1,426 acres, ranging in size from 56 to 3,193 acres (USDA FS 2006a). When looking at the combined road-effects of reduced snags and screening with potential noise disturbance to both eagles and waterfowl nesting and loafing areas, Alternative 1 equated to the collective potential loss in habitat for one territory.

As illustrated in Table 172, none of the action alternatives would have added routes within bald eagle territories or other suitable habitat. Therefore, no action alternative would have a road-effect to bald eagle territories. Risk of disturbance to suitable habitats would be very low.

Bald Eagle: Direct/Indirect Effects of New Seasonal Restrictions

As illustrated on Map 12 – Alternatives 4 and 5 Seasonal Restrictions (Map Package) and listed in Appendix G, Road Use Category Tables and Appendix E, Mitigation Measures, there are no new seasonal restrictions under any alternative within or near bald eagle territories, winter roosts or foraging habitats. Therefore, there are no direct, indirect or cumulative effects from these administrative actions to the species or its habitat.

Bald Eagle: Cumulative Effects

Cumulative Effects from Action Alternatives

For route additions Alternative 3 would have no indirect effects, where the other alternatives would each have varying degrees of indirect effects from additions to the NFTS. As shown in Table 170, when considering the existing NFTS and additions, Alternative 1 provides desirable very low to low road densities on 32.33% of wetland and riparian habitats; Alternative 2 provides 43.21%; Alternative 3 provides 43.73%; Alternative 4 provides 43.62%; Alternative 5 provides 42.88%; and Alternative 5 Modified provides 42.88%. Alternative 1 poses the greatest overall risk for cumulative effects, where the other alternatives would each have varying degrees of cumulative effects.

For the new seasonal restrictions there are no anticipated adverse direct, indirect or cumulative adverse effects from these administrative actions to bald eagles or their habitats. Alternatives 2 and 4 have very low cumulative risk to eagle territories and foraging areas; the cumulative risk under Alternatives 5 and Modified 5 are slightly higher. There is no cumulative risk under Alternative 3.

Cumulative Effects from All Other Foreseeable Actions

The combination of natural lakes, ephemeral wetlands, and developed reservoirs across Lassen NF on both NFS and non-NFS lands have enhanced historic bald eagle breeding and foraging habitats. Past and current management protection measures have benefited bald eagles and their breeding habitats on Lassen NF. Cumulative effects to the bald eagle habitat around these territories include disturbance from a variety recreational activities, including developed and dispersed camping, hiking, fishing, boating, and snowmobiling. Existing forest buffer standards are comparable to USFWS recommendations and would continue to be used to mitigate potential adverse recreational disturbance to nesting bald eagles. Historic vegetation and fuels management activities, combined with personal fuelwood collection, have likely diminished the abundance of large snags and potential nest trees. Present and future vegetation and fuels management prescriptions are designed to retain the larger tree component, so that bald eagle nest tree recruitment should improve over time. Forest thinning and fuels treatment projects are designed to prevent loss of bald eagle habitat over the long-term.

Active cattle grazing allotments continue over approximately half of the areas containing bald eagle territories. Grazing permittees are subject to the same operating buffers as other forest users to minimize noise disturbance from vehicles or use of motorized equipment. Unauthorized use of OHVs is more likely if a road or trail is present. Grazing can have an indirect effect on eagle foraging areas by effecting wetland and riparian vegetation in close proximity to water, generally key waterfowl habitat areas. Grazing is subject to Forest Plan forage utilization standards and cover retention standards in key waterfowl nesting areas (USDA FS PSW Region 1993, 2004). Roads provide increased accessibility for cattle into remote areas and key focal areas having water, shade, and palatable forage. Cattle prefer

to use roads and trails that penetrate thick brushy areas, heavily wooded areas, or steep terrain (Heitschmidt and Stuth 1991). Roads can improve cattle dispersal across the landscape, but also become areas of concentrated use. Spatial grazing use patterns tend to be higher near water and also near roads, trails, fence lines, utility corridors, etc. When roads are in close proximity to water, concentrated use from cattle can occur.

When considering the cumulative effects of all past, present, and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires, recreation, and grazing, Alternative 1 poses the greatest risk to bald eagles, though the risk from human disturbance has been managed to low levels over the last decade. Continued use of unauthorized routes and cross-country travel would facilitate unintended disturbance to eagles by OHV users, as well as lowered large tree snag recruitment.

Bald Eagle: Determination

For all action alternatives, the new seasonal restrictions would have no direct, indirect or cumulative effects from these administrative actions to the species or its habitat. It has been determined in the Biological Evaluation (Frolli 2009) that Alternative 3 would have no effect on bald eagle. Alternatives 1, 2, 4, 5 and Modified 5 may affect individuals, but are not likely to lead to a trend towards Federal listing.

Bufflehead & Mallard

Bufflehead & Mallard: Affected Environment

Bufflehead and mallard are both emphasis waterfowl species on Lassen NF with somewhat different breeding habitat requirements. Bufflehead is an obligate cavity nesters and breed primarily in boreal forest. Only a few isolated breeding populations occur in northern California, primarily in Lassen and Modoc Counties. Breeding habitat consists of permanent freshwater ponds and small lakes having snags within one-eighth mile (200 meters) and also having high concentrations of aquatic invertebrates, crustaceans, and mollusks. Females are strongly philopatric to their natal areas, and adults of both sexes return to their breeding and wintering areas (USDA FS 2006a).

Mallards select habitats which characteristically have varied landscapes of riparian areas, wetland, open water bodies having still or slow-moving currents. Micro-habitats during breeding season favor shallow waters with emergent vegetation. A mallard's diet consist of insects, aquatic invertebrates, earthworms, plant seed, aquatic plants and acorn. Mallards opportunistically use the 9,000 acres of seasonal wetlands on Lassen NF. Seasonal use is very much dependent upon the precipitation in any given year. They ground nest in tall herbaceous or shrub cover, as well as dense wooded areas within one-half mile (800 meters) of open water (USDA FS 2006a).

Bufflehead & Mallard: Environmental Consequences

Human disturbance has been documented to have a negative effect on waterfowl, particularly during the nesting period. Negative effects include nest abandonment, egg

mortality from exposure, increased predation of nest sites and hatchlings, depressed feeding rates, and avoidance of suitable habitat (Gaines et al. 2003).

Based on a literature review of human disturbance factors to waterfowl and colonial nesting birds, Gaines et al. (2003) recommend road analysis using a 250-meter (820-foot) zone of influence. This road-effect zone was applied to potential high-suitable habitat, which was queried using a one-quarter mile buffer from perennial and seasonal wetlands (inclusive), as well as perennial streams, lakes, and ponds (from the water's edge). As shown in Table 173, under Alternative 1, more than 483 miles of routes, roads, or trails intersect potential suitable waterfowl habitat.

Bufflehead & Mallard: Direct Effects of Additions to NFTS

Lands within waterfowl habitats have been found to have higher road densities than other upland habitats across Lassen NF. Nearly 68% of these waterfowl habitats have moderate to high road densities. Under Alternative 1, routes would intersect 483.32 miles of high-potential habitat for breeding waterfowl. This equates to a potential noise and sight disturbance of 106,868 acres across Lassen NF. Actual disturbance is thought to be somewhat less, given the time of year breeding occurs (May through June) and the relatively low traffic volume on Lassen NF during that time of year. Increased edge effect would increase the risk of nest exposure to predators. Under Alternative 1, ground nesting mallards are at moderate risk of direct damage from cross-country travel vehicles. Under all action alternatives there would be no adverse effects from cross-country travel prohibitions.

Bufflehead & Mallard: Indirect Effects of Additions to NFTS

The opportunity to expand habitat for either of these waterfowl species is negligible on Lassen NF. The focus of management direction from the LRMP (USDA FS PSW Region 1993) has been to improve the quality of waterfowl breeding habitats where they are available. For bufflehead, a primary risk to breeding habitat is the removal of snags within 200 meters (656 feet) of occupied water bodies. Mallards select for areas with heavy ground cover, such as downed woody material, within 800 meters (2,624 ft) of occupied water bodies.

For this analysis the 60-meter (197-foot) road effect zone is applied where fuelwood collection is likely to occur in association with the route. For mallards, ground nests are susceptible to damage from cross-country vehicle travel. In the absence of cross-country travel prohibitions, fuelwood collection could occur on 25,648 acres within these habitats with potential to lower snag recruitment and potential nesting sites for bufflehead; removal of downed logs could diminish ground nest hiding cover for mallards.

Table 173 Miles of route within suitable habitat for bufflehead and mallard

Road Effect	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Road miles w/in habitat	483.32	8.56	0	5.44	28.18	28.18
60m zone Reduced	25,648	590	0	413	1,923	1,923

snags (acres)						
250m zone Noise/sight Disturbance (acres)	106,868	2,460	0	1,720	8,012	8,012

Source: GIS query, 29Oct2009

Under Alternatives 2, 3, 4, 5 and Modified 5, large portions of breeding habitat would have potential to improve. However, designated route vehicle traffic under Alternatives 2, 4, 5, and Modified 5, could potentially cause noise/sight disturbance on up to 2,460 acres, 1,720 acres, and 8,012 acres respectively; Alternative 3 would have no potential for noise or sight disturbance. Nesting cavities would be less prevalent on approximately 590 acres under Alternative 2; on 0 acres under Alternative 3; on 413 acres under Alternative 4; and on 1,923 acres under Alternative 5 and Modified 5.

The risk of noise and sight disturbance would be 2,460 acres under Alternative 2; 0 acres under Alternative 3; 1,720 acres under Alternative 4; and 8,012 acres under Alternative 5 and Modified 5. Cross-country travel would be eliminated in proximity to open water, nesting cover, and brood hiding cover. The indirect effects from predation would be lessened within these same nesting and brood rearing areas.

Bufflehead & Mallard: Direct/Indirect Effects of New Seasonal Restrictions

As illustrated on Map 12 – Alternatives 4 and 5 Seasonal Restrictions (Map Package) and listed in Appendix G, Road Use Category Tables and Appendix E, Mitigation Measures, there are no new seasonal restrictions under any alternative within or near suitable habitat for buffleheads or mallards. Therefore, there are no direct, indirect or cumulative effects from these administrative actions to these two species or their habitats.

Bufflehead & Mallard: Cumulative Effects

Cumulative Effects from Action Alternatives

For route additions Alternative 3 would have no indirect effects, where the other alternatives would each have varying degrees of indirect effects from additions to the NFTS. As shown in Table 170, when considering the existing NFTS and additions, Alternative 1 provides desirable very low to low road densities on 32.33% of wetland and riparian habitats; Alternative 2 provides 43.21%; Alternative 3 provides 43.73%; Alternative 4 provides 43.62%; Alternative 5 provides 42.88%; and Alternative 5 Modified provides 42.88%. Alternative 1 poses the greatest overall risk for cumulative effects, where the other alternatives would each have varying degrees of cumulative effects.

For the new seasonal restrictions there are no anticipated adverse direct, indirect or cumulative adverse effects from these administrative actions to these species or their habitats. Alternatives 2 and 4 have very low cumulative risk to waterfowl breeding territories and foraging areas; the cumulative risk under Alternatives 5 and Modified 5 are slightly higher. There is no cumulative risk under Alternative 3.

Overall species richness and biodiversity could be expected highest under Alternative 3, and then Alternatives 4, 2, 5 or Modified 5 in that order, based on findings cited in Forman et al. (2002).

Cumulative Effects from All Other Foreseeable Actions

Commercial grazing is one of the primary management activities that can affect riparian and wetland areas. These same areas are typically primary rangelands. Active cattle grazing allotments cover most of these habitats. Summer grazing is typically later in the season, after the waterfowl nesting period. Grazing permittees are subject to the same operating buffers as other forest users to minimize noise disturbance from vehicles or use of motorized equipment. Unauthorized use of OHVs is more likely if a road or trail is present. Cattle can have an indirect effect on waterfowl nesting areas by grazing and trampling wetland and riparian vegetation in key brood rearing areas, in close proximity to water. Grazing is subject to LRMP forage utilization standards and cover retention standards in key waterfowl nesting and brood rearing areas (USDA FS PSW Region 1993). Roads provide increased accessibility by cattle into remote areas and key focal areas having water, shade, and palatable forage. Cattle prefer to use roads and trails that penetrate thick brushy areas, heavily wooded areas, or steep terrain (Heitschmidt and Stuth 1991). Roads can improve cattle dispersal across the landscape, but also become areas of concentrated use. Spatial grazing use patterns tend to be higher near water, and also near roads, trails, fence lines, utility corridors, etc. When roads are in close proximity to water, concentrated use from cattle can occur. Heavy concentration of cattle during the early season on ground nesting areas can lead to trampled nests. Diminished hiding cover and increased trailing can increase risk of nest or brood predation.

Greater Sandhill Crane

Sandhill Crane: Affected Environment

The greater Sandhill crane (*Grus canadensis* ssp. *tabida*) is a Forest Service Sensitive species. In California, pairs of Sandhill cranes generally nest in wet meadow, shallow lacustrine, and fresh emergent wetland habitats, with nests constructed of large mounds of water plants over shallow water. On dry sites, nests are scooped-out depressions lined with grasses (Zeiner et al. 1990). Studies in California during 1988 showed water depths averaging 2.3 inches (CDFG 1994). Open meadow and grassland habitats are also used (Littlefield 1989). Greater Sandhill cranes have varied site philopatry. Established crane pairs may defend their established territory in successive years (CDFG 2008b). The majority of greater Sandhill cranes found in California are located in the northeastern portion of the state. In a 1988 CDFG survey, Lassen County had 122 pairs, or 26 percent, of the state census. National Forest System lands account for 15 percent of breeding sites statewide (USDA FS PSW Region 2001). On Lassen NF, most cranes are found in Pine Creek Valley, Grays Valley, Harvey Valley, Poison Lake and Papoose Meadow. Eagle Lake RD has the

most occupied breeding habitat in the Pacific Southwest Region. Lassen NF has 38 documented breeding locations on NFS lands (see Map 29). Since 1999, there have been 173 crane observation points documented forest wide with 87 points (50 percent) categorized as having documented reproduction.

Sandhill Crane: Environmental Consequences

Zeiner et al. (1990) report that Sandhill cranes are particularly sensitive to human disturbance when nesting, especially within one mile of the nest site (USDA FS PSW Region 2001). Current Forest Plan management standards require a limited operating period between April 15 and August 1 within one-half mile (800 meters) of a breeding pair. Primary direct risks to wetland habitats have included conversions for road development, croplands, and water diversions. Indirect risk factors include loss of hiding and nesting cover from livestock grazing, which makes nest sites and colts susceptible to predation. Cross-country travel during the breeding season could also cause direct mortality of colts.

Sandhill Crane: Direct Effects of Additions to NFTS

For this analysis, each alternative was compared against the 38 recorded breeding sites within one-half mile (~800 meters) of a route, based on surveys from 1999 to 2006 as shown in Table 174. Under existing conditions, 23 recent sites and 95 historic sighting locations are within one-half mile of a route.

Table 174 Sandhill crane breeding locations within 1/2 mile of added routes

Greater sandhill crane	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Known breeding sites	23	0	0	0	1	1

Source: GIS query, 03Apr2009; Greater Sandhill crane survey period 1999 to 2006.

As listed in Table 175, Alternative 2, 4, 5, and Modified 5 have 0.29, 0.26, 1.53, and 1.53 miles of route within ¼ mile of a Sandhill crane breeding site. Given the short route distances, frequency, duration and level of OHV noise or sight disturbance are anticipated to be short duration during the active breeding season (April 1 – August 1). Field review of ULA420 indicated that it was not within sight distance of any suitable or occupied crane site. This route would have no ground or sight disturbance on any crane breeding site; noise disturbance would be inconsequential.

Table 175 Sandhill crane breeding sites within 1/4 mile of added routes

Route	Alt 2	Alt 4	Alt 5	Mod 5
290606UC01	0.00	0.00	0.01	0.01
290606UC04	0.00	0.00	0.02	0.02
UBB794	0.00	0.00	0.11	0.11
UBB796	0.00	0.00	0.05	0.05
UCC127	0.00	0.08	0.08	0.08
ULA420	0.00	0.07	0.07	0.07
ULA505	0.00	0.11	0.11	0.11

UNE642	0.00	0.00	0.07	0.07
UNH001	0.29	0.00	0.29	0.29
UNH528	0.00	0.00	0.10	0.10
Totals	**0.29**	**0.26**	**1.53**	**1.53**

Sandhill Crane: Indirect Effects of Additions to NFTS

As noted for waterfowl, the opportunity to expand habitat for Sandhill cranes is negligible. The focus of management direction from the LRMP (USDA FS PSW Region 1993) has been to improve the quality of seasonal wetland habitat and conduct spring surveys so limited operating periods can be applied to permitted or contracted forest activities. Focus has generally been on cattle grazing operators, timber harvest operations and road maintenance. The overall risk of habitat alteration and wetland dissection is described above and elsewhere in this report (see Chapter 3: Aquatic Biota and Hydrological Resources)

Under Alternative 1, there are 23 potential breeding sites within one-half mile of a route that could be disturbed during the nesting season by vehicle travel. Under Alternative 2, 3 and 4 the risk of vehicle noise and sight disturbance to any known nest sites would be nearly zero. Alternatives 5 and Modified 5 could potentially disturb one site, however the risk would be very low.

Sandhill Crane: Direct/Indirect Effects of New Seasonal Restrictions

Sandhill cranes have a Limited Operating Period standard and guide from April 1 to August 1 for activities within ½ mile of known nest sites (HFQLG ROD 1999). However, as illustrated on Map 12 – Alternatives 4 and 5 Seasonal Restrictions (Map Package) and listed in Appendix G, Road Use Category Tables and Appendix E, Mitigation Measures, there are no new seasonal restrictions under any alternative within ½ mile of any known Sandhill crane nest site or suitable habitat. For Modified 5 there is one new route (ULA505) with seasonal restrictions for wet weather. The wet season restriction, which amounts to a 30-day extension of the winter recreation restriction, is an administrative action that would have no adverse direct or indirect effects and may have beneficial effects by further reducing risk of disturbance during the breeding season.

Sandhill Crane: Cumulative Effects

Cumulative Effects from Action Alternatives

For route additions Alternative 3 would have no indirect effects, where the other alternatives would each have varying degrees of indirect effects from additions to the NFTS. As shown in Table 170, when considering the existing NFTS and additions, Alternative 1 provides desirable very low to low road densities on 32.33% of wetland and riparian habitats; Alternative 2 provides 43.21%; Alternative 3 provides 43.73%; Alternative 4 provides 43.62%; Alternative 5 provides 42.88%; and Alternative 5 Modified provides 42.88%. Alternative 1 poses the greatest overall risk for cumulative effects, where the other alternatives would each have varying degrees of cumulative effects.

For the new seasonal restrictions there are no anticipated adverse direct, indirect or cumulative adverse effects from these administrative actions to the species or its habitat. Alternatives 2, 3, and 4 have very low cumulative risk to crane breeding territories and foraging areas; Alternatives 5 and Modified 5 could cause potential disturbance to one site, though from review of Route ULA420, the risk is also very low.

Cumulative Effects from All Other Foreseeable Actions

The cumulative effects would be similar to those discussed for mallards. Livestock grazing is one of the primary management activities that can affect riparian and wetland areas. Roads can improve cattle dispersal across the landscape, but also become areas of concentrated use. Spatial grazing use patterns tend to be higher near water, and also near roads, trails, fence lines, utility corridors, etc. When roads are in close proximity to water, concentrated use from cattle can occur. Heavy concentration of cattle during the early season on ground nesting areas can lead to trampled nests. Diminished hiding cover and increased trailing can increase risk of nest predation. Annual surveys for territorial crane pairs would need to continue in order to effectively implement limited operating periods to cattle grazing operators, timber harvest operations, fuels reduction projects, and road maintenance. Risk of potential nest site disturbance would be lowered from vehicle users who are not under any type of operating restrictions that may be traveling near such sites. Under any alternative, risk of disturbance may be possible if and when birds relocate within a given meadow complex or newly established nest territory that has not been documented during annual surveys.

When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires, recreation, and grazing, Alternative 1 poses the greatest risk to greater Sandhill crane breeding territories with potential disturbance to 23 known breeding sites. Overall species richness and correlating foraging values could be expected highest under Alternatives 3, than Alternatives 4, 2, 5 or Modified 5 in that order, based on findings cited in Forman et al. (2002).

Sandhill Crane: Determination

Alternatives 2, 3, and 4 have no direct risk to any crane breeding territories and foraging areas; Alternatives 5 and Modified 5 could cause potential disturbance to one site. For the new seasonal restrictions, there are no direct, indirect or cumulative effects from these administrative actions to this species or its habitat. It has been determined in the Biological Evaluation (Frolli 2009) that Alternative 3 would have no effect on Sandhill crane. Alternatives1, 2, 4, 5, and Modified 5 may affect individuals but are not likely to lead to a trend towards Federal listing.

Northwestern Pond Turtle

Pond Turtle: Affected Environment

The northwestern pond turtle (*Clemmys marmorata* ssp. *marmorata*) occurs from San Francisco Bay to the Puget Sound of Washington. This subspecies of western pond turtle is found on Lassen NF in tributaries to the Sacramento River system below 4,500 foot elevation. Pond turtles inhabit fresh and brackish waters in permanent or intermittent ponds, lakes, streams, and rivers. They are restricted to areas near banks or in quiet backwaters having slow currents, basking sites, and refugia from other predatory aquatic species (e.g., bull frogs and bass). Basking areas are critical to the species for proper thermoregulation. Nests are dug in soft soils having relatively high internal humidity. Adults are known to relocate up to 1.24 miles. Natural, stochastic events which provide disturbance to aquatic systems, such as fire or high stream flows, and provide openings to otherwise dense riparian corridors, are important in providing basking areas over time (USDA FS PSW Region 2001).

Pond Turtle: Environmental Consequences

Risk factors to pond turtles include road building, which could provide a source of pool sedimentation and increased access to occupied turtle habitat; cattle grazing, which can alter riparian zone vegetation; and vegetation management activities, which can alter hydrologic regimes, riparian zone vegetation, or suitable nest sites. Because the species has a low recruitment rate, protective measures for nesting sites and juvenile rearing habitats are believed to be key in the viability of local populations. Roads adjacent to streams and ponds provide increase access to otherwise remote turtle areas, leading to possible repeat disruption. Because pond turtles seek open areas to bask, they are at risk of mortality from vehicle collision along local, slow-speed roads. Collection of turtles or malicious shooting of basking turtle are also risk factors associated with increased exposure to recreation activities (USDA FS PSW Region 2001).

Pond Turtle: Direct Effects of Additions to NFTS

The largest concentration of pond turtles are on the Lassen NF can be found within the Front Country OHV recreation area (see Map 29). Pond turtles have been observed during stream inventories in the Deer, Mill, Antelope, Paynes, Dry, and Burney Creeks. Turtles have also been observed in the Pit River system, primarily in Burney Creek below Lake Britton and the main stem Pit River. As shown in Table 176, there are currently six recorded turtle observation sites within one-quarter mile of an unauthorized route. None of the alternatives include route additions to the NFTS within ¼ mile of any known turtle location.

Pond Turtle: Indirect Effects of Additions to NFTS

Under existing conditions and within the project area, there are 9.44 miles of unauthorized routes that intersect the Riparian Conservation Areas having potential suitable habitat for pond turtles as shown in Table 176.

Table 176 Northwestern pond turtles and habitat affected by added routes

Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Pond turtle observations within ¼ mile of added routes					
6	0	0	0	0	0
Miles of added route within pond turtle suitable habitat					
9.44	0	0	0.48	0.85	0.85

Source: GIS query, 9Oct2009

Alternative 1 would continue the risk of negative human interactions on three occupied sites. The continued opportunity to use 9.44 miles of unauthorized routes within the RCA would increase the likelihood of pool sedimentation. Any potential road deposition would likely settle in habitats having slow-moving water, favored by pond turtles. Alternatives 2 and 3 propose no route additions to the NFTS within any RCA having known turtle occurrences and therefore would have no effect to turtle habitat. Alternatives 4, 5, and Modified 5 propose to designate 0.48, 0.85, and 0.85 miles of route within potential suitable turtle habitat.

Pond Turtle: Direct/Indirect Effects of New Seasonal Restrictions

As illustrated on Map 12 – Alternatives 4 and 5 Seasonal Restrictions (Map Package) and listed in Appendix G, Road Use Category Tables and Appendix E, Mitigation Measures, there are no new seasonal restrictions under any alternative within suitable habitat of the pond turtle. Therefore, there are no direct, indirect or cumulative effects from these administrative actions to the species or its habitat.

Pond Turtle: Cumulative Effects

Cumulative Effects from Action Alternatives

Under Alternative 1, there are 6 occupied sites at risk to direct or indirect disturbance for recreational activities and cross-country travel. Under Alternatives 2, 3, 4, 5, and Modified 5 have no direct or indirect adverse effects from prohibition of cross-country travel; this administrative action would diminish the cumulative risk of disturbance to the 6 occupied sites.

For route additions Alternative 3 would have no indirect effects, where the other alternatives would each have slight varying degrees of indirect effects from additions to the NFTS. As shown in Table 170, when considering the existing NFTS and additions, Alternative 1 provides desirable very low to low road densities on 32.33% of wetland and riparian habitats; Alternative 2 provides 43.21%; Alternative 3 provides 43.73%; Alternative 4 provides 43.62%; Alternative 5 provides 42.88%; and Alternative 5 Modified provides 42.88%. Alternative 1 poses the greatest overall risk for cumulative effects, where the other alternatives would each have slight varying degrees of cumulative effects.

For the new seasonal restrictions there are no anticipated adverse direct, indirect or cumulative adverse effects from these administrative actions to the species or its habitat.

Cumulative Effects from All Other Foreseeable Actions

Cumulative impacts to the northwestern pond turtle include past, present, and future impacts from livestock grazing, roads associated with vegetation and fuels management, and recreational activities. Habitat disturbance and alteration from commercial livestock would be a notable risk factor. However, for this project analysis, the areas where pond turtles and their habitat occur are in vacant or closed grazing allotments. For vegetation projects, the sites where pond turtles occur fall within either off-base and deferred areas under HFQLG or matrix lands under NWFP where no treatments are scheduled. Increased sedimentation may result from wildfires that occurred in Antelope and Deer Creek drainages during July 2008.

Pond Turtle: Determination

There would be no direct effects to pond turtles, under any of the alternatives, from the addition of routes to the NFTS. Alternatives 2 and 3 would have no indirect effects and Alternatives 4, 5, and Modified 5 would have low risk indirect effects due to the addition of a minimal amount of new routes within riparian habitat conservation areas and minimal anticipated cumulative effects. For the new seasonal restrictions there are no direct, indirect or cumulative effects from these administrative actions to the species or its habitat. It has been determined in the Biological Evaluation (Frolli 2009) that Alternatives 2 and 3 would have no adverse effect to Northwestern pond turtle. Alternatives 4, 5, and Modified 5 may affect individuals but are not likely to lead to a trend towards Federal listing.

Willow Flycatcher

Willow Flycatcher: Affected Environment

On Lassen NF, two willow flycatcher (WIFL) subspecies could occur: *Empidonax traillii* ssp. *adastus* and *E. traillii* ssp. *brewsteri.* Both subspecies are on the regional Forest Service Sensitive species list. *E. traillii* ssp. *brewsteri* is the more prevalent subspecies for west slope Sierran habitats on Almanor RD where occupied habitats are found. Lassen NF has one of the largest concentrations of breeding willow flycatcher in the Sierra Nevada. Most birds are located in Warner Valley Ecological Reserve, managed by California Department of Fish and Game (CDFG), situated upstream from Lake Almanor and near the southwest boundary of Lassen Volcanic NP (see Map 29). In California, willow flycatcher is a rare to locally uncommon summer resident in wet meadow and montane riparian habitats at 2,000–8,000 feet elevation in the Sierra Nevada and California Cascades (CDFG 2008b). Willow flycatcher populations in the Sierra Nevada are considered to be at risk (USDA FS PSW Region 2001).

Historically, willow flycatchers were once common throughout the Sierra Nevada. The current distribution of the willow flycatcher has been drastically reduced compared to historic distributions. Therefore, a conservation strategy was put in motion with the SNFPA (USDA FS PSW Region 2001, 2004). Willow flycatcher breeding habitat is characterized as

montane wetland shrub habitat where there is a prevalence of willows and montane meadows with standing or flowing water, or highly saturated soils throughout the nesting season (Green et al. 2003). A study by Cain et al. (2003) indicated that meadow wetness may assist in successful nesting by willow flycatcher by inhibiting potential forest and edge predators from accessing willow flycatcher nests. Meadow wetness is also important for willow flycatcher insect prey species.

Willow Flycatcher: Environmental Consequences

Willow Flycatcher: Direct Effects of Additions to NFTS

As shown in Table 177 within the Lassen NF administrative boundaries there are 3,512 acres of occupied willow flycatcher habitat, 22,419 acres of emphasis wet meadow habitat and 2,788 acres of small wet meadow habitat. On NFS lands, within the project area, 1,581 acres are occupied habitat, 11,959 acres are emphasis habitat, and 1,736 acres are small meadow habitat. The remaining 13,443 acres of habitat are on the CDFG Warner Valley Ecological Reserve and other lands.

Table 177 Willow flycatcher habitats within project area, LNF

Habitat Type	Habitat within Travel Management Project Area	Habitat within LNF Administrative Boundary
Occupied Meadows	1,581 acres	3,512 acres
Emphasis Meadows > 15 acres in size	12,065 acres	22,525 acres
Small Meadows < 15 acres in size	1,900 acres	2,952 acres
Totals	**15,546 acres**	**28,989 acres**

Source: GIS query, 04Apr2009

Under Alternative 1 and within the project area, four occupied sites are at risk to direct or indirect disturbance from recreational activities and cross-country travel (Table 178). Under Alternatives 2, 3, 4, 5, and Modified 5 the number of sites at risk of direct mechanical disturbance from cross-country is zero; Alternatives 4, 5, and Modified 5 may have noise disturbance to these 4 sites though the risk is very low. The number of sites protected under all action Alternatives is much higher when considering routes adjacent to the Warner Ecological Reserve.

Table 178 Willow flycatcher breeding sites within ¼ mile of added routes

Alt 1	Alt 2	Alt 4	Alt 5	Mod 5
31	0	4	4	4

The Willow Flycatcher Conservation Assessment (Green et al. 2003) identified roads as contributing factors responsible for loss and degradation of willow flycatcher habitat. Roads intercept surface and subsurface hydrological flow. Road impacts are increased especially when the road prism bisects a meadow and the road has associated drainage structures to maintain road conditions. Meadow desiccation occurs when hydrological flows are

intercepted and redirected, which may result in long-term habitat loss or degradation. Flycatchers are thought to select meadows with standing water and dense foliage, in part to deter nest predators. Secondary habitat modifications from roads include the increased likelihood of sedimentation, which can impact aquatic invertebrates, a potential willow flycatcher food source.

Emphasis habitats (Table 177) are wet meadows with standing water, woody vegetation (preferably willow stands), and greater than or equal to 15 acres in size; they provide potential suitable nesting habitat for willow flycatchers. Unoccupied emphasis sites within five miles of known breeding sites are thought to have a higher chance of colonization than sites a farther distance from current occupied sites. Smaller meadows, with the needed habitat attributes, also provide potential habitat.

As listed in Table 179, Alternatives 2, 4, 5, and Modified 5 have 0.00, 0.07, 0.07, and 0.07 miles of add route within ¼ mile of a willow flycatcher breeding site. Field review of Route ULA420 indicated that it was not within sight distance of any suitable or occupied WIFL site. This route addition, under Alternatives 4, 5, and Modified 5 would have no ground or sight disturbance on any WIFL breeding site; noise disturbance would be inconsequential.

Table 179 Willow flycatcher occupied meadows intersected by added routes

Habitat Type	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Occupied Meadows (including CDFG Warner Valley)	36	0	0	0	0	0
Occupied Meadows on NFS lands	4	0	0	0	0	0
Added route mileage within ¼ mile of willow flycatcher breeding sites						
ULA420	n/a	0.00	0.00	0.07	0.07	0.07

Source: GIS query, 13 November 2008.

Willow flycatcher: Indirect Effects of Additions to NFTS

As summarized in Table 180, Alternative 1 has 35.1 miles of route that intersect potential willow flycatcher habitat, poses the greatest risk and impediment to future colonizations by willow flycatcher. The emphasis habitats would remain vulnerable to continued cross-country travel and a higher level of human access. Wet meadows, both large and small, would continue to have potential effects from roads. Alternative 2 has a total of 2.4 miles of routes that intersect potential meadow habitats; total disturbance to occupied habitat is 0.1 acres and very low risk. Alternative 4 has a total of 1.2 miles of routes that intersect potential meadow habitats; total disturbance to occupied habitats is 0.4 miles. Alternatives 5 and Modified 5 4 have a total of 4.1 miles of routes that intersect potential meadow habitats; total disturbance to occupied habitats is also 0.4 miles. Alternative 3 would have no effect on any potential suitable willow flycatcher and provides the greatest reduction of risk from roads to all potential willow flycatcher habitats.

: Pacific Southwest Region RSL library; GIS query, 11.13.09.

Willow flycatcher: Direct/Indirect Effects of New Seasonal Restrictions

As illustrated on Map 12 – Alternatives 4 and 5 Seasonal Restrictions (Map Package) and listed in Appendix G, Road Use Category Tables and Appendix E, Mitigation Measures, some of the new seasonal restrictions under Alternatives 4, 5, and Modified 5 are within ¼ mile of known willow flycatcher nest sites. The wet season restriction, in practice extends the winter recreation closure by 30 days (April 1 to April 30) on those identified roads, would occur prior to nesting season; furthermore that administrative action would have no adverse direct or indirect effects even if individual willow flycatchers were in the area.

Table 180 Miles of route within emphasis meadows for willow flycatcher

Habitat Type (Wet Meadow)	Alt 1	Alt 2	Alt 3	Alt4	Alt 5	Mod 5
Occupied Meadows (1,581 acres)	5.1	0.1	0	0.4	0.4	0.4
Emphasis Meadows > 15 acres in size (12,065 acres)	27.2	2.1	0	0.7	3.5	3.5
Small Meadows < 15 acres in size (1,900 acres)	2.8	0.2	0	0.1	0.2	0.2
Total Habitat (15,546 acres)	35.1	2.4	0	1.2	4.1	4.1

The hunting roads season (August 1 to October 31) is outside any known occupied willow flycatcher sites and near the end of the nesting season limited operating period (June 15 to August 15). There are no anticipated adverse direct or indirect effects to willow flycatchers from that new season of use.

Willow Flycatcher: Cumulative Effects

Cumulative Effects from Action Alternatives

Under Alternative 1, there are four occupied sites at risk to direct or indirect disturbance for recreational activities and cross-country travel. Under Alternatives 2, 3, 4, 5, and Modified 5 have no direct or indirect adverse effects from prohibition of cross-country travel; this administrative action would diminish the cumulative risk of disturbance to the four occupied sites.

For route additions Alternative 3 would have no indirect effects, where the other alternatives would each have varying degrees of indirect effects from additions to the NFTS. As shown in Table 170, when considering the existing NFTS and additions, Alternative 1 provides desirable very low to low road densities on 32.33% of wetland and riparian habitats; Alternative 2 provides 43.21%; Alternative 3 provides 43.73%; Alternative 4 provides 43.62%; Alternative 5 provides 42.88%; and Alternative 5 Modified provides 42.88%. Alternative 1 poses the greatest overall risk of habitat fragmentation from

cumulative effects, where the other alternatives would each have varying degrees of cumulative effects.

For the new seasonal restrictions there are no anticipated adverse direct, indirect or cumulative adverse effects from these administrative actions to the species or its habitat.

Cumulative Effects from All Other Foreseeable Actions

Cumulative impacts to the willow flycatcher include past, present, and future impacts from livestock grazing, roads associated with vegetation and fuels management, and recreational activities. The Forest Service has completed a Conservation Assessment of the Willow Flycatcher in the Sierra Nevada (Green et al. 2003), which identified meadow drying, loss of nesting and foraging substrates (riparian shrubs), increased predator access to meadow interiors, and potential cowbird parasitism as among the key factors likely responsible for the decline of the willow flycatcher. Habitat disturbance and alteration from commercial livestock is the most notable risk factor, followed by water development, sedimentation off of forest roads, and recreational activities that attract or provide access routes to competitors and predators.

Roads provide access for livestock grazing, and often, meadows occupied by willow flycatchers are key forage areas for livestock. Excessive historic livestock grazing of wet montane meadows and willow complexes has been identified as the primary contributor to the decline in these specialized willow flycatcher habitats in the Sierra Nevada (Graber 1996, Green et al. 2003, Menke et al. 1996). Cowbirds, often associated with concentrations of livestock, are known to parasitize willow flycatcher nests and ultimately may reduce overall willow flycatcher nesting success (Green et al. 2003). The current habitat conservation strategy implements grazing standards, guidelines and limited operating periods to minimize these livestock effects to these meadow systems (USDA FS PSW Region 2004).

Alternative 1 poses the greatest overall risk to known nesting sites and potentially nesting sites from the combination of roads that intersect occupied or emphasis willow flycatcher meadows that are within active grazing allotments. Cattle trailing would be highest where there are established roads intersecting meadows. Dehydrated wet meadows would provide a dryer meadow complex that would be subject to a more thorough grazing search and higher likelihood of direct nest site disturbance or removal of nest hiding cover. Alternative 3 has no additional cumulative impacts to potential willow flycatcher habitats. Alternatives 4 and 2 have slight cumulative effects to potential unoccupied habitats. Alternatives 5 and Modified 5 may have modest cumulative effects to potential unoccupied habitats. Over time, through passive restoration, meadows would be more inclined to re-hydrate. Cattle trailing would be less pronounced and confined to dryer portions of the meadow complex. The amount and extent of standing water and nest hiding cover would be expected to trend towards site potential.

Willow flycatcher: Determination

It has been determined in the Biological Evaluation (Frolli 2009) that Alternative 3 would have no effect to willow flycatcher. Alternatives 2, 4, 5, and Modified 5 may affect individuals, but are not likely to lead to a trend towards Federal listing.

Management Indicator Species and Associated Habitats

The analysis here is to evaluate and disclose the impacts on the habitat of eight terrestrial Management Indicator Species (MIS) identified in the Lassen NF Forest Plan (USDA FS PSW Region 1993) as amended by the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (USDA FS PSW Region 2007a). This report documents the effects of the proposed action and alternatives on the habitat of selected project-level MIS. The SNF MIS Amendment was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule; 36 CFR 219). The current rule applicable to project decisions is the 2004 Interpretive Rule, which states “Projects implementing land management plans…must be developed considering the best available science in accordance with §219.36(a)…and must be consistent with the provisions of the governing plan.” (Appendix B to §219.35). Guidance regarding MIS set forth in the Lassen Forest Plan (USDA FS PSW Region 1993) as amended by the 2007 SNF MIS Amendment ROD directs Forest Service resource managers to (1) at project scale, analyze the effects of proposed projects on the habitat of each MIS affected by such projects, and (2) at the bioregional scale, monitor populations and/or habitat trends of MIS, as identified in the Lassen Forest Plan as amended.

Direction Regarding the Analysis of Project-Level Effects on MIS Habitat

Project-level effects on MIS habitat are analyzed and disclosed as part of environmental analysis under the National Environmental Policy Act (NEPA). This involves examining the impacts of the proposed project alternatives on MIS habitat by discussing how direct, indirect, and cumulative effects will change the habitat in the analysis area.

These project-level impacts to habitat are then related to broader scale (bioregional) population and/or habitat trends. The appropriate approach for relating project-level impacts to broader scale trends depends on the type of monitoring identified for MIS in the Forest Plan as amended by the SNF MIS Amendment ROD. Hence, where the Lassen Forest Plan as amended by the SNF MIS Amendment ROD identifies distribution population monitoring for an MIS, the project-level habitat effects analysis for that MIS is informed by available distribution population monitoring data, which are gathered at the bioregional scale. The bioregional scale monitoring identified in the Lassen Forest Plan, as amended, for MIS analyzed for the Motorized Travel Management Project is summarized in Section 3 of this report.

Adequately analyzing project effects to MIS generally involves the following steps:

Identifying which habitat and associated MIS would be either directly or indirectly affected by the project alternatives; these MIS are potentially affected by the project.

Summarizing the bioregional-level monitoring identified in the Forest Plan, as amended, for this subset of MIS.

Analyzing project-level effects on MIS habitat for this subset of MIS.

Discussing bioregional scale habitat and/or population trends for this subset of MIS.

Relating project-level impacts on MIS habitat to habitat and/or population trends at the bioregional scale for this subset of MIS.

Direction for Monitoring MIS Population & Habitat Trends at Bioregional Scale

The bioregional scale monitoring strategy for the Lassen NF's MIS is found in the SNF MIS Amendment (USDA FS PSW Region 2007a). Bioregional scale habitat monitoring is identified for all eight of the terrestrial MIS analyzed. The current bioregional status and trend of populations and/or habitat for each of the MIS is discussed in the SNF Forests Bioregional MIS Report (USDA FS PSW Region 2008a).

MIS Habitat Status and Trend

All habitat-monitoring data are collected and/or compiled at the bioregional scale, consistent with the Forest Plan as amended by the 2007 SNF MIS Amendment. Habitats for terrestrial MIS are the vegetation types (e.g., early seral coniferous forest) or ecosystem components (e.g., snags in green forest) required by an MIS for breeding, cover, and/or feeding. MIS for the Sierra Nevada National Forests represent nine major habitats and two ecosystem components (USDA FS PSW Region 2007a), as listed in Table 181. These habitats are defined using the California Wildlife Habitat Relationship (CWHR) System (CDFG 2008b). The CWHR System provides the most widely used habitat relationship models for California's terrestrial vertebrate species (ibid). It is described in detail in the SNF Bioregional MIS Report (USDA FS PSW Region 2008a). Habitat status is the current amount of habitat on the Sierra Nevada Forests. Habitat trend is the direction of change in the amount or quality of habitat over time. The methodology for assessing habitat status and trend is described in detail in the SNF Bioregional MIS Report (USDA FS PSW Region 2008a).

MIS Population Status and Trend - all population monitoring data are collected and/or compiled at the bioregional scale, consistent with the Forest Plan as amended by the 2007 SNF MIS Amendment ROD (USDA FS PSW Region 2007a). The information is presented in detail in the 2008 SNF Bioregional MIS Report (USDA FS PSW Region 2008a).

Population monitoring strategies - population monitoring strategies for MIS on the Lassen NF are identified in the SNF MIS Amendment (USDA FS PSW Region 2007a). Population status is the current condition of the MIS related to the population monitoring data required

in the amendment for that MIS. Population trend is the direction of change in that population measure over time. There are a myriad of approaches for monitoring populations of MIS, from simply detecting presence to detailed tracking of population structure (USDA FS PSW Region 2001: appendix E: 19). A distribution population monitoring approach is identified for the terrestrial MIS in the SNF MIS Amendment (USDA FS PSW Region 2007a). Distribution population monitoring consists of collecting presence data for the MIS across a number of sample locations over time. Presence data are collected using a number of direct and indirect methods, such as surveys (population surveys), bird point counts, tracking number of hunter kills, counts of species sign (such as deer pellets), and so forth. The specifics regarding how these presence data are assessed to track changes in distribution over time vary by species and the type of presence data collected, as described in the SNF Bioregional MIS Report (USDA FS PSW Region 2008a).

Selection of Project level MIS

Management Indicator Species (MIS) for the Lassen NF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA FS PSW Region 2007a). The habitats and ecosystem components and associated MIS analyzed for the project were selected from this list of MIS, as indicated in Table 181. In addition to identifying the habitat or ecosystem components (1st column), the CWHR type(s) defining each habitat/ecosystem component (2nd column), and the associated MIS (3rd column), Table 181 discloses whether or not the habitat of the MIS is potentially affected by this motorized travel management proposed action (4th column).

Given that this project is nearly forest-wide, most terrestrial MIS were identified as either Category 2 or 3 in Table 181. There were no route additions proposed within riparian (yellow warbler) or late seral open canopy coniferous habitats (sooty grouse). Therefore those two habitats were not analyzed in detail. Nine habitats for eight MIS were carried forward in this analysis for evaluation of direct, indirect, and cumulative effects of the proposed action and alternatives.

Bioregional Monitoring Requirements for MIS Project-Level Analysis

MIS Monitoring Requirements

The Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA FS PSW Region 2007a) identifies bioregional scale habitat and/or population monitoring for the Management Indicator Species for ten National Forests, including the Lassen NF (USDA FS PSW Region 2007a). The habitat and/or population monitoring requirements for Lassen NF's MIS are described in the Sierra Nevada Forests Bioregional Management Indicator Species (SNF Bioregional MIS) Report (USDA FS PSW Region 2008a) and are summarized below for the MIS being analyzed for the Motorized Travel Management Project. The applicable habitat and/or population monitoring results are described in the SNF Bioregional

MIS Report (USDA FS PSW Region 2008a) and are summarized under each MIS being analyzed for the proposed action and alternatives.

Habitat monitoring at the bioregional scale was identified for all the habitats and ecosystem components that would be intersected by route additions to the NFTMS: West-slope chaparral-type shrublands; Oak-associated hardwood & hardwood/conifer; Early and Mid seral coniferous forests; late seral closed canopy coniferous forest; snags in green forest; and snags in burned forest as listed in Table 181.

Table 181 Selected MIS for habitat analysis within the project area

Habitat or Ecosystem Component	[a]CWHR Type(s) defining the habitat component	Sierra Nevada Forests Mgt Indicator Species	[b]Category for Project Analysis
Shrubland (west-slope chaparral types)	montane chaparral (MCP), mixed chaparral (MCH), chamise-redshank chaparral (CRC)	fox sparrow *Passerella iliaca*	3
Oak-associated Hardwood & Hardwood/conifer	montane hardwood (MHW), montane hardwood-conifer (MHC)	mule deer *Odocoileus hemionus*	3
Riparian	montane riparian (MRI), valley foothill riparian (VRI)	yellow warbler *Dendroica petechia*	2
Early Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), size classes 1/2/3/4 all canopy closures	Mountain quail *Oreortyx pictus*	3
Mid Seral Coniferous Forest			
Late Seral Open Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 5, canopy closures S and P	Sooty (blue) grouse *Dendragapus obscurus*	2
Late Seral Closed Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), tree size 5 (canopy closures M and D), and tree size 6.	California spotted owl *Strix occidentalis occ.*	3
		American marten *Martes americana*	
		northern flying squirrel *Glaucomys sabrinus*	
Snags in Green Forest	Medium and large snags in green forest	hairy woodpecker *Picoides villosus*	3
Snags in Burned Forest	Medium and large snags in burned forest (stand-replacing fire)	black-backed woodpecker *Picoides arcticus*	2

aAll CWHR size classes and canopy closures are included unless otherwise specified; dbh = diameter at breast height; Canopy Closure classifications: S=Sparse Cover (10-24% canopy closure); P= Open cover (25-39% canopy closure); M= Moderate cover (40-59% canopy closure); D= Dense cover (60-100% canopy closure); Tree size classes: 1 (Seedling)(<1" dbh); 2 (Sapling)(1"-5.9" dbh); 3 (Pole)(6"-10.9" dbh); 4 (Small tree)(11"-23.9" dbh); 5 (Medium/Large tree)(>24" dbh); 6 (Multi-layered Tree) [In PPN and SMC] (Mayer and Laudenslayer 1988).
bCategory 1: MIS habitat not in or adjacent to the project area and not affected by the project.
bCategory 2: MIS habitat in or adjacent to project area, but not directly or indirectly affected by the project;
bCategory 3: MIS habitat either directly or indirectly affected by the project.

Distribution-type population monitoring at the bioregional scale was summarized for fox sparrow, mule deer, mountain quail, California spotted owl, American marten, northern flying squirrel, hairy woodpecker, and black-backed woodpecker. Distribution population monitoring consists of collecting presence data for MIS across a number of sample locations over time (USDA FS PSW Region 2001: appendix E).

How MIS Monitoring Requirements are being met

Habitat and/or distribution population monitoring for all MIS is conducted at the Sierra Nevada scale. Refer to the SNF Bioregional MIS Report (USDA FS PSW Region 2008a) for details by habitat and MIS.

Effects on the Habitat for the Selected Project-Level MIS

The following section documents the analysis for the following 'Category 3' species: The analysis of the effects of the Motorized Travel Management on the MIS habitat for the selected project-level MIS is conducted at the project scale. The analysis used the following habitat data: Lassen NF CALVEG 1999 and CWHR version 8.2 (USDA FS PSW Region 1999, CDFG 2008b) as shown in Table 182. Detailed information on the MIS is documented in the SNF Bioregional MIS Report (USDA FS PSW Region 2008a), which is hereby incorporated by reference.

Table 182 Road-effects Management Indicator Species habitat components

Species name	Habitat Component	Habitat GIS Query	Route Zone of Influence[a]
Fox sparrow ***Passerella iliaca***	West-slope chaparral-type shrublands	Montane chaparral (MCP), mixed chaparral (MCH), chamise-redhank (CRC) @ all size classes	100 meter – noise, cowbirds
Mule deer ***Odocoileus heminonus***	Oak-associated hardwood and hardwood/ conifer	Montane hardwood (MHW), montane hardwood-conifer (MHC) @ all size classes	200 meter – noise disturbance
Mountain quail ***Oreortyx pictus***	Early seral and mid seral Coniferous	Ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), & eastside pine (EPN) @ size classes 1/2/3/4 for all canopy closures.	60 meter – down logs
American marten ***Martes americana*** **CA spotted owl** ***Strix occidentalis*** **Northern flying squirrel** ***Glaucomys sabrinus***	Late seral, closed canopy coniferous	Query on CWHR ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR) @ 5M, 5D, 6	60 meter – snags and down logs 200 meter – noise disturbance Miles of road by alternative
Hairy woodpecker ***Picoides villosus***	Snags in green forest	Medium (15–30-inch) and large (>30-inch) snags in green forest	60 meter – snags and down logs

Species name	Habitat Component	Habitat GIS Query	Route Zone of Influence[a]
Black-backed woodpecker ***Picoides arcticus***	Snags in burned forest	Medium (15–30-inch) and large (>30-inch) snags in burned forest (i.e., stand-replacing fire)	60 meter – snags & downed logs 1) All forested types w/in project 2) 60-m zone of influence on proposed routes; 3) Miles & acres in forest habitats.

Sources: USDA FS PSW Region 2008a, Gaines et al. 2003. a Buffered meters on each side.

Shrubland Habitat for Fox Sparrow

Habitat-Species Relationship

The fox sparrow was selected as the MIS for shrubland (chaparral) habitat on the west-slope of the Sierra Nevada, comprised of montane chaparral (MCP), mixed chaparral (MCH), and chamise-redshank chaparral (CRC) as defined by the California Wildlife Habitat Relationships System (CWHR) (CDFG 2008b). Recent empirical data from the Sierra Nevada indicate that, in the Sierra Nevada, the fox sparrow is dependent on open shrub-dominated habitats for breeding (Burnett and Humple 2003, Burnett et al. 2005, USDA FS PSW Research Station 2007).

Project-level Effects Analysis

Habitat Factor(s) for the Analysis - there are 111,297 acres of shrubland habitat in the project area. Habitat factors included: (1) Acres of shrubland (chaparral) habitat [CWHR montane chaparral (MCP), mixed chaparral (MCH), and chamise-redshank chaparral (CRC)]. (2) Acres with changes in shrub ground cover class (Sparse=10-24%; Open=25-39%; Moderate=40-59%; Dense=60-100%). (3) Acres with changes in CWHR shrub size class (Seedling shrub (seedlings or sprouts <3years); Young shrub (no crown decadence); Mature Shrub (crown decadence 1-25%); Decadent shrub (>25%).

Habitat Conversion Using 4-Meter Road Prism - for the purpose of this analysis all shrubland cover classes were grouped together. Changes in habitat type or size class are limited to the width of the road prism, approximately 4 meters which equates to 111 acres over 70.02 miles or 0.099% of 111,297 acres total habitat within the project area. This percentage of effect in habitat change associated with the road prism would be essentially the same under all action alternatives at less than or equal to 0.00449% of 111,297 acres (Alternative 2 @ 5 acres; Alternative 3 @ 0 acres; Alternative 4 @ 0.2 acres; Alternative 5 @ 4 acres). Given this small value, analysis was not conducted to assess changes in ground cover class or size class. Primary effects from this forest action were assessed using the road-effect zone concept described by Forman et al. (2002) and Gaines et al. (2003).

Current Condition of Habitat Factor(s) in the Project Area

Road-effect Zone of 100 meters - under Alternative 1 there are approximately 70.02 miles of unauthorized route within this habitat type as shown in Table 183. For this project a road-effect zone of 100 meters was assumed to account for potential sensitivity to vehicle noise; fox sparrow are noted for having shy behavioral habits with a preference for dense

vegetation (Weckstein et al. 2002). Fox sparrow are also susceptible to nest parasitism from cow birds (Airola 1986); and increased predator pathways increase the likelihood of predation for this ground nesting species (Forman et al. 2002). There are 5,808 acres affected under existing conditions. This amount of affected habitat accounts for 5.2% of total habitat (111,297 ac) available within the project area and 0.63%t of total habitat (922,000 ac) within NFS lands in the Sierra Nevada (USDA FS PSW Region 2008a).

Direct and Indirect Effects to Habitat

Changes under each action alternatives would be very nominal. Alternative 3 would have no effect on shrubland habitats. Alternative 2 would affect habitat quality on 263 acres; Alternative 4 would affect 8 acres; and Alternative 5 would affect 354 acres. Alternative 5 would affects 0.32% of total habitat (111,297 ac) available within the project area and 0.04%t of total habitat (922,000 ac) within NFS lands in the Sierra Nevada (USDA FS PSW Region 2008a); the other alternatives are proportionally less. All action alternatives have a net enhancement of habitat quality, when compared to Alternative 1.

Table 183 Miles of route and affected acres within shrubland habitat for fox sparrow assuming a 100-meter road effect zone from vehicle noise and sight disturbance

Road Effect	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Route Miles	70.02 mi	3.05 mi	0.00 mi	0.10 mi	3.88 mi
Acres Affected	5,808 ac	263 ac	0 ac	8 ac	354 ac

Source: GIS query, 04Apr2009

Cumulative Effects to Habitat in the Analysis Area

Cumulative effects to shrubland habitat include past, present and future actions from fuels and vegetation management, wild fire, livestock grazing, and recreation activities. Wild fire accounts for the largest change to this habitat type. For example between 1991 and 1996 the Lassen NF had type conversion on 5505 acres of chaparral (CDF 2002, USDA FS 2006a).

Summary of Fox Sparrow Status and Trend at the Bioregional Scale

The Lassen Forest Plan (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the fox sparrow; hence, the shrubland effects analysis for this project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the fox sparrow. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA FS PSW Region 2008a) hereby incorporated by reference.

Habitat Status and Trend - there are currently 922,000 acres of west-slope chaparral shrubland habitat on National Forest System lands in the Sierra Nevada. Within the last decade, the trend has been stable.

Population Status and Trend - the fox sparrow has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including: PRBO on Lassen National Forest from 1997 to present (Burnett and Humple 2003, Burnett et al. 2005); PRBO on Plumas and Lassen National Forests 2002 to present (USDA FS PSW Region 2007); on-going monitoring through California Partners in Flight Monitoring Sites (PRBO CPIF 2002b); Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations from 1992 to 2005 (Siegel and Kaschube 2007); and BBS routes throughout the Sierra Nevada 1968 to present (Sauer et al. 2007). These data indicate that fox sparrows continue to be present at these sample sites, and current data at the range-wide, California, and Sierra Nevada scales indicate that, although there may be localized declines in the population trend, the distribution of fox sparrow populations in the Sierra Nevada is stable.

Project-Level Habitat Impacts relative to Bioregional-Scale Fox Sparrow Trend – Based on the above analysis, it is determined that the change in canopy closure of 0 to 5 acres out of 111,297 is less than or equal to 0.00449% of shrubland habitat within the project area. Potential noise disturbance would be greatest under Alternative 5 at 354 acres or 0.32% of total habitat (111,297 ac) available within the project area and 0.04% of total habitat (922,000 ac) within NFS lands in the Sierra Nevada (USDA FS PSW Region 2008a). This change will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of fox sparrows across the Sierra Nevada bioregion.

Oak-Associated Hardwoods and Hardwood/Conifer Habitat for Mule deer

Habitat-Species Relationship

The mule deer was selected as the MIS for oak-associated hardwood and hardwood/conifer in the Sierra Nevada, comprised of montane hardwood (MHW) and montane hardwood-conifer (MHC) as defined by CWHR (CDFG 2008b). Mule deer range and habitat includes coniferous forest, foothill woodland, shrubland, grassland, agricultural fields, and suburban environments (CDFG 2008b). Many mule deer migrate seasonally between higher elevation summer range and low elevation winter range (ibid). On the west slope of the Sierra Nevada, oak-associated hardwood and hardwood/conifer areas are an important winter habitat (CDFG et al. 1998).

Project-level Effects Analysis

Habitat Factor(s) for the Analysis - there are 26,817 acres of oak-associated hardwood and hardwood/conifer habitat in the project area. Habitat factors include: (1) Acres of oak-associated hardwood and hardwood/conifer habitat [CWHR montane hardwood (MHW), montane hardwood-conifer (MHC)]. (2) Acres with changes in hardwood canopy cover (Sparse=10-24%; Open=25-39%; Moderate=40-59%; Dense=60-100%). (3) Acres with changes in CWHR size class of hardwoods [1/2 (Seedling/Sapling)(<6"" dbh); 3 (Pole)(6"-10.9" dbh); 4 (Small tree)(11"-23.9" dbh); 5 (Medium/Large tree)(>24" dbh)].

Habitat Conversion Using 4-Meter Road Prism - for the purpose of this analysis all oak hardwood/conifer cover classes were grouped together. Changes in habitat type or size class are limited to the width of the road prism, approximately 4 meters which equates to 56.14 acres over 36.32 miles or 0.21% of 26,817 acres total habitat within the project area. This percentage of effect in habitat change associated with the road prism would be essentially the same under all action alternatives at less than or equal to 0.0007% of 26,817 acres (Alternative 2 @ 0.48 acres; Alternative 3 @ 0 acres; Alternative 4 @ 0 acres; Alternative 5 @ 1.86 acres). Given this small value, analysis was not conducted to assess changes in ground cover class or size class. Primary effects from this forest action were assessed using the **road-effect zone** concept described by Forman et al. (2002) and Gaines et al. (2003).

Current Condition of Habitat Factor(s) in the Project Area

Road-effect Zone of 200 meters - under Alternative 1 there are approximately 35.32 miles of unauthorized route within this habitat type as shown in Table 184. For this project a road-effect zone of 200 meters was assumed to account for potential sensitivity to vehicle noise. Deer avoid arterial, surfaced roads more than secondary roads, and also avoid roads at greater distances in open habitats as opposed to areas with vegetative or topographic cover (deVos 2003). Various studies have shown that mule deer displace at distances from 200 to 800 meters (one-eighth to one-half miles), depending upon the road type, traffic levels, and surrounding habitats (Perry and Overly 1977, deVos 2003). There are 192 acres affected under existing conditions. This amount of affected habitat accounts for 0.72% of total habitat (26,817 ac) available within the project area and 0.024%t of total habitat (809,000 ac) within NFS lands in the Sierra Nevada (USDA FS PSW Region 2008a).

Table 184 Miles of route and affected acres within hardwood/conifer habitat assuming a 200-meter road effect zone from vehicle noise and sight disturbance

Road Effect	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Route Miles	35.32 mi	0.30 mi	0.00 mi	0.00 mi	1.17 mi
Acres Affected	192 ac	2 ac	0 ac	1 ac	6 ac

Source: GIS query, 04Apr2009.

Direct and Indirect Effects to Habitat

Changes under each action alternatives would be almost nonexistent. Alternative 3 would have no effect on shrubland habitats. Alternative 2 would affect habitat quality on 2 acres; Alternative 4 would affect 1 acre; and Alternative 5 would affect 6 acres. Alternative 5 would affects 0.02% of total habitat (26,817 ac) available within the project area and 0.0007%t of total habitat (809,000 ac) within NFS lands in the Sierra Nevada (USDA FS PSW Region 2008a); the other alternatives are proportionally less. All action alternatives have a net enhancement of habitat quality, when compared to Alternative 1.

Cumulative Effects to Habitat in the Analysis Area

Cumulative effects to shrubland habitat include past, present and future actions from fuels and vegetation management, wild fire, livestock grazing, and recreation activities. Wild fire accounts for the largest change to this habitat type. For example between 1991 and 1996 the Lassen NF had type reduction of 2,747 acres and type increase of 2,662 acres for an overall net change was a reduction of hardwood cover by 85 acres in oak-associated hardwoods and hardwood/mixed conifer habitats (CDF 2002, USDA FS 2006a).

Summary of Mule Deer Status and Trend at the Bioregional Scale

The Lassen Forest Plan (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the mule deer; hence, the oak-associated hardwood and hardwood/conifer effects analysis for this project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the mule deer. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA FS PSW Region 2008a), which is hereby incorporated by reference.

Habitat Status and Trend - there are currently 809,000 acres of oak-associated hardwood and hardwood/mixed conifer habitat on National Forest System lands in the Sierra Nevada. The trend is slightly increasing (within the last decade, changing from 5% to 7% of the acres on National Forest System lands).

Population Status and Trend - the mule deer has been monitored in the Sierra Nevada at various sample locations by herd monitoring (spring and fall) and hunter survey and associated modeling (CDFG 2007). California Department of Fish and Game (CDFG) conducts surveys of deer herds in early spring to determine the proportion of fawns that have survived the winter, and conducts fall counts to determine herd composition (CDFG 2007). This information, along with prior year harvest information, is used to estimate overall herd size, sex and age rations, and the predicted number of bucks available to hunt (ibid). These data indicate mule deer continue to be present across the Sierra Nevada. Current data at the range-wide, California, and Sierra Nevada scales indicate that, there may be localized declines in some herds or Deer Assessment Units, though distribution of mule deer populations in the Sierra Nevada is stable.

Project-Level Habitat Impacts relative to Bioregional-Scale Mule Deer Trend - based on the above analysis, it is determined that the change in canopy closure of 0 to 1.86 acres out of 26,817 acres is less than or equal to 0.0007% of oak hardwood/conifer habitat within the project area. Potential noise disturbance would be greatest under Alternative 5 at 6 acres or 0.02% of total habitat (26,817 ac) available within the project area and 0.0006% of total habitat (809,000 ac) within NFS lands in the Sierra Nevada (USDA FS PSW Region 2008a). This change will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of mule deer across the Sierra Nevada bioregion.

Early and Mid Seral Coniferous Forest Habitats for Mountain quail

Habitat/Species Relationship

The mountain quail was selected as the MIS for early- and mid-seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat in the Sierra Nevada. Early seral coniferous forest habitat is comprised primarily of seedlings (<1" dbh), saplings (1"-5.9" dbh), and pole-sized trees (6"-10.9" dbh). Mid seral coniferous forest habitat is comprised primarily of small-sized trees (11"-23.9" dbh). The mountain quail is found particularly on steep slopes, in open, brushy stands of conifer and deciduous forest and woodland, and chaparral; it may gather at water sources in the summer, and broods are seldom found more that 0.8 km (0.5 mi) distance from water (CDFG 2008b).

Project-level Effects Analysis

Habitat Factor(s) for the Analysis - There are 493,581 acres of early- and mid-seral coniferous forest habitat in the project area. Habitat factors include: (1) Acres of early (CWHR tree sizes 1, 2, and 3) and mid seral (CWHR tree size 4) coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat [CWHR ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree sizes 1, 2, 3, and 4, all canopy closures]. (2) Acres with changes in CWHR tree size class. (3) Acres with changes in tree canopy closure. (4) Acres with changes in understory shrub canopy closure.

Habitat Conversion using 4-Meter Road Prism - For the purpose of this analysis all early- and mid-seral coniferous forests cover classes were grouped together. Changes in habitat type or size class are limited to the width of the road prism, approximately 4 meters which equates to 883 acres over 555.54 miles or 0.018% of 493,581 acres total habitat within the project area. This percentage of effect in habitat change associated with the road prism would be essentially the same under all action alternatives at less than or equal to 0.01% of 493,581 acres (Alt. 2 @ 18.51 ac; Alt. 3 @ 0 ac; Alt. 4 @ 8.65 ac; Alt. 5 @ 51.01 ac). Given this small value, analysis was not conducted to assess changes in ground cover class or size class. Primary effects from this forest action were assessed using the road-effect zone concept described by Forman et al. (2002) and Gaines et al. (2003).

Current Condition of Habitat Factor(s) in the Project Area

Road-effect Zone of 60 meters - under Alternative 1 there are approximately 555.54 miles of unauthorized route within this habitat type as shown in Table 185. For this project a road-effect zone of 60 meters was assumed to account for potential sensitivity to vehicle noise and sight disturbance, and reduced snags/downed logs from fuel wood gathering. There are 28,275 acres affected under existing conditions. These affected habitat account for 5.73% of total habitat (493,581 ac) available within the project area and 0.85%t of total habitat (3,312,000 ac) on NFS lands in the Sierra Nevada (USDA FS PSW Region 2008a).

Table 185 Miles of added route and affected acres within early & mid seral conifer habitat assuming a 60-m road effect zone from vehicle noise, sight disturbance and reduced snags

Road Effect	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Route Miles	555.54 mi	11.64 mi	0 mi	5.44 mi	32.09 mi
Acres Affected	28,275 ac	556 ac	0 ac	309 ac	1,666 ac

Source: GIS query, 04Apr2009

Direct and Indirect Effects to Habitat

Changes under each action alternatives would be very nominal. Alternative 3 would have no effect on early- and mid-seral coniferous forest habitats. Alternative 2 would affect habitat quality on 556 acres; Alternative 4 would affect 309 acres; and Alternative 5 would affect 1,666 acres. Alternative 5 would affects 0.34% of total habitat (493,581 ac) available within the project area and 0.05%t of total habitat (3,312,000 ac) within NFS lands in the Sierra Nevada (USDA FS PSW Region 2008a); the other alternatives are proportionally less. All action alternatives have a net enhancement of habitat quality, when compared to Alternative 1.

Cumulative Effects to Habitat in the Analysis Area

Cumulative effects to early- and mid-seral coniferous forest habitats include past, present and future actions from fuels and vegetation management, wild fire, livestock grazing, and recreation activities. Wild fire and vegetation management activities have accounted for the largest changes to this habitat type. For example between 1991 and 1996 the Lassen NF had a net decrease of 13,426 acres for all coniferous forests. Regeneration is the largest verified change on NFS lands. Wildfire accounted for the most conifer cover decrease, and re-growth from harvesting or wildfire accounts for the most conifer cover increase (CDF 2002, USDA FS 2006a).

Summary of Mountain Quail Status and Trend at the Bioregional Scale

The Lassen Forest Plan (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the mountain quail; hence, the early and mid seral coniferous forest effects analysis for this project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the mountain quail. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA FS PSW Region 2008a), which is hereby incorporated by reference.

Habitat Status and Trend - There are currently 546,000 acres of early seral and 2,766,000 acres of mid seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat for a total of 3,312,000 acres on National Forest System lands in the Sierra Nevada. Within the last decade, the trend for early seral is slightly decreasing (from

9% to 5% of the acres on National Forest System lands) and the trend for mid seral is slightly increasing (from 21% to 25% of the acres on NFS lands).

Population Status and Trend - mountain quail have been monitored in the Sierra Nevada at various sample locations by hunter survey, modeling, and breeding bird survey protocols, including California Department of Fish and Game hunter survey, modeling, and hunting regulations assessment (CDFG 2004c, 2004d); also BBS routes throughout the Sierra Nevada from 1968 to present (Sauer et al. 2007). These data indicate that mountain quail continue to be present across the Sierra Nevada, and current data at the range-wide, California, and Sierra Nevada scales indicate that the distribution of mountain quail populations in the Sierra Nevada is stable.

Project-Level Habitat Impacts relative to Bioregional-Scale Mountain Quail Trend - based on the above analysis, it is determined that the change in canopy closure of 0 to 51 acres out of 493,581 acres is less than or equal to 0.019% of early and mid-seral coniferous forest habitat within the project area. Potential noise and ground disturbance would be greatest under Alternative 5 at 1,666 acres or 0.34% of total habitat (493,581 ac) available within the project area and 0.05%t of total habitat (3,312,000 ac) on NFS lands in the Sierra Nevada (USDA FS PSW Region 2008a). This change will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of mountain quail across the Sierra Nevada bioregion.

Late Seral Closed Canopy Coniferous Forest Habitat for American marten, California spotted owl, and Northern flying squirrel

Habitat/Species Relationship

American Marten - marten was selected as an MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches dbh) with canopy closures above 40% within ponderosa pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. Martens prefer coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high canopy closure, and an interspersion of riparian areas and meadows. Important habitat attributes are: vegetative diversity, with predominately mature forest; snags; dispersal cover; and large woody debris (Allen 1987). Key components for westside and eastside marten habitat can be found in the Sierra Nevada Forest Plan Amendment FEIS (USDA FS PSW Region 2001), Volume 3, Chapter 3, part 4.4, pg 20-21.

California spotted owl - California spotted owl was selected as an MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches dbh) with canopy closures above 40% within ponderosa

pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. The California spotted owl is strongly associated with forests that have a complex multi-layered structure, large-diameter trees, and high canopy closure (CDFG 2008a, USDI FWS 2006b). It uses dense, multi-layered canopy cover for roost seclusion; roost selection appears to be related closely to thermoregulatory needs, and the species appears to be intolerant of high temperatures (CDFG 2008a). Mature, multi-layered forest stands are required for breeding (ibid). The mixed-conifer forest type is the predominant type used by spotted owls in the Sierra Nevada: about 80 percent of known sites are found in mixed-conifer forest, with 10 percent in red fir forest (USDA FS PSW Region 2001).

Northern flying squirrel - northern flying squirrel was selected as an MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches dbh) with canopy closures above 40% within ponderosa pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. The northern flying squirrel occurs primarily in mature, dense conifer habitats intermixed with various riparian habitats, using cavities in mature trees, snags, or logs for cover (CDFG 2008b).

Project-level Effects Analysis

Habitat Factor(s) for the Analysis - there are 114,709 acres of early- and mid-seral coniferous forest habitat in the project area. Habitat factors include: (1) Acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat [CWHR ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), tree size 5 (canopy closures M and D), and tree size 6]. (2) Acres with changes in canopy closure (D to M). (3) Acres with changes in large down logs per acre or large snags per acre.

Habitat Conversion Using 4-Meter Road Prism - changes in habitat type or size class are limited to the width of the road prism, approximately 4 meters which equates to 81.73 acres over 51.41 miles or 0.071% of 114,709 acres total habitat within the project area. This percentage of effect in habitat change associated with the road prism would be essentially the same under all action alternatives at less than or equal to 0.0048% of 114,709 acres (Alt. 2 @ 1.72 ac; Alt. 3 @ 0 ac; Alt. 4 @ 1.30 ac; Alt. 5 @ 5.50 ac). Given this small value, analysis was not conducted to assess changes in ground cover class or size class. Primary effects from this forest action were assessed using the **road-effect zone** concept described by Forman et al. (2002) and Gaines et al. (2003).

Current Condition of Habitat Factor(s) in the Project Area

Road-effect Zone of 60 meters - under Alternative 1 there are approximately 51.41 miles of unauthorized route within this habitat type as shown in Table 186. For this project a road-effect zone of 60 meters was assumed to account for potential sensitivity from reduced

snags/downed logs by fuel wood gathering. There are 2,547 acres affected under existing conditions. These affected habitat account for 2.22% of total habitat (114,709 ac) available within the project area and 0.256%t of total habitat (994,000 ac) on NFS lands in the Sierra Nevada (USDA FS PSW Region 2008a).

Road-effect Zone of 200 meters - under Alternative 1 there are approximately 51.41 miles of unauthorized route within this habitat type as shown in Table 186. For this project a road-effect zone of 200 meters was assumed to account for potential sensitivity to vehicle noise and sight disturbance, and noise associated with fuel wood cutting. There are 10,169 acres affected under existing conditions. These affected habitat account for 8.865% of total habitat (114,709 ac) available within the project area and 1.023%t of total habitat (994,000 ac) on NFS lands in the Sierra Nevada (USDA FS PSW Region 2008a).

Direct and Indirect Effects to Habitat

Changes under each action alternatives would be nominal. Alternative 3 would have no effect on late-seral, closed-canopy coniferous forest habitats. Alternative 2 would affect habitat quality on 63 acres using a 60-m road effect and 236 acres assuming a 200-m road effect; Alternative 4 would affect 34 acres using a 60-m road effect and 138 acres assuming a 200-m road effect; and Alternative 5 would affect 168 acres using a 60-m road effect and 612 acres assuming a 200-m road effect. For a 200-m road effect zone, Alternative 5 would affects 0.53% of total habitat (114,709 ac) available within the project area and 0.061% of total habitat (994,000 ac) within NFS lands in the Sierra Nevada (USDA FS PSW Region 2008a); the other alternatives are proportionally less. All action alternatives have a net enhancement of habitat quality, when compared to Alternative 1.

Table 186 Route miles & affected acres within late-seral, closed canopy coniferous habitat for marten, California spotted owl, and Northern flying squirrel assuming a 60-meter road- effect zone for snag reduction and a 200-meter road-effect zone for noise and sight disturbance

Road Effect	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Route Miles	51.41 mi	1.08 mi	0.00 mi	0.82 mi	3.46 mi
Acres Affected at 60m	2547 ac	63 ac	0 ac	34 ac	168 ac
Acres affected at 200m	10,169 ac	236 ac	0 ac	138 ac	612 ac

Source: GIS query, 04Apr2009.

Cumulative Effects to Habitat in the Analysis Area

Cumulative effects to late-seral, closed-canopy coniferous forest habitats include past, present and future actions from fuels and vegetation management, wild fire, livestock grazing, and recreation activities. Wild fire and vegetation management activities have accounted for the largest changes to this habitat type. For example between 1991 and 1996 the Lassen NF had a net decrease of 13,426 acres for all coniferous forests. Regeneration is the largest verified change on NFS lands. Wildfire accounted for the most conifer cover

decrease, and re-growth from harvesting or wildfire accounts for the most conifer cover increase (CDF 2002, USDA FS 2006a).

Summary of Late-seral Species Status and Trend at the Bioregional Scale

The Lassen NF Forest Plan (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the American marten, California spotted owl, and northern flying squirrel; hence, the late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat effects analysis for this project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA FS PSW Region 2008a), which is hereby incorporated by reference.

Habitat Status and Trend - there are currently 994,000 acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands in the Sierra Nevada. The trend is slightly increasing (from 7% to 9% within the last decade on National Forest System lands).

Population Status and Trend for American marten - American marten has been monitored throughout the Sierra Nevada as part of general surveys and studies from 1996-2002 (Zielinski et al. 2005). Since 2002, the American marten has been monitored on the Sierra Nevada forests as part of the Sierra Nevada Forest Plan Amendment (SNFPA) monitoring plan (USDA FS PSW Region 2005, 2006c, 2007b). Current data at the range-wide, California, and Sierra Nevada scales indicate that, although marten appear to be distributed throughout their historic range, their distribution has become fragmented in the southern Cascades and northern Sierra Nevada, particularly in Plumas County. The distribution appears to be continuous across high-elevation forests from Placer County south through the southern end of the Sierra Nevada.

Population Status and Trend for California spotted owl - California spotted owl has been monitored in California and throughout the Sierra Nevada through general surveys, monitoring of nests and territorial birds, and demography studies (Verner et al. 1992; USDA FS 2006a; USDA FS PSW Region 2001, 2004; USDA FS PSW Research Station 2007; USDI FWS 2006b). Current data at the range-wide, California, and Sierra Nevada scales indicate that, although there may be localized declines in population trend [e.g., localized decreases in “lambda” (estimated annual rate of population change)], the distribution of California spotted owl populations in the Sierra Nevada is stable.

Population Status and Trend for northern flying squirrel - northern flying squirrel has been monitored in the Sierra Nevada at various sample locations by live-trapping, ear-tagging, camera surveys, snap-trapping, and radio telemetry: On the Plumas and Lassen National Forests from 2002 to present (USDA FS PSW Research Station 2007); and throughout the Sierra Nevada in various monitoring efforts and studies from 1958 through 2004 (USDA FS

PSW Region 2008a: Table NOFLS-IV-1). These data indicate that northern flying squirrels continue to be present at these sample sites, and current data at the range-wide, California, and Sierra Nevada scales indicate that the distribution of northern flying squirrel populations in the Sierra Nevada is stable.

Project-Level Habitat Impacts relative to Bioregional-Scale Trend - based on the above analysis, it is determined that the change in canopy closure of 0 to 5.5 acres out of 114,709 acres is less than or equal to 0.0048% of 114,709 acres of late-seral, closed-canopy coniferous forest habitat within the project area. Potential noise and ground disturbance would be greatest under Alternative 5 at 612 acres or 0.53% of total habitat (114,709 ac) available within the project area and 0.061% of total habitat (994,000 ac) on NFS lands in the Sierra Nevada (USDA FS PSW Region 2008a). This change will not alter the existing trend in the habitat, nor would it lead to a change in the distribution of marten, spotted owl or flying squirrel across the Sierra Nevada bioregion.

Snag Component in Green Forest Habitats for Hairy woodpecker

Habitat/Species Relationship

The hairy woodpecker was selected as the MIS for the ecosystem component of snags in green forests. Medium (diameter breast height between 15 to 30 inches) and large (diameter breast height greater than 30 inches) snags are most important. The hairy woodpecker uses stands of large, mature trees and snags of sparse to intermediate density; cover is also provided by tree cavities (CDFG 2008b). Mature timber and dead snags or trees of moderate to large size are apparently more important than tree species (Siegel and DeSante 1999).

Project-level Effects Analysis

Habitat Factor(s) for the Analysis: (1) Medium (15-30 inches dbh) snags per acre; and (2) large (greater than 30 inches dbh) snags per acre.

Habitat Conversion Using 4-Meter Road Prism—Changes in habitat type or size class are limited to the width of the road prism, approximately 4 meters which equates to 1,403 acres over 882.8 miles or 0.184% of 759,797 acres total habitat within the project area. This percentage of effect in habitat change associated with the road prism would be essentially the same under all action alternatives at less than or equal to 0.011% of 759,797 acres (Alt. 2 @ 18.45 ac; Alt. 3 @ 0 ac; Alt. 4 @ 7.75 ac; Alt. 5 @ 81.73 ac). Given this small value, analysis was not conducted to assess changes in ground cover class or size class. Primary effects from this forest action were assessed using the road-effect zone concept described by Forman et al. (2002) and Gaines et al. (2003).

Current Condition of Habitat Factor(s) in the Project Area

An analysis summary of snags and down wood conditions was conducted on the Lassen NF in 2006 using data from the Forest Inventory and Analysis program (USDA FS 2006a). The number of snags measured across the forest varied greatly, ranging from 0 to just over 8

snags per acre for each forest strata. The mean number of snags per acre across the forest was 2.86. Snags were also evaluated for two size classes, medium snags of between 15 and 30 inches diameter at breast height (dbh), and large snags of over 30 inches dbh. The mean number of medium snags per acre across all strata was 2.24, while large snags numbered less than one (0.62) per acre. The eastside mixed conifer type supported an average of 5.24 snags per acre. This value is greater than the 3 snags per acre recommended by the Guidelines. All other forest types had lower than recommended levels of large snag retention; the red fir forest type had an average of 5.4 snags per acre, compared to a recommended value of 6 snags per acre, and the westside mixed conifer forest type had an average of 3.5 snags per acre, compared with a recommended value of 4 snags per acre. As expected, the eastside pine and westside hardwood types had the lowest snag densities of all forest types evaluated (Figure 9).

Road-effect Zone of 60 meters - Under Alternative 1 there are approximately 882.8 miles of unauthorized route within the coniferous forest habitat types as shown in Table 187. For this project a road-effect zone of 60 meters was assumed to account for reduced snags/downed logs from fuel wood gathering. There are 44,542 acres affected under existing conditions. The affected green snag component, in these coniferous forest habitats, accounts for 5.86% of all coniferous forest habitats (759,797 ac) available within the project area.

Table 187 Miles of route and affected acres on green snag component hairy woodpecker assuming a 60-meter road-effect zone for reduction in snags

Road Effect	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Route Miles	882.80 mi	18.45 mi	0 mi	7.75 mi	51.41 mi
Acres Affected	44,542 ac	914 ac	0 ac	435 ac	2,653 ac

Source: GIS query, 04Apr2009.

Direct and Indirect Effects to Habitat

Changes under each action alternatives would be very nominal. Alternative 3 would have no effect on green snags in coniferous forest habitats. Alternative 2 would affect habitat quality on 914 acres; Alternative 4 would affect 435 acres; and Alternative 5 would affect 2,653 acres. Alternative 5 would affects 0.349% of total habitat (759,797 acres) available within the project area. The other alternatives are proportionally less. All action alternatives have a net enhancement of habitat quality, when compared to Alternative 1.

Cumulative Effects to Habitat in the Analysis Area

Cumulative effects to green snags in coniferous forest habitats include past, present and future actions from fuels and vegetation management, wild fire, livestock grazing, and recreation activities. Wild fire, vegetation management activities For example between 1991 and 1996 the Lassen NF had a net decrease of 13,426 acres for all coniferous forests and associated snags. Regeneration is the largest verified change on NFS lands. Wildfire

accounted for the most conifer cover decrease, and re-growth from harvesting or wildfire accounts for the most conifer cover increase (CDF 2002, USDA FS 2006a). Tree mortality due to overstocked stands and resulting tree stress, increased insect infestations and tree disease have accounted for changes to this habitat component which are not reflected in the 2002 change detection analysis.

Summary of Hairy Woodpecker Status and Trend at the Bioregional Scale

The Lassen Forest Plan (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the hairy woodpecker; hence, the snag effects analysis for the Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the hairy woodpecker. This information is drawn from the detailed information on habitat and distribution population trends in the SNF Bioregional MIS Report (USDA FS PSW Region 2008a), which is hereby incorporated by reference.

Ecosystem Component Status and Trend - The current (based on 2001-2004 inventory sources) average number of medium-sized and large-sized snags (> 15" dbh, all decay classes) per acre across major coniferous and hardwood forest types (westside mixed conifer, ponderosa pine, white fir, productive hardwoods, red fir, eastside pine) in the Sierra Nevada ranges from 1.4 per acre in eastside pine to 8.3 per acre in white fir. Detailed information by forest type, snag size, and snag decay class can be found in the SNF Bioregional MIS Report (USDA FS PSW Region 2008a).

Data from the mid-to-late 1990s were compared with the current data to calculate the trend in total snags per acre by Regional forest type for the 10 Sierra Nevada national forests and indicate that, during this period, snags per acre increased within westside mixed conifer (+0.80), white fir (+1.98), and red fir (+0.68) and decreased within ponderosa pine (-0.17), productive hardwoods (-0.17), and eastside pine (-0.16).

Population Status and Trend - The hairy woodpecker has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including: PRBO – Lassen National Forest monitoring from 1997 to present (Burnett and Humple 2003, Burnett et al. 2005); Plumas and Lassen National Forests from 2002 to present (USDA FS PSW Research Station 2007); Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations from 1992 to 2005 (Siegel and Kaschube 2007); and BBS routes throughout the Sierra Nevada 1968 to present (Sauer et al. 2007). These data indicate that the hairy woodpecker continues to be present at these sample sites, and current data at the range-wide, California, and Sierra Nevada scales indicate that the distribution of hairy woodpecker populations in the Sierra Nevada is stable.

Project-Level Habitat Impacts relative to Bioregional-Scale Hairy Woodpecker Trend - as noted in Figure 9, in this Chapter 3 Wildlife Section, total snag numbers per acre vary from 3 snags/acre in Eastside pine to 6 snags per acre in red fir. Based on the above analysis,

under Alternative 5 it is determined that the potential change in snag abundance could be reduced on up to 2,653 acres out of 759,797 acres which is 0.349% of all coniferous forest habitat within the project area. Other alternatives would be lower. This change will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of hairy woodpecker across the Sierra Nevada bioregion.

Snag Component in Burned Forest Habitats for Black-backed woodpecker

Habitat/Species Relationship

The black-backed woodpecker was selected as the MIS for the ecosystem component of snags in burned forests. Recent data indicate that black-backed woodpeckers are dependent on snags created by stand-replacement fires (Hutto 1995, Kotliar et al. 2002, Smucker et al. 2005). The abundant snags associated with severely burned forests provide both prey (by providing food for the specialized beetle larvae that serve as prey) and nesting sites (Hutto and Gallo 2006).

Project-level Effects Analysis

Habitat Conversion Using 4-Meter Road Prism - changes in habitat type or size class are limited to the width of the road prism, approximately 4 meters which equates to 53 acres over 33.5 miles or 0.44% of 11,957 acres total habitat within the project area (using on change detection data from 1991 to 1996 [(CDF 2002, USDA FS 2006a)]. This percentage of effect in habitat change associated with the road prism would be essentially the same under all action alternatives at less than or equal to 0.002% of 11,957 acres (Alt. 2 @ 0 ac; Alt. 3 @ 0 ac; Alt. 4 @ 0 ac; Alt. 5 @ 0.24 ac). Given this small value, analysis was not conducted to assess changes in ground cover class or size class. Primary effects from this forest action were assessed using the road-effect zone concept described by Forman et al. (2002); Gaines et al. (2003).

Habitat Factor(s) for the Analysis: (1) Medium (15-30 inches dbh) snags per acre within burned forest created by stand-replacing fire. (2) Large (greater than 30 inches dbh) snags per acre within burned forest created by stand-replacing fire.

Current Condition of Habitat Factor(s) in the Project Area

An analysis summarizing change detection on the Lassen NF (CDF 2002, USDA FS 2006a) indicates that, for all vegetation types, total change detection in canopy class was measured and verified at 11,957 acres from wild fire leading to stand replacement. The actual foot print of wildfires, and resulting abundance of burned snags, would likely much greater than this size by a magnitude of ten. For example, between 1999 and 2002, large wildfires, greater than 100 acres in size, totaled 143,883 acres (USDA FS 2006a); with varying degrees of severity; numerous wildfires are not accounted for in this amount. For the purpose of analyzing within this project are, the 2002 change detection value of 11,957 acres was used.

Road-effect Zone of 60 meters - Under Alternative 1 there are approximately 33.5 miles of unauthorized route within burned forest habitat types as shown in Table 188. For this

project a road-effect zone of 60 meters was assumed to account for reduced snags/downed logs from fuel wood gathering. There are 1,935 acres affected under existing conditions. The affected green snag component, in these burned forest habitats, accounts for 16.1% of all burned forest habitats (11,957 ac) available in the project area.

Table 188 Miles of route and affected acres on burned snag component black-backed woodpecker assuming a 60-meter road-effect zone for reduction in snags

Road Effect	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Route Miles	33.50 mi	0.00 mi	0.00 mi	0.00 mi	0.24 mi
Acres Affected	1,935 ac	0 ac	0 ac	0 ac	18 ac

Source: GIS query, 04Apr2009.

Direct and Indirect Effects to Habitat

Changes under each action alternatives would be very nominal. Alternatives 2, 3 and 4 would have no effect on green snags in coniferous forest habitats. Alternative 5 would affect habitat quality on 18 acres; affects 0.15% of total habitat (11,957 ac) available within the project area. All action alternatives have a net enhancement of habitat quality, when compared to Alternative 1.

Cumulative Effects to Habitat in the Analysis Area

Cumulative effects to snags in burned forest habitats include past, present and future actions from suppression, restoration, salvage logging, other fuels and vegetation management, post-fire livestock grazing, and fuelwood cutting. Wild fire and vegetation management activities accounted for a net decrease of 13,426 acres for all coniferous forests and associated snags between 1991 and 1996. Wildfire accounted for the most conifer cover decreases, and re-growth from harvesting or wildfire accounts for the most conifer cover increase (CDF 2002, USDA FS 2006a).

Summary of Black-backed Woodpecker Status and Trend at Bioregional Scale

The Lassen NF LRMP, as amended by SNF MIS Amendment, requires bioregional-scale habitat and distribution population monitoring for black-backed woodpecker; hence, the snags effects analysis for this project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the black-backed woodpecker. This information is drawn from the detailed information on habitat and distribution population trends in the SNF Bioregional MIS Report (USDA FS PSW Region 2008a), which is hereby incorporated by reference.

Ecosystem Component Status and Trend–The current (based on 2001-2004 inventory sources) average number of medium-sized and large-sized snags (> 15" dbh, all decay classes) per acre across major coniferous and hardwood forest types (westside mixed conifer, ponderosa pine, white fir, productive hardwoods, red fir, eastside pine) in the Sierra Nevada ranges from 1.4 per acre in eastside pine to 8.3 per acre in white fir. Detailed

information by forest type, snag size, and snag decay class can be found in the SNF Bioregional MIS Report (USDA FS PSW Region 2008a). These data include snags in both green forest and burned forest. Between the 2000 and 2007 period 211,000 acres have undergone severe burn in the Sierra Nevada. Data from the mid-to-late 1990s were compared with the current data to calculate the trend in total snags per acre by Regional forest type for the 10 Sierra Nevada national forests and indicate that, during this period, snags per acre increased within westside mixed conifer (+0.80), white fir (+1.98), and red fir (+0.68) and decreased within ponderosa pine (-0.17), productive hardwoods (-0.17), and eastside pine (-0.16).

Population Status and Trend - black-backed woodpecker has been monitored in the Sierra Nevada at various sample locations by avian point counts, spot mapping, mist-netting, and breeding bird survey protocols, including: On-going monitoring through California Partners in Flight Monitoring Sites (PRBO CPIF 2002a); Plumas and Lassen National Forests 2002 to present (USDA FS PSW Research Station 2007); Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations from1992 to 2005 (Siegel and Kaschube 2007); various Sierra Nevada monitoring and study efforts from 1970 to present (USDA FS PSW Region 2008a: table BLWO-IV-1); and BBS routes throughout the Sierra Nevada from 1971 to present (Sauer et al. 2007). These data indicate that black-backed woodpeckers continue to be distributed across the Sierra Nevada, and current data at range-wide, California, and Sierra Nevada scales indicate that the distribution of black-backed woodpecker populations in the Sierra Nevada is stable.

Project-Level Habitat Impacts relative to Bioregional-Scale Black-Backed Woodpecker Trend–Based on the above analysis, it was determined that there would be no effect to snags in burned forest habitats under Alternatives 2, 3, and 4. Under Alternative 5 it is determined that the potential change in snag abundance could be reduced on up to 18 acres out of 11,957 acres which is 0.15% of all stand replacing burned areas; the actual area of burned forest may be up to ten times this amount. As described in the SNF Bioregional MIS Report (USDA FS PSW Region 2008a), between the period from 2000 to 2007, severe burns totaled 211,000 acres across the Sierra Nevada. For Alternative 5, the potential change in snag abundance at the Sierra Nevada scale would be 0.0085% at 18 of 211,000 acres in stand replacing burned areas. This minute change would not alter the existing trend in the habitat, nor will it lead to a change in the distribution of hairy woodpecker across the Sierra Nevada bioregion.

Migratory Landbird Conservation on Lassen National Forest

Within the National Forests, conservation of migratory birds focuses on providing a diversity of habitat conditions at multiple spatial scales and ensuring that bird conservation is addressed when planning for land management activities. As part of the Travel Management process, the Lassen NF has conducted an assessment of existing roads and

trails within the project area as described in Chapter 1, Project Location and Scope. Any new construction, reconstruction and maintenance of system roads or trails will be conducted under a separate NEPA analysis and decision. Because current travel management efforts are directed at identifying which existing unauthorized routes will be formally added to the National Forest Transportation System while prohibiting cross-country travel, and because there is no expectation of new construction or development, no changes in the distribution or abundance of habitats available to migratory birds are anticipated.

Changes in authorization are not anticipated to contribute to measurable increase in use levels, but the prohibition of cross-country travel is expected to result in less use across the landscape. Therefore, habitat functionality is expected to remain similar to existing conditions or more likely be enhanced. Levels of noise, sight or ground disturbance, related to OHV use are expected to remain similar to or less than, pre-decisional levels.

Species Not Analyzed in Detail

Great Gray Owl

The project analysis area falls within the range of this species. Sightings have been reported on the Lassen NF. However, to date none have been confirmed and recorded. Since 1996 there have been 15 survey efforts on various meadow/forest areas which are potential suitable habitat for great gray owl. Additional surveys were conducted by CDFG in 2008. There have been no positive detections from these survey efforts (USFS LNF 2670 survey files). Potentially suitable habitat for the great gray owl is scattered across the Lassen NF. Most habitats meeting the above mentioned description occur on the southwest side of the forest south and west of Lassen Volcanic NP. Given that there have been no great gray owls confirmed breeding on the Lassen NF, to date there have been no protected activity center (ggoPACs) established. If great gray owls are present and undetected within the project area, it is presumed that direct effects would be similar to those described for California spotted owl. However, with no known breeding occurrences, in the project area, there would be no effect to nest sites when comparing the No Action against any of the action alternatives. It has been determined in the Biological Evaluation (Frolli 2009) that the proposed project and action Alternatives 2, 4, 5 and Modified 5 may affect individual great gray owls, though not likely to result in a trend towards Federal listing or loss of viability for the species. Alternative 3 would have no effect on great gray owls.

Pallid Bat

The project analysis area falls within the range of this species which has been found in various open habitats across the Lassen NF. Important roost habitats on the Lassen NF would also likely be behind the bark of large pine snags, and in cavities in mature riparian hardwoods found along riparian areas. Given that pallid bats feed mostly by gleaning large terrestrial arthropods (e.g. scorpions, crickets, grasshoppers and beetles) from the ground,

foraging habitat may be more restrictive than roosting habitat (USDA FS PSW Region 2001). This species appears to be more prevalent within edges, in open stands with a large hardwood component and in open areas without trees (ibid pg. 55). Direct effects to this species could include disturbance to roosting individuals. However, there is no known literature which has quantified the noise tolerance levels which would cause the species to abandon their roosts. In general, noise disturbance was not identified as a primary threat to bats by Kunz and Fenton (2003). The direct risk of disturbance under each of the action alternatives would appear to be very low. Kunz and Fenton (2003) identified loss of foraging habitat and roost sites as two primary threats to bats. Given the foraging habits of this species, there do not appear to be any indirect effects of the proposed action or other action alternatives on foraging habitat. However, since pallid bats are roosting habitat generalists and likely to use snags for roosting, the addition of roads to the NFTS may have indirect adverse effects on roost habitat. It has been determined in the biological Evaluation (Frolli 2009) that Alternatives 2, 4 and 5 may affect individual pallid bats, though not likely to result in a trend towards Federal listing or loss of viability for the species. Alternative 3 would have no effect on pallid bats.

Shasta Hesperian

The project analysis area falls within the range of this species which occurs on Lassen NFs in the Pit River watershed. This is a riparian species is provided management protection within Riparian Conservation Areas buffers within the Lassen NF Late Seral Reserves managed under Northwest Forest Plan management direction. As described in Table 148, of the northern spotted owl section, there are currently 1.24 miles of unauthorized route within the Late Seral Reserve. Cross-country travel prohibitions, under all action alternatives would eliminate the risk of ground disturbance to this species or its habitat. There are no route additions, within these riparian buffers, under any of the action alternatives. Therefore, there are no anticipated direct, indirect, cumulative effects from any action alternative. It has been determined in the biological Evaluation (Frolli 2009) that Alternatives 2, 3, 4 and 5 would have no effect to individuals; there would also be no effect to suitable habitats within Late Seral Reserve lands.

Townsend’s big-eared bat

The project analysis area falls within the range of this species which has been found in selective habitats across the Lassen NF. Suitable habitat exists on the west side of Eagle Lake where lava tubes may provide roosting areas. The species is also known to occur in the lava tube complexes on the floor of Hat Creek Valley (Rowe 2003). Direct effects to this species could include disturbance to roosting individuals. However, there is no known literature which has quantified the noise tolerance levels which would cause the species to abandon their roosts. Though this species has been suggested to be sensitive to

disturbance (Brown 1996), noise disturbance was not identified as a primary threat to bats by either Brown (ibid) or Kunz and Fenton (2003). In addition, roost areas in the various lave reefs on the forest would be somewhat inaccessible by OHV users by cross-country travel, designated routes or otherwise. The direct risk of noise disturbance under each of the action alternatives would appear to be very low. It does not appear that route additions would have a direct effect on known roosting areas associated with this species. This species appears to be most affected by loss of roost sites. These roost sites appear to be decreasing on other lands due to shaft closure and disturbance associated with an increasing human population and expanding recreational spelunking (USDA FS PSW Region 2001). However, most roosts on the Lassen NF are thought to be lava tubes associated with several large reefs that would be at very low risk from the proposed actions. It has been determined in the biological Evaluation (Frolli 2009) that Alternatives 2, 4, 5 and Modified 5 may affect individuals though not likely to result in a trend towards Federal listing or loss of viability for the species. Alternative 3 would have no effect on the species.

Valley Elderberry Longhorn Beetle

The project analysis area falls within the range of this species and potential suitable habitat occurs below 3,000 feet in elevation along the foothills in the southwest portion of the forest (i.e. watersheds of Antelope, Deer, Mill and Butte Creeks, Tehama and Butte Counties. Other riparian zones, below 3,000 feet in elevation are within the Pitt River watershed around Lake Britton, Shasta County. Field review of proposed route additions were made in June 2009, when elderberry are at peak bloom and easily detectable from a distance. No suitable habitat has been found near any proposed route addition. It has been determined in the biological Assessment (Frolli 2009) that the proposed project and all other action alternatives would have no effect on the species or its designated critical habitat.

Western red bat

The project analysis area falls within the range of this species which has been found at lower elevations along the Pit River at Lake Britton at the northwest boundary of the Forest (Pierson et al. 2001). Woody riparian forests along the west slope of the Forest appear to provide potential suitable habitat for this species. None of these areas would be affected by the proposed action or other action alternatives. Other possible roost sites include aspen stands in close proximity to riparian areas. Approximately 4,700 acres of aspen have been inventoried on the Forest (USDA FS 2006). It appears unlikely that this species would hibernate on the Forest due to the annual snowfall. Hibernating bats would have to survive under snow for most of the winter. There is no evidence of this ever occurring. Leaf litter hibernation appears to occur on the floor of the Central Valley where snow is not a risk factor. Although this bat's roosts seem to be linked with riparian hardwoods, and there are small stands of aspen throughout the analysis area, there appears to be little chance of

direct effects on this species from the proposed action or other action alternatives. It has been determined in the biological Evaluation (Frolli 2009) that Alternatives 2, 4, 5 and Modified 5 may affect individuals, though not likely to result in a trend towards Federal listing or loss of viability for the species. Alternative 3 would have no effect on the species.

Summary of Effects for Wildlife Habitats

Prohibition of cross-country travel – as discussed under *General Direct and Indirect Effects by Action* there would be no direct, indirect, or cumulative adverse effects to TEP or sensitive wildlife species from the administrative action prohibiting cross-country motorized travel. Road density values were used as a relative measure of habitat fragmentation. Cumulative effects analysis for habitats of each species group accounted for the existing NFTS and additive effects of cross-country prohibitions and route additions to the NFTS. Terrestrial habitats would move towards low road densities by a range of 8.23%, 8.16%, 8.06%, 7.69% and 7.65% under Alternatives 3, 4, 2, 5 and Modified 5, in that order.

Additions to the NFTS – the bulk of analysis found in this Wildlife Section was focused on specific routes that would be added to the NFTS. Alternative 3 would pose the least risk to all species groups, special status species, and Management Indicator Species habitats analyzed in this wildlife section. For most habitat types, the human influence to high-value habitats would be low to moderate under the No Action alternative and negligible or non-existent under Alternatives 2, 4 and 5.

Changes to the existing NFTS vehicle class - The wildlife analysis has been conducted under the assumption that all vehicle types or classes result in the same amount of disturbance effect to wildlife. Therefore, it has been determined that changes to vehicle class or motorized mixed use would have no effects to any species or its habitat.

Changes to the existing NFTS Seasons of Use – For all species there were no direct or indirect adverse effects from implementing administrative actions for winter seasonal restrictions or extending those restrictions on particular roads as wet weather restrictions. For some species groups, Alternatives 4, 5 and Modified 5, these seasonal restrictions would provide additional habitat and breeding season protections from ground or noise disturbance. The hunting access seasonal restriction would have very low or very low risk of direct or indirect effects to some species.

Changes to the existing NFTS from ML-1 to Motorized Trails – Changes of NFTS ML-1 roads to motorized trails has been analyzed together with to route additions to NFTS. There has been no distinction made between effects from either action. One change from ML-1 to motorized trail would require a seasonal restriction mitigation measure in order to keep direct and indirect effects of noise disturbance to California spotted owl at low risk levels.

Table 189 Ranking of Alternatives for each indicator

Indicators	Rankings of Alternatives for Each Indicator					
	1	2	3	4	5	Mod 5
Prohibition of cross-country travel and addition of unauthorized routes to the NFTS						
Acres open to motorized use.	1	4	5	4	4	4
Miles of route within habitat for special-status species.	1	4	5	4	3	3
Effects from additions to NFTS and changes of ML-1 roads to motorized trails						
Number of TES species within ¼ mile of an added route.	1	4	5	4	3	3
Miles of routes within habitat for special statis species.	1	4	5	4	3	3
Density of all motorized routes by species groups.	1	4	5	4	4	4
Changes to the NFTS Seasons of Use						
Spatial proximity and temporal use of NFTS routes or added routes relative to high value habitats such as nesting or fawning habitats or deer winter range.	2	3	3	4	5	5
Average for Wildlife Resources	**1.2**	**3.8**	**4.7**	**4.0**	**3.7**	**3.7**

Note: Indicator Score 5 is most benefical and Indicator Score 1 is least beneficial for wildlife resources related to indicator.

Compliance with Forest Plan Direction

Alternative 1 does not meet most current guidelines with respect to special status species. Most wildlife species analyzed have some level of effect from the high mileage of unauthorized routes across the project area.

Alternative 3 fully meets direction for special status wildlife species listed in Table 190. This alternative would have no adverse effects from prohibition of cross-country travel; no effects from zero route additions to the NFTS; and no effect from zero changes to the existing NFTS. Alternatives 2, 4 and 5 generally meet the management direction for special status wildlife species. Wildlife mitigation measures would be implemented on one added motorized trail (29N21Y) which would lower risk of noise disturbance down to acceptable levels. These alternatives would have no adverse effects from prohibition of cross-country travel; varying degrees of effect from route additions to the NFTS; and varying degrees of effect from zero changes to the existing NFTS. Several federally listed species, northern spotted owl and valley elderberry longhorn beetle, would have no adverse effects from these actions. There would be low risk to all other species analyzed from the cumulative effects of these actions.

Table 190 Summary of Biological Evaluation determinations by alternative

Species	Scientific Name	Alt 2	Alt 3	Alt 4	Alt 5	Mod 5
Federally Listed Threatened Species (USFWS)						
Valley elderberry longhorn beetle	***Desmocerus californicus* ssp. *dimorphus***	NE	NE	NE	NE	NE
Northern spotted owl	***Strix occidentalis* ssp. *caurina***	NE	NE	NE	NE	NE
Forest Service Sensitive Species (Pacific Southwest Region 5)						
American marten	***Martes americana***	MAI	NE	MAI	MAI	MAI
Bald eagle	***Haliaeetus leucocephalus***	MAI	NE	MAI	MAI	MAI
California spotted owl	***Strix occidentalis ssp. occidentalis***	MAI	NE	MAI	MAI	MAI
California wolverine	***Gulo gulo* ssp. *luteus***	MAI	NE	MAI	MAI	MAI
Great gray owl	***Strix nebulosa***	MAI	NE	MAI	MAI	MAI
Greater Sandhill crane	***Grus canadensis ssp. tabida***	MAI	NE	MAI	MAI	MAI
Northern goshawk	***Accipiter gentilis***	MAI	NE	MAI	MAI	MAI
Northwestern pond turtle	***Clemmys marmorata ssp. marmorata***	NE	NE	MAI	MAI	MAI
Pacific fisher	***Martes pennanti ssp. pacifica***	MAI	NE	MAI	MAI	MAI
Pallid bat	***Antrozous pallidus***	MAI	NE	MAI	MAI	MAI
Shasta hesperian	***Vespericola shasta***	MAI	NE	MAI	MAI	MAI
Sierra Nevada red fox	***Vulpes vulpes necator***	MAI	NE	MAI	MAI	MAI
Townsend's big-eared bat	***Corynorhinus townsendii***	MAI	NE	MAI	MAI	MAI
Western red bat	***Lasiurus blossevillii***	MAI	NE	MAI	MAI	MAI
Willow flycatcher	***Empidonax traillii***	MAI	NE	MAI	MAI	MAI

Source: Frolli 2009; NE = No Effect; MAI = May affect individuals, not likely to lead to a trend towards Federal listing

3.14 Special Areas Management

Changes between the DEIS and FEIS

The section was edited for clarity, organization, and conciseness. The outstanding values of Deer and Mill Creek Wild and Scenic corridors are explained. How mitigation for unauthorized routes analyzed in these areas under the various alternatives would preserve these values is explained. Discussion of Modified Alternative 5 was added.

Introduction

Special Area land allocations have been identified on the Lassen NF for their special attention and management direction by the Forest Service, as designated by the Regional Forester or Chief. Like wilderness, Wild and Scenic Rivers are designated by U.S. Congress.

This section examines how alternatives respond to Lassen NF LRMP direction (USDA FS PSW Region 1993) for Special Areas which are land allocations identified in the following categories: Experimental Forests, Research Natural Areas (RNAs), eligible RNAs, Special Interest Areas (SIAs), eligible Wild and Scenic Rivers and designated Wilderness. In addition, this section will address Inventoried Roadless Areas (IRAs) located within the project area. As discussed in Chapter 1, under Project Location, Caribou Wilderness (20,546 ac), Ishi Wilderness (41,399 ac) and Thousand Lake Wilderness (16,355 ac) where taken out of the project analysis area and are not addressed any further in this section.

The LRMP (USDA FS PSW Region 1993: chapter 4) provides general management direction for special areas. Applicable standards and guidelines for this analysis are listed below:

Special Areas – Protect areas of outstanding scientific, scenic, botanic or geologic value as Research Natural Areas or Special Interest Areas (5).

Wild and Scenic Rivers - Protect and enhance outstandingly remarkable values and the free-flowing condition of recommended and designated Wild and Scenic Rivers (5).

Prohibit motorized vehicles within RNAs (69).

Protect recommended RNAs as if they were approved RNAs until completion of Establishment Reports and final decision by the Chief of the Forest Service (69).

Wild and Scenic Rivers - Do not expand developed recreation site capacity or existing access until river plans are adopted (69).

Wild and Scenic Rivers - Allow no degradation of free-flowing condition, outstandingly remarkable values or qualifying features for the proposed classification (Proposed Wild and Scenic Rivers, 70).

Special Areas/Issues and Concerns

Several respondents to the NOI expressed concerns about proposed route designation within Special Areas on the Lassen NF. Most of the comments indicated that the Lassen NF should not designate motor vehicle routes within Special Interest Areas, Eligible Wild and Scenic River segments, or Inventoried Roadless Areas. Those comments stated that the Lassen NF needed to protect the natural resource values for which Special Areas were set aside, and that designating routes within those areas would have negative resource effects.

Several respondents to the NOI specifically addressed adding motor vehicle routes in Special Areas. One comment indicated the Lassen NF should not arbitrarily reject popular OHV routes just because they are located within Inventoried Roadless Areas. Two other responses proposed designation of selected unauthorized routes within IRAs.

Affected Environment and Environmental Consequences

Affected Environment

Experimental Forests

These units are outdoor laboratories set aside by the Forest Service for research and development of forest management techniques. The two experimental forests on the Lassen NF include: Swain Mountain (5,994 acres) and Blacks Mountain (10,853 acres). The Pacific Southwest Forest and Range Experiment Station (PSW Research Station) is responsible for management of these areas and Lassen NF is responsible for implementing the PSW Research Station's management direction for each experimental forest.

Swain Mountain Experimental Forest was designated in 1932 as a place for field studies and demonstration of forest management practices in the true-fir types of California. The initial road system was developed in the early 1950's in preparation for an active program of regenerative research. A subsequent round of research cutting in the 1970's led to development of the current road system within the experimental forest. There are approximately 26 miles of NFTS routes and one mile of unauthorized routes within this unit.

Blacks Mountain Experimental Forest was designated in 1934 as the principal site in California for management studies of the eastside ponderosa pine type. Studies dating back to 1910 have resulted in new theories of management, silviculture, and insect control. A primary objective of this experimental forest was to develop those theories into a system of management, and to test, demonstrate, and improve the system through continuous operation of a timber tract on a commercial scale. An intensive road system, the first in the western United States specifically designed for truck hauling, was developed in this unit. There are approximately 49 miles of NFTS routes and 2.7 miles of unauthorized routes within the experimental forest.

Inventoried Roadless Areas (IRAs)

Approximately 169,400 acres of IRAs are located within the project area. Inventoried roadless areas provide clean drinking water and function as biological strongholds for populations of threatened and endangered species. They provide large, relatively undisturbed landscapes that are important to biological diversity and the long-term survival of many at risk species. Inventoried roadless areas provide opportunities for dispersed outdoor recreation, opportunities that diminish as open space and natural settings are developed elsewhere. They also serve as bulwarks against the spread of non-native invasive plant species and provide reference areas for study and research.

Research Natural Areas

Research Natural Areas are public lands protected permanently to maintain biological diversity and provide ecological baseline information, education and research. Areas representing both widespread and unique ecosystems are selected for RNAs. Non-manipulative research, monitoring, and education are promoted on these RNA lands. In California, the RNA program is administered jointly by the USDA Forest Service Pacific Southwest Research Station and Pacific Southwest Region in collaboration with various Universities and research groups. The LRMP directs that the Lassen NF manage all candidate RNAs to maintain their inherent qualities.

There are two RNAs within the project area; Blacks Mountain RNA (683 acres) and Cub Creek RNA (4,055 acres). There are a total of 3.6 miles of NFTS routes and 1.0 miles of unauthorized routes within these two RNAs.

Additionally, six candidate RNAs are located within the project area: Green Island Lake (1,125 acres); Soda Ridge (1,202 acres); Timbered Crater (1,784 acres); and Mayfield (1,075 acres); Graham Pinery aka Iron Mountain (351 acres); and Indian Creek (2,890 acres). There are a total of 5.4 miles of NFTS routes and 1.5 miles of unauthorized routes within these candidate RNAs. In sum, there are 9.0 miles of NFTS routes and 2.5 miles of unauthorized routes within established or candidate RNAs. Refer to the Botanical Resources section (Chapter 3) for a complete analysis of RNAs.

Special Interest Areas

Special Interest Areas are broadly defined to include areas of unusual or outstanding botanical, aquatic, scenic, geologic, zoological, paleontological, cultural, or other unique characteristics that may merit special attention and management. There are seven SIAs located within the project area: Black Rock (13 acres); Crater Lake (192 acres); Deep Hole (126 acres); Homer-Deerheart (1,477 acres); Montgomery Creek Grove (5 acres); Murken (480 acres); and Willow Lake Bog (59 acres). There are a total of 1.2 miles of NFTS routes and 0.1 miles of unauthorized routes within SIAs.

Based upon current inventory, 2.6 miles of unauthorized routes are located within these areas of the forest. Refer to the Botanical Resources section (Chapter 3) for a complete analysis of SIAs.

Eligible Wild and Scenic Rivers

Segments of three streams within the project area were evaluated and classified in 1979 by the former Heritage Conservation and Recreation Service (incorporated into present USDI Park Service) as suitable and eligible for Wild and Scenic River System designation, commensurate with proposed wild, scenic or recreational classification (USDA FS PSW Region 1993: chapter 4: 70). As described in the Lassen LRMP FEIS (USDA FS PSW Region 1993: FEIS Appendix E), this includes: (a) three segments of Antelope Creek with Wild Eligibility, North Fork (5.72 miles) and South Fork (7.05 miles); (b) seven segments of Deer Creek having either Wild, Scenic, and Recreational (WSR) Eligibility (22.0 miles); and (c) five segments of Mill Creek having either Wild, Scenic, and Recreational Eligibility (24.0 miles). Eligibility studies for these streams were conducted during development of the Lassen NF LRMP. These river segments have been recommended for Wild and Scenic River designation because of their free-flowing condition and "outstandingly remarkable" resource values. The Lassen NF is responsible for administering these river corridors commensurate with their Eligible Wild and Scenic River classifications (USDA FS PSW Region 1993: chapter 4: 70).

As shown in Table 191, there are 4.73 miles of unauthorized routes within Eligible Wild, Scenic or Recreation River corridors in the project area. For the most part, public motor vehicle access to eligible streams is limited to developed recreation sites and pull-outs along State Highway 32 (Deer Creek), and unauthorized routes accessing Mill Creek from State Highway 172. Other than access provided via those two arterial roads, most portions of each Eligible WSR River corridor segment are inaccessible by motor vehicle. The exceptions are a few unauthorized routes accessing dispersed campsites along Mill Creek in the vicinity of Highway 172, and two dispersed recreation sites along Deer Creek that are accessed by NFTS road 27N08.

Environmental Consequences:

Alternative 1 – Direct, Indirect and Cumulative Effects

Experimental Forests: Under the no-action alternative, cross-country motor vehicle travel and use of unauthorized routes would be allowed to continue within these units. There are no recreational facilities or destinations located within the experimental forests, and observed recreation use is very low. Impacts from OHV use have not been found within the Swain Mountain and Blacks Mountain units. However, without cross-country prohibitions, the experimental forests would continue to be subject to potential route proliferation and

resource damage caused by unmitigated OHV use. Over time, the values for which these areas were set aside could be negatively affected if cross-country motorized use increased.

Eligible Wild and Scenic Rivers: Under the no-action alternative, unmitigated cross-country motor vehicle travel would be allowed to continue on 4.73 miles of unauthorized routes within eligible Wild & Scenic corridors along Antelope, Mill and Deer Creek. Unauthorized routes would continue to access dispersed campsites located along each of these stream corridors. Unmanaged use of these sites would likely lead to increase further resource degradation.

Dispersed recreation sites adjacent to eligible Wild and Scenic rivers are subject to recreational impacts typical of heavily-used dispersed recreation sites on the Lassen NF. Evidence of solid human waste is common, as is trash and multiple fire rings. The outstandingly remarkable values identified for sections of Deer Creek include the scenic values of the river corridor and its significance as an anadromous fishery. While the unauthorized routes proposed for designation do not necessarily have a negative impact on the outstandingly remarkable values of Deer Creek, the condition of the recreation sites accessed by those routes does affect the scenic and aesthetic values of the corridor river segments where those dispersed recreation sites occur.

The Wild, Scenic and Recreation River eligibility evaluation for Deer Creek and Mill Creek identified scenic values of those river corridors as ‘outstandingly remarkable’. Interim management of these eligible wild and scenic rivers directs the Lassen NF to only authorize projects that are consistent with protecting the outstandingly remarkable values of the river corridor. The no-action alternative would not fulfill agency direction for protection of scenic values because of negative resource impacts occurring at dispersed recreation sites directly accessed by motor vehicles.

Inventoried Roadless Areas: Under the no-action alternative, these areas would be subject to motor vehicle use. Cross-country travel would not be prohibited and inventoried roadless areas within the project area would be subject to potential route proliferation and associated resource damage.

Alternative 2 – Direct, Indirect and Cumulative Effects

Experimental Forests: Under the proposed action, cross-country motor vehicle travel and use of unauthorized routes would be prohibited within these units. No additional motor vehicle routes would be added within experimental forests. In comparison to the no-action alternative, resource conditions would receive greater protection because of reduced possibilities for damage caused by cross-country travel.

Eligible Wild and Scenic Rivers: This alternative would prohibit cross-country travel by motor vehicles in the Deer Creek and Mill Creek corridors and designate two routes, for a total of 0.13 miles, accessing dispersed recreation sites as listed here and summarized in Table 191:

Rt. No. UBB707 @ 0.08 miles - Mill Creek, Segment 2 – Recreation River eligibility.

Rt. No. UBB707A @ 0.05 miles - Mill Creek, Segment 2 – Recreation River eligibility.

If identified routes are designated, recreation mitigation measures, as described in Appendix A, Table A-2 would be implemented at vehicle accessible sites to protect the "outstandingly remarkable values" for this eligible Recreation River segment on Mill Creek.These values include include rainbow and brown trout, as well as steelhead and spring-run salmon. Yahi-Yani Indians inhabited this drainage. Mitigations include controlled access to designated dispersed camping sites; and signed restriction and closure of any other routes into those designated camps. These administrative actions would maintain the eligibility of these river segments at or above that esthetic value at which they were inventoried in 1979.

Motor vehicle use of unauthorized routes leading to popular dispersed recreation sites along Deer Creek would be restricted to designated and signed camps. It is reasonable to assume that resource conditions would improve in restricted areas along Deer Creek with reduced recreational access and motor vehicle use. However, the reduction of access would have a negative impact for visitors who enjoy camping at two large dispersed recreations sites along Deer Creek. These administrative actions would maintain the eligibility of these river segments at or above that esthetic value at which they were inventoried in 1979, by controlling unrestricted access by motor vehicles, especially keeping vehicles out of the creek.

Inventoried Roadless Areas: Under Alternative 2, there are no proposed routes for designation within IRAs on the Lassen NF. As compared to Alternative 1, these areas would be restricted from motor vehicle use. Cross-country travel would be prohibited and inventoried roadless areas within the project area would be protected from potential route proliferation and associated resource damage. Many of the unauthorized routes would slowly rehabilitate as well as the destinations to which they provided motorized.

Alternative 3 – Direct, Indirect and Cumulative Effects

Experimental Forests: Same as Alt. 2.

Eligible Wild and Scenic Rivers: Alternative 3 would serve to maintain or enhance outstandingly remarkable scenic values within the eligible Wild & Scenic corridors. Under this alternative, cross-country motor vehicle travel would be prohibited within eligible Wild & Scenic corridors along Mill Creek and Deer Creek. As shown in Table 191, no unauthorized routes leading to popular dispersed recreation sites along Deer Creek would be added to the NFTS. It is reasonable to assume that resource conditions at dispersed sites along Deer Creek would improve with reduced recreational access and use. However, the lack of access would have a negative impact for visitors who currently enjoy camping at two large dispersed recreation sites along Deer Creek.

These administrative actions would maintain the eligibility of these river segments at or above that esthetic value at which they were inventoried in 1979.

Inventoried Roadless Areas: Same as Alt 2.

Alternative 4 – Direct, Indirect and Cumulative Effects

Experimental Forests: Same as Alt. 2.

Eligible Wild and Scenic Rivers: This alternative would prohibit cross-country travel by motor vehicles in the Deer Creek and Mill Creek corridors. In the Deer Creek corridor it would designate two long used routes, for a total of 0.48 miles, accessing dispersed recreation sites as listed here and summarized in Table 1:

Rt. No. 260225UC21 @ 0.25 miles – Deer Creek, Segment 6 - Scenic River eligibility.

Rt. No. 270326UC14 @ 0.13 miles - Deer Creek, Segment 4 - Scenic River eligibility.

Rt. No. 270326UC14 @ 0.10 miles - Deer Creek, Segment 5 - Wild River eligibility.

If identified routes are designated, recreation mitigation measures, as described in Appendix A, Table A-2 would be implemented at vehicle accessible sites to protect the "outstandingly remarkable values" for which these eligible Scenic River segments on Deer Creek. These values include resident rainbow and brown trout, as well as steelhead and spring-run salmon that migrate from the Pacific up to the barrier at Upper Deer Creek Fall for spawning. The character of the area remains primitive and the lower section near Deer Creek Flats contains the historic Yahi-Yana Indian site known as Ishi Caves. The river cuts through rugged forested mountains with spectacular geological formations. The only values that might be affected by designating these routes without mitigation are the anadromous fish.

Mitigations include controlled access to designated dispersed camping sites; and signed restriction and closure of any other routes into those designated camps. For Deer Creek, a forest plan amendment would be needed to adjust the identification and description of River Segments 4 and 5, as described in the 1992 Lassen LRMP FEIS Table E-2and Figure E-3, placing the entire route within the adjusted corridor of Segment 4 which has Scenic River eligibility. These mitigation and administrative actions would maintain the eligibility of these river segments at or above that esthetic value at which they were inventoried in 1979. With mitigation, the routes will not impinge upon or cross the creek, and therefore not harm the fish. The plan amendment corrects the mapping error to allow continued use of this entire route as intended in the Plan.

Inventoried Roadless Areas: Same as Alt. 2

Alternative 5 and Modified Alternative 5 – Direct, Indirect and Cumulative Effects

Modified Alternative 5

Modified Alternative 5 has identical affects in Special Management Areas as Alternative 5.

Experimental Forests: Same as Alt. 2.

Eligible Wild and Scenic Rivers: This alternative would prohibit cross-country travel by motor vehicles in the Deer Creek and Mill Creek corridors. In the Deer Creek corridor it would designate two long used routes, for a total of 0.48 miles, accessing dispersed recreation sites as listed here and summarized in Table 1:

Rt. No. 260225UC21 @ 0.25 miles – Deer Creek, Segment 6 - Scenic River eligibility.

Rt. No. 270326UC14 @ 0.13 miles - Deer Creek, Segment 4 - Scenic River eligibility.

Rt. No. 270326UC14 @ 0.10 miles - Deer Creek, Segment 5 - Wild River eligibility.

If identified routes are designated, recreation mitigation measures, as described in Appendix A, Table A-2 would be implemented at vehicle accessible sites to protect the "outstandingly remarkable values" for which these eligible Scenic River segments on Deer Creek. These values include resident rainbow and brown trout, as well as steelhead and spring-run salmon that migrate from the Pacific up to the barrier at Upper Deer Creek Fall for spawning. The character of the area remains primitive and the lower section near Deer Creek Flats contains the historic Yahi-Yana Indian site known as Ishi Caves. The river cuts through rugged forested mountains with spectacular geological formations. The only values that might be affected by designating these routes without mitigation are the anadromous fish.

Mitigations include controlled access to designated dispersed camping sites; and signed restriction and closure of any other routes into those designated camps. For Deer Creek, a forest plan amendment would be needed to adjust the identification and description of River Segments 4 and 5, as described in the 1992 Lassen LRMP FEIS Table E-2and Figure E-3, placing the entire route within the adjusted corridor of Segment 4 which has Scenic River eligibility. These mitigation and administrative actions would maintain the eligibility of these river segments at or above that esthetic value at which they were inventoried in 1979. With mitigation, the routes will not impinge upon or cross the creek, and therefore not harm the fish. The plan amendment corrects the mapping error to allow continued use of this entire route as intended in the Plan.

Inventoried Roadless Areas: Same as Alt. 2

Summary of Direct, Indirect, and Cumulative Effects by Alternative

Table 191 Summary of route miles within Eligible WSR River Corridors by Alternative

River *WSR Eligibility*	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5 and Modified Alt 5.
Antelope Creek					
Wild	0.09	0.00	0.00	0.00	0.00
Deer Creek					
Recreation	1.18	0.00	0.00	0.00	0.00
Scenic	1.01	0.00	0.00	0.38	0.38
Wild	0.49	0.00	0.00	0.10	0.10
Mill Creek					
Recreation	1.84	0.13	0.00	0.00	0.00
Scenic	0.12	0.00	0.00	0.00	0.00
Total	**4.73**	**0.13**	**0.00**	**0.48**	**0.48**

Source: GIS query, 22Sep09.

3.15 Irretrievable and Irreversible Commitment of Resources

Irreversible commitments of resources are those that cannot be regained, such as extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or a road. Unauthorized routes that are added to the Forest Transportation System will represent an irretrievable but not an irreversible commitment of resources as routes can be decommissioned and rehabilitated to pre-disturbance conditions at anytime.

CHAPTER 4. CONSULTATION AND COORDINATION

Interdisciplinary Team Members that Contributed to Preparation of the Document

Brian Barnes – Resource Information (GIS) Specialist

Brian graduated from the University of Northern Iowa in 2000 with a Bachelor of Arts degree in Biology with an Environmental emphasis, a minor in Chemistry, and a program certificate in Cartography and Geographic Information Systems (GIS). He previously worked for the National Park Service, and has worked for the Lassen NF since 2004.

Christopher Bielecki – Supervisory Civil Engineer

Chris holds a Bachelor of Science degree in Forestry from Humboldt State University and a Master of Science degree in Forest Engineering from Oregon State University. He has worked for the Forest Service for nine years, in three regions, on three forests and one research station. Chris currently serves as the Transportation Program Manager on the Lassen NF. His experience includes transportation engineering, logging systems, trail construction, and forestry legislation.

Kirsten Bovee – Assistant Forest Botanist

Kirsten holds a Master of Science degree in Plant Biological Sciences from the University of Minnesota. She has worked as a botanist in California, Colorado, Montana, and Oregon, including positions with Whiskeytown National Recreation Area for the National Park Service, the Forest Service Rocky Mountain Research Station, and the Pacific Southwest Research Station. Kirsten has been with the Lassen NF for three years.

Andrew Breibart – Hydrologist

Andrew received his Bachelors degree in Business Administration from James Madison University in 1991 and his Master of Science degree in Environmental Science and Management from the University of California, Santa Barbara in 2001. Andrew has been a Hydrologist for the Forest Service since 2002.

Robin Bryant – Forester

Robin has a Bachelor of Science degree in Forestry, with an emphasis in Forest Production from Humboldt State University. Robin has 21 years experience in forest management with the Forest Service. Robin has been a Forester and Project Leader on the Lassen NF for 16 years.

Dominic Cesmat – Forester

Dominic holds a Bachelor of Science degree in Forest Resource Management from Humboldt State University. He has 30 years experience with the Forest Service, including experience in timber sale preparation and administration. Since 1985 he has worked as a Planning Forester on the Beckwourth Ranger District of the Plumas NF, and the Almanor and Eagle Lake RDs of the Lassen NF.

Susan Chappell – Fisheries Biologist

Susan received her Bachelor of Science degree in Natural Resources Management, with an emphasis in Fisheries Management from California Polytechnic State University, San Luis Obispo. Susan's experience includes; two years as a Wildlife Biologist for the California Department of Fish and Game, two years as a Wildlife Biologist on the Plumas NF, and two years as Fisheries Biologist for the Eagle Lake Resource Area, Bureau of Land Management. Susan has been a Fisheries Biologist on the Lassen NF since 1990.

John Colby – Fuels Specialist

John attended college at Miami University of Ohio and at Ohio State University. He graduated with a Bachelor of Science degree in Natural Resource Management, in 1975. John started his career with the Forest Service in 1976 as a temporary firefighter on the Gifford Pinchot NF, where he went on to become a Fire and Fuels Planning Specialist. He transferred to the Eldorado NF in California, where he became a Hotshot Captain, and in 1999 he moved to the Lassen NF, and again resumed duties in fire and fuels planning. John has over 30 years of experience in fire management and planning.

Tim Dedrick – Civil Engineering/Transportation Planner

Tim received his Bachelor of Science degree in 1988 from Southern Oregon University and continued his Post Graduate Engineering Studies at the Institute of Transportation Studies, University of California at Berkeley. Tim has 20 years of experience in Civil Engineering at the municipal, state, and Federal levels. He has worked for the Forest Service in master planning and construction engineering/inspection.

Kim Earll – Forest Environmental Coordinator

Kim has a Bachelor of Science degree in Biology from California State University, Chico. She has worked for the Lassen NF as Assistant Forest Botanist, Forest Botanist, and presently as the Forest Environmental Coordinator. Kim has also worked on the Klamath NF as a District Botanist.

Julia Everta – Lands, Special Uses, and Minerals Specialist

Julia earned her Master of Arts degree in Biology from Humboldt State University in 2006, and her Bachelor of Science degree in Kinesiology, Exercise Science emphasis, from Sonoma State University in 1997. She was a teaching associate and tutor in multiple subjects at Humboldt State for five years. Julia started with the Forest Service in 2001 as a Biology Technician. She was then hired as a Lands Utilization Specialist on the Hat Creek RD in 2004. In 2006 she became the Lassen NF Lands, Special Uses, and Minerals Specialist.

Jason Flaherty – Web Manager

Jason received a double major from Sierra Nevada College in Lake Tahoe, with a Bachelor of Science degree in both Ecology and Computer Science. He worked summer positions for the U. S. Geological Survey's Greater Glacier Grizzly Bear DNA Project in Glacier National Park, and with the Forest Service Lake Tahoe Basin Management Unit Pine Marten Project.

He has also worked for a timber marking and GPS crew on the Lassen NF. Since 2006, Jason has been working full time for the Lassen and Plumas NFs as the Web Manager and Multimedia Specialist.

Theresa M. Frolli – Eagle Lake District Ranger

Theresa holds a Master of Arts degree in Geography (GIS) from California State University, Fresno and a Bachelor of Science degree in Rangeland Management from the University of Wyoming. Theresa is currently the District Ranger on the Eagle Lake RD of the Lassen NF. She has been the Forest Planner for the Lassen NF, and served as the NEPA Coordinator for the Herger-Feinstein Quincy Library Group Pilot Project Implementation Team. She has worked for the Forest Service for 27 years, with the last 19 years in resource planning. Theresa has worked at eight national forests within four regions.

Tom Frolli – Range and Wildlife Program Manager

Tom received his Bachelor of Science degree in Range Management, with emphasis in Wildlife Management from Humboldt State University in 1979. He has also taken graduate courses in biology, ecology, and natural resources at University of Nevada, Reno. Tom has worked for the Forest Service 27 years as a Rangeland Management Specialist in California, Colorado, Idaho, Montana, Nevada, and Wyoming. He has worked on Lassen NF for the past seven years as an interdisciplinary Wildlife Biologist and Rangeland Management Specialist and Wildlife Biologist as forest program manager for wildlife, fisheries, botany, invasive species, and livestock grazing.

Lorraine Gerchas – Forester

Lorraine received a Bachelor of Science Degree in Natural Resources Management from California State University, Northridge, and later attended the University of Nevada, Reno, for a second degree in Range, Wildlife, and Forestry. Lorraine began her career with the Forest Service in 1981 on the Angeles National Forest, and has since worked on the Shasta-Trinity, Lake Tahoe Basin Management Unit, and the Eldorado. Her experience is in Special Uses and Recreation, holding various positions as District Recreation and Special Uses Officer, and Asst. Forest Special Uses Officer. After working as the Forest Realty Specialist on the Eldorado, Lorraine accepted a position on the Recreation Solutions Enterprise Unit working on Special Uses, Lands, and Recreation projects.

Jane Goodwin– Resource Officer

Jane has a Bachelors of Arts degree in Recreation Administration with an emphasis in community recreation from California State University, Chico. Jane has worked as a harvest inspector, certified Timber Sale Administrator, and Recreation officer. For the past ten years Jane has served as the District Resource Officer at Almanor RD with program responsibilities for Recreation, Special Uses (recreation and land uses), Trails, Wilderness, OHV, FERC, and Minerals.

Kevin Grady – Soil Scientist

Kevin earned his M.S. in Forestry at Northern Arizona University, Flagstaff, Arizona in 2006 where he focused on understanding the effects of land management on soil properties and processes. Kevin has been collaborating with the Forest Service since 2003.

Blair Halbrooks – Student Trainee (Resources Management)

Blair holds a Bachelor of Science degree in Business Administration from the University of Phoenix and a Masters Certificate from Virginia Tech. She has worked in timber, recreation, and planning for seven years. Currently, she is pursuing further graduate work in human dimensions in resource management.

Amy Harrison-Smith

Amy received a Bachelor of Science degree in Forestry from Humboldt State University in 2002. She worked for state and private industry before moving to Forest Service in 2005 on the Apache-Sitgreaves NF. Since 2007, she has been with the Lassen NF in Pre-Sale on the Eagle Lake District.

Patrick Hickey – Soil Scientist

Patrick received his Bachelor of Science degree in Natural Resources with an emphasis on Soil and Water Systems from North Carolina State University and his Masters Degree in Soil and Land Resources from the University of Idaho. He is a member of both the Soil Science Society of America and Sigma Xi Research Society.

Michael D. Holmes – Forest Fuels Officer

Mike has spent 30 fire seasons working for the Forest Service on the Custer, Inyo, Lake Tahoe Basin, Lassen, Modoc, and Plumas, NFs. He has held numerous positions which include: Supervisor of Engine Modules and Hotshot Crews, Prevention Technician, District Fuels Management Officer, District Fire Management Officer, Forest Fuels Office, and Forest Fire Management Officer. He works at command staff level on incident management teams and is a Prescribed Fire Specialist. Mike was schooled in the woods and on the fire line, with side trips to several colleges and universities that include: Cal Poly University in San Luis Obispo, Colorado State University, Humboldt State University, Lassen College, Mount San Antonio College, University of California at Davis, and Utah State.

Matt House – Resource Information (GIS) Specialist

Matt graduated from Chico State University in 2008 with a Bachelor of Arts in Geography with an emphasis on Physical and Environmental Geography, and a certificate in GIS. He joined the Forest Service in January 2009.

Judy Maddox – Forest Budget Officer

Judy has worked for the Forest Service for 30 years. She earned her degree in Business from Healds Business College in Sacramento, California

Patricia Martinez – Writer/Editor

Pat has worked for the Federal Government for 35 years. She was employed by the Department of Defense in various environmental specialties for 34 of those years. Prior to coming to the Lassen NF, Pat was the NEPA Branch Head at Marine Corp Base, Camp

Pendleton, CA, Hazardous Waste Facility Manager at Camp Pendleton, and a Resource Specialist on the US Naval Station, Guantanamo Bay, Cuba. There she managed the Hazardous Waste, Solid Waste, and Natural Resource Programs. Pat was the Project Manager for a Rapid Ecological Assessment conducted by The Nature Conservancy. Pat earned a Certificate of Hazardous Waste Management from the University of California, Santa Cruz in 1991.

Kevin McCombe – Recreation

Kevin received his Bachelor of Science degree in Land Use Planning from Metropolitan State College, Denver, Colorado in 1985. He has worked for the Forest Service for 19 years in outdoor recreation management on the Gallatin, Tonto, and Lassen NFs.

Melanie McFarland – Forest Fisheries Biologist

Melanie received her Bachelor of Science degree in Fisheries from Humboldt State University. She worked four seasons in fisheries for the California Department of Fish and Game and private organizations/consultants. Melanie worked for three years as a Fisheries Biologist for the U.S. Fish and Wildlife Service and 19 years as a Forest Fisheries Biologist on the Lassen NF.

Kit Mullen – Hat Creek District Ranger

Kit holds a Bachelor of Science degree in Wildlife Biology from Colorado State University. She worked six seasons as a Wildlife Biologist followed by six years as an Environmental Specialist at Wrangell-St. Elias National Park and Preserve, Alaska. From 1992 to 1995 she worked at the National Park Service, Denver Service Center as the Senior Compliance Specialist for the Central Team guiding large planning and NEPA projects. In 1995, Kit went to Grand Teton National Park, Wyoming as the Management Assistant. From 1998 to 2006 she was the Superintendent of Timpanogos Cave National Monument, Utah. Kit has been the Hat Creek District Ranger on the Lassen NF since December 2006.

Mark Nebel – GIS Coordinator (transferred)

Mark earned his Bachelor of Science degree in Geology from the University of Wisconsin. He received his Master of Science degree in Geology from the University of Minnesota, and a Ph.D. in Geology from the Colorado School of Mines. He has over 17 years of work experience in GIS, as a consultant for private industry. He has also worked for the Wisconsin Department of Natural Resources and the Forest Service. Mark has been the GIS Coordinator for the Lassen NF since 2002.

Christopher O'Brien – Public Services Officer

Chris has a Bachelor of Science degree in Anthropology from the University of California, Davis and Masters of Arts and Ph.D. degrees in Anthropology from the University of Wisconsin, Madison. He has been conducting archaeological research in North America and Africa for 25 years. Chris has been with the Lassen NF as an archaeologist since 1995. He has been the Heritage (Cultrual) Program Manager for the Lassen NF since 2002, and recently obtained the position of Public Services Officer for the Lassen NF.

Priscilla Peterson – Resource Information (GIS) Specialist

Priscilla received her Bachelor of Science degree in Anthropology in 1985 from the University of Oregon. She received a GIS Certificate from Chico State University Graduate School in 2001. Priscilla started her Forest Service career in 1984. After working various technician positions, she worked as a Wildland Firefighter from 1987 – 1989. She then worked as an Archaeologist from1989 – 2001. Priscilla has worked as a Natural Resources Information Specialist (GIS) since 2001.

Terre Pearson-Ramirez – Forester

Terre received a Bachelor of Science Degree in Forest Management from the University of Maine in 1987. She has worked as a Forester for the Forest Service in project planning and implementation for the past 18 years.

David Pilz – Natural Resource Planner

David earned his M.S. in Forest Ecology at Oregon State University in 1982. He has worked as a forest fire fighter, reforestation technician, forest nursery seed specialist. Most recently he was a researcher with the Pacific Northwest Research Station in Corvallis, OR where he published extensively on nontimber forest products and managing for commercial harvests of wild edible mushrooms. He joined the Travel Management Interdisciplinary Team on the Lassen National Forest in January 2009.

Brenda Reed – Archaeologist

Brenda received her Bachelor and Masters of Science in Archaeology from the University of Montana. She completed additional studies in Archaeology at the University of Washington. Her diverse experience has been within the western United States, including the Central Coast of California and eastern Nevada. Her recent experience includes work on the Los Padres National Forest, and for the Bureau of Land Management.

Leona Rodreick – Public Affairs Specialist

Leona obtained an Associate of Science degree in Forestry from Flathead Valley Community College in Kalispell, Montana. She earned her Bachelor of Science degree in Human Services from Eastern Montana College in Billings, Montana. Leona began her career in 1979 and has worked for several national forests including the Cleveland, Colville, Flathead, Gifford-Pinchot, Helena, Humboldt, Lassen, and Lewis and Clark. Her work background includes fire prevention and suppression, recreation, timber, range, wilderness and trails management. She is currently a Public Affairs Specialist and serves on a Type 1 Incident Team as a Public Information Officer.

Allison L. Sanger – Forest Botanist

Allison has a Bachelor of Science degree in Environmental and Systematic Biology, with an emphasis in Fisheries and Wildlife Management from California Polytechnic State University, San Luis Obispo, California. She has two years of Botany graduate coursework from California State University, Chico. Allison has 15 years experience in botany and weed

ecology working for the Bureau of Land Management as well as the Modoc and Lassen NFs in California.

Jennifer Sieracki – Resource Information (GIS) Specialist

Jennifer earned a Bachelor of Science degree in Fisheries and Wildlife Conservation, with a minor in Forest Resources, and a Masters of Science, in Forestry, with a focus in GIS and remote sensing systems from the University of Minnesota, Twin Cities in 2000. Jennifer worked for the National Park Service, Great Lakes Network as a Data Specialist for four years. Prior to that, she worked for a small private consulting firm in the Minneapolis area as a GIS Specialist/Ecologist. Jennifer has been working for the Lassen NF, since January of 2008.

Sabrina Stadler – Natural Resource Planner

Sabrina has a Bachelor of Science degree in Biology and a Masters degree in Natural Resources Planning and Interpretation from Humboldt State University. She has worked for the Plumas NF as Senior NEPA Planner for the past five years. She took a temporary promotion to work with the Lassen NF to finalize their Travel Management Plan. Prior to working for the Forest she worked as an Ecologist and GIS analyst doing baseline mapping and watershed planning.

Molly Simonson – Forester

Molly received two Bachelor of Science degrees, in Forestry and Wildlife Ecology, from the University of Maine in 2007. She started working, seasonally, for the Forest Service in 2004 on a timber crew. In 2006 she was picked up through the Student Career Employment Program (SCEP) with a target to a Forester position, which she obtained in 2007.

Scott Tangenberg – Forest Hydrologist

Scott earned a Bachelor of Arts degree in Geology from the University of Colorado at Boulder and a Master of Science degree in Geology from the University of Utah. Scott has worked for the Forest Service since 2000 as a Hydrologist, Content Analyst, and Watershed Program Manager. Scott has worked on the Black Hills, Umpqua, and Lassen NFs.

Karen Vandersall – Fisheries Biologist

Karen graduated with a Bachelor of Arts degree in Biology from the University of Delaware in 1992. She has worked in the field of Aquatic Ecology for 16 years. Karen has worked for the University of Maryland, the National Park Service, U. S. Fish and Wildlife Service, U.S. Geological Survey, and the Forest Service.

Jack Walton – Forest Engineer

Jack received his Bachelor of Science degree in Civil Engineering from Montana State University in 1972. Jack has been a Supervisory Civil Engineer for the past 30 years, the last nine of those years as Forest Engineer. He has been on five national forests, in five regions. His experience include: Design and Construction Inspector, Construction and Maintenance Engineer, Surveyor, Designer, Facilities Engineer, Transportation Planner, Operations and Management Engineer, Zone and Winter Sports Engineer, and Forest

Engineer. Jack has been involved with implementing access and travel management policies since 1987 and is a registered Professional Engineer in Colorado, Idaho, Montana, and Washington.

Joshua Wilson – Economics

Joshua Wilson has worked as an Economist for TEAMS Enterprise since October 2007. He began working for the Forest Service as an economist for Ecosystems Management Coordination (EMC) as a student in March of 2006. Joshua holds a B.S. in Managerial Economics with an emphasis in Agriculture from the University of California Davis, and a M.S. in Agricultural Economics from Colorado State University. He is currently working toward a PhD in Forestry Economics at Colorado State University.

Jeff Withroe – Ecosystems Manager (Retired)

Jeff received his Bachelor of Science degree in Forest Management from Humboldt State University in 1975. He has worked for private industry and the California Department of Forestry. For the last 32 years, Jeff has worked for the Forest Service in a number of resource management positions.

Federal, State, and Local Agencies Consulted

California Department of Fish and Game

Lassen County Board of Supervisors

Modoc County Board of Supervisors

National Marine Fisheries Service

Plumas County Board of Supervisors

Plumas National Forest

Shasta-Trinity National Forest

Tehama County Board of Supervisors

USDA Forest Service, Pacific Southwest Regional Office

US Fish and Wildlife Service

Tribal Governments Consulted

Greenville Rancheria

Pit River Tribe

Susanville Indian Rancheria

Other Groups Consulted

Blue Ribbon Coalition

California Wilderness Legacy Project

California Wilderness Society

Recreation Outdoor Coalition

Susanville Rotary

Notifications of availability of Travel Management DEIS for public comment.

Agencies contacted

USDA National Agricultural Library
Head, Acquisitions & Serial Branch
10301 Baltimore Blvd., Rm. 002
Beltsville, MD, 20705

National Marine Fisheries Service
Habitat Conservationists Division
Southwest Region
501 West Ocean Blvd., Suite 4200
Long Beach, CA, 90802-4213

Environmental Protection Agency
Region 9
EIS Review Coordinator
75 Hawthorne Street
San Francisco, CA, 94105

Director, Planning and Review
Advisory Council on Historic Preservation
1100 Pennsylvania Ave., NW
Suite 809
Washington, DC, 20004

Deputy Director
USDA APHIS PPD/EAD
4700 River Rd., Unit 149
Riverdale, MD, 20737-1238

Natural Resources Conservation Service
National Environmental Coordinator
U.S. Department of Agriculture
P.O. Box 2890, Room 6158-S
Washington, DC, 20013-2890

USDA Office of Civil Rights
Room 326-W, Whitten Building
14th and Independence Aves., SW
Washington, DC, 20250-9410

NOAA Office of Policy
and Strategic Planning
NEPA Coordinator, 14th and Constitutional Ave. NW
Room 6117
Washington, DC, 20230

U.S. Army Engineer Division,
South Pacific
CESPD-CMP, 1455 Market Street
San Francisco, CA, 94103-1398

U.S. Coast Guard (USCG)
Environmental Management
CG-443, 2100 2nd Street, SW
Washington, DC, 20593

Western-Pacific Region
Regional Administrator
Federal Aviation Adminstration
15000 Aviation Blvd.
Lawndale, CA, 90261

Division Administrator
Federal Highway Administration, 650 Capitol Mall
Suite 4-100
Sacramento, CA, 95814

U.S. Department of Energy
Director, Office of NEPA
Policy and Compliance
1000 Independence Ave, SW
Mail Code EH-42, Room 3E094
Washington, DC, 20585

Tribes Contacted

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Honorable Stacy Dixon
Chairman
Susanville Indian Rancheria
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Susanville, CA, 96130

Honorable Waldo Walker
Chariman
Washoe Tribe of California and Nevada
919 U.S. 395 South
Gardnerville, NV, 89410

Honorable Dennis Ramirez
Chairman
Mechoopda Indian Tribe of Chico Rancheria
125 Mission Rd.
Chico, CA, 95926

Honorable Barbara Murphy
Chairperson
Redding Rancheria
2000 Redding Rancheria Road
Redding, CA, 96001

Honorable Ida Riggins
Chairwoman, Pit River Tribe
37118 Main Street
Burney, CA, 96013

Outreach For Comments

Emails

2,382 emails to everyone and (including organizations and agencies) that ever inquired about the project

US Postal Service Mailed to:

45 Businesses (Sports shops, resorts, repair shops, etc.)

California Wilderness Project
Trails West, Inc., President
The Wilderness Society
Pacific Crest Trail Assoc.
771 Individuals (Many associated with organizations)

Agencies, Organizations and Businesses

Ace Hardware
American Sportfishing Association
Assemblyman Rep. Senior Field Steve Thompson
Beaty and Associates
Bicycle Bananas
Bicycle Warehouse
Big 5 Sporting Goods
Big Valley Honda
Bikes etc.
Blue Ribbon Coalition
Bodfish Bicycles
Boone & Crockett Club
Butte Co. Public Works
CA DFG
CA/NV Chapter of OCTA, President
CA/NV Chapter of OCTA, Trail Preservation Officer
California Wilderness Project
Camp Tehema
Champs Sports

Check Logging
Chester Mountain Sports
Childs Meadow Resort
Collage Cyclery
Cycle Sport
District 2 Caltrans
Dupont Power Tool
El Reglo
Fast Wheels Bike Shop
Fruit Growers Supply Company
Great Basin Bicycles
High Sierra Cycling and Fitness
HPE Inc.
Humboldt-Toiyabe National Forest
Jones Logging
Kawasaki of Reno
King Sport Int Inc
Lassen Motorcycle Club
Lee's Motorcycles & ATV's
Los Gatos Motorcycle Club
Mark Fore & Strike
Medici Logging, Inc.
Member of OCTA/Trails West, Inc.
Modoc County S.O.
Mother Lode Bicycles
Mountain Top Sports
North Valley 4 Wheel Drive
Northwest Chapter of OCTA, Trail Preservation
Off-Road Junkies
Pacific Crest Trail Assoc.
Peloton Bicycles
Plumas Co. Public Works
Public Lands Department Manager
Recreation Outdoor Coalition
Red Bluff Sporting Goods
Redding Sports LTD
REI-Recreational Equipment Inc.
Reno Cycles and Gear
Reno Mountain Sports

Ross Auto Repair
Shasta Co. Sheriff
Sierra Access Coalition
Sierra Cyclesmith
Sierra Mountain Sports
Sierra Pacific Industries
Sonora Pass Sno-Goers
Sportsman
Sportsman Warehouse
Sprockets Bike Shop
The Bidwell House
The Bike Shop
The Bike Station
The Sports Authority
The Sports Nut
The Wilderness Society
Trails West, Inc., President
US Senator Diane Feinstein
USDA Forest Service, Pacific Southwest Research Station
Vanmeter AG

CHAPTER 5. GLOSSARY OF TERMS AND ACRONYMS

Administrative Roads: Roads that are managed for administrative access to and within the National Forest; generally closed to full-size vehicle use by the public; may be closed to other uses.

ADT: Average Daily Traffic.

Anadromous Fish: A group of fish that hatch in freshwater creeks, travel to the ocean to grow and mature, then return to the creek or river of their birth to spawn.

Annual Maintenance: Work performed to maintain serviceability, or repair failures during the year in which they occur. Includes preventive and/or cyclic maintenance performed in the year in which it is scheduled to occur. Unscheduled or catastrophic failures of components or assets may need to be repaired as a part of annual maintenance.

APE: Area of Potential Effect(s).

Area: A discrete, specifically delineated space that is smaller, and in most cases much smaller, than a Ranger District.

Arterial Road: A road within the primary transportation system; main roads designed to handle higher volumes of traffic and to provide access to key locations across the forest.

ATV: All-Terrain Vehicle.

BA: Biological Assessment.

BE: Biological Evaluation.

Beneficial (water) use: How water will be used. Beneficial uses include, but are not limited to, domestic, irrigation, frost protection, heat control, power, municipal, mining, industrial, recreational, fish and wildlife preservation and/or enhancement, aquaculture, stock-watering, and water quality.

Benthic: Relating to the bottom of a sea or lake or the organisms that live there.

Biomass: The mass of living organisms within a particular environment, measured in terms of weight per unit of area; the oven-dry organic matter used as a source of fuel.

Biota: The combined flora and fauna or a region.

BLM: Bureau of Land Management.

BMP: Best management Practice(s).

BMPEP: Best Management Practices Evaluation Program.

Board foot/feet: The board-foot is a specialized unit of volume for measuring lumber in the United States and Canada. It is the volume of a one foot length of a board one foot wide and one inch of nominal thickness.

CAA: Clean Air Act.

Cal EPA: California Environmental Protection Agency.

CAL VEG: California Vegetation.

CAR: Critical Aquatic Refuge.

CARB: California Air Resources Board.

CCAA: California Clean Air Act.

CDFA: California Department of Food and Agriculture.

CDFG: California Department of Fish and Game.

CEQ: Council on Environmental Quality.

CFR: Code of Federal Regulations.

Chips: Wood rendered into small pieces to be used for bulk products such as pulp or particle board or to be used as fuel.

Collector Roads: Intermediate branch roads the collect and connect local roads to arterial roads.

Cord(s): Unit of volume to measure stacked firewood, usually 4 feet x 4 feet x 8 feet (128 cubic feet).

Crash Probability: The potential for a crash/accident to occur resulting from factors affecting traffic safety.

Crash Severity: The probable degree of property damage and personal injury, resulting from a crash/accident.

Cross-Country: Use of motor vehicles on NFS lands off of existing roads, trails, and off-route use areas.

CSU: California State University.

Cultural Resources: Previously referred to as “Heritage Resources.” The places, artifacts, structures, items, and other documentation of the human record on the landscape.

Cultural Resource Sites: Sites, buildings, structures, and objects older than 50 years that have been influenced by humans. These sites are of historic and archaeological interest.

CWE: Cumulative Watershed Effects.

CWHR: California Wildlife Habitat Relationship.

DCH: Designated Critical Habitat.

Decommission: Demolition; dismantling; removal; obliteration; and/or disposal of a deteriorated or otherwise unneeded asset or component, including necessary cleanup work. This action eliminates the deferred maintenance needs for the fixed asset. Portions of an asset or component may remain if they do not cause problems nor require maintenance.

Decommissioned Routes: Roads and travel ways removed from access to and within the National Forest.

Deferred Maintenance: Maintenance that was not performed when it should have been or when it was scheduled and which, therefore, was put off or delayed for a future period. When allowed to accumulate without limits or consideration of useful life, deferred maintenance leads to deterioration of performance, increased costs to repair, and decrease in asset value. Deferred maintenance needs may be categorized as critical or non-critical at any point in time. Continued deferral of non-critical maintenance will normally result in an increase in critical deferred maintenance. Code compliance (e.g. life safety, Americans with

Disabilities Act,Occupational Health and Safety Act, environmental, etc.), Forest Plan Direction, Best Management Practices, Biological Evaluations other regulatory or Executive Order compliance requirements, or applicable standards not met on schedule are considered deferred maintenance.

DEIS: Draft Environmental Impact Statement.

Designated Road, Trail, or Area: A National Forest System road, a National Forest System trail, or an area on National Forest System lands that is designated for motor vehicle use pursuant to Section 212.51 on a motor vehicle use map (MVUM).

DSD: detrimental soil disturbances.

EFH: Essential Fish Habitat.

EHR: erosion hazard rating.

EIS: Environmental Impact Statement.

Engineering Analysis: An analysis conducted by or under the supervision of a qualified engineer of a National Forest System road, road segment, or road system being considered for motorized mixed use designation. The analysis and evaluations may include recommended mitigation measures. The analysis may be the documentation of engineering judgment or, if the issues involved are more complex, may be documented in an engineering report that addresses multiple factors related to motorized mixed use.

Engineering Judgment: The evaluation of available information and the application of appropriate principles, standards, guidance, and practices as contained in these guidelines and other sources for the purpose of considering motorized mixed use designation for a NFS road. Engineering judgment must be exercised by a qualified engineer or by an individual working under the supervision of a qualified engineer, through the application of procedures and criteria established by the qualified engineer.

Engineering Report: A report, signed by a qualified engineer, analyzing the factors in these guidelines, and other applicable factors, pertaining to the proposed designation of a NFS road for motorized mixed use. The report may identify alternatives for mitigation measures to reduce crash probability or crash severity. The report identifies risks associated with those alternatives and provides recommendations to the responsible official regarding the proposed designation for motorized mixed use.

EPA: Environmental Protection Agency.

Ephemeral: Lasting for only a short period of time. Example: An ephemeral stream may exist only during the “rainy” season.

ESA: Endangered Species Act.

Facility (Forest Transportation Facility): A classified road, designated trail, or designated airfield, including bridges, culverts, parking lots, log transfer facilities, safety devices and other transportation network appurtenances under Forest Service jurisdiction that is wholly or partially within or adjacent to National Forest System lands. (36 CFR § 212.1).

FE: Federally Endangered.

FEIS: Final Environmental Impact Statement.

Fell Field: A fell field comprises the environment of a slope, usually alpine or tundra, where the dynamics of frost (freeze and thaw cycles) and of wind give rise to characteristic plant forms in rocky crags.

Fen: Groundwater-fed wetlands that develop where perennially saturated soils and cool temperatures slow the decomposition of plant material, allowing it to accumulate and form organic soils, called peat.

FERC: Federal Energy Regulatory Commission.

FT: Federally Threatened.

FHWA: Federal Highways Administration.

Forest Plan: Guidance document on management of the forest.

Forest Transportation Atlas: A display of the system of roads, trails, and airfields of an administrative unit.

Habitat Factor(s) for the Analysis: The system of National Forest System roads, National Forest System trails, and airfields on National Forest System lands.

FR: Federal Register.

Fry: Baby fish.

FS: Forest Service.

FSH: Forest Service Handbook.

FSM: Forest Service Manual.

FSS: Forest Service sensitive.

NFTS: Forest Transportation System.

Geomorphic/Geomorphology: Pertaining to; or like the form or figure of the earth/study of form, nature and evolution on earth's surface.

GIS: Geographic Information System.

GPS: Global Positioning System.

Green Volume: Volume of cut timber from live trees.

Ground disturbing activity: In the context of this document, and pertaining to roads, ground disturbing activity is defined as road reconstruction or decommissioning. These activities exceed the minor disturbances described under the definition of "road maintenance" and in the mitigation tables.

Gully: a small channel (greater than 2 inches deep) formed by concentrated water and displacement of soil.

Habitat: An ecological or environmental area that is inhabited by a particular species. It is the natural environment in which an organism lives, or the physical environment that surrounds (influences and is utilized by) a species population.

Heritage Resources: Now referred to as "Cultural Resources." The places, artifacts, structures, items, and other documentation of the human record on the landscape.

HFQLG: Herger-Feinstein Quincy Library Group.

Highway-Legal Vehicle: Any motor vehicle, to include the operator, who is licensed or certified for general operation on public roads within the State.

HUC: Hydrologic Unit Code Number.

IDF: Integrated Design Features.

IDT: Interdisciplinary Team.

INFRA: Infrastructure Data Base.

Infrastructure: Typically refers to the technical structures that support the forest, such as roads, water supply, power grids, flood management systems, communications, and so forth.

Interdisciplinary: Integrating several academic disciplines, professions, or technologies, along with their specific perspectives, in the pursuit of a common task. Interdisciplinary approaches typically focus on problems believed to be too complex or vast to be dealt with the knowledge and tools of a single discipline.

Intermittent: (of streams, or lakes or springs) recurrent; showing water only part of the time.

IRA: Inventoried Road-less Areas.

KV Funds: Knudsen-Vandenberg Funds.

LEIMARS: Law Enforcement Investigations Management Attainment Report System.

Lemma: One of the specialized bracts (modified or specialized leaf) enclosing a floret (small or reduced flower) in a grass inflorescence (flower head).

Lentic: Of, relating to, or living in still waters such as lakes or ponds.

Licensed Motorized Only: All vehicles, that are legal for use on public roadways, under the California Vehicle Code. Includes highway-legal motorcycles.

Local Roads: Lower standard roads that receive the least volume of traffic, often serving needs like camping, trailheads, and general forest access.

Long-Term (effects): Cumulative effects of an action/project, over a set-period, usually 20 years.

LOP: Limited Operating Period.

Lotic: Of, relating to, or living in actively moving water.

LRMP: Land and Resource Management Plan.

MA: Management Area.

Maintenance: The preservation of the entire highway, including surface, shoulders, roadsides, structures and such traffic-control devices as are necessary for its safe and efficient utilization.

The upkeep of the entire forest development transportation facility including surface and shoulders, parking and side areas, structures, and such traffic-control devices as are necessary for its safe and efficient utilization.

The act of keeping fixed assets in acceptable condition. It includes preventive maintenance normal repairs; replacement of parts and structural components, and other activities needed to preserve a fixed asset so that it continues to provide acceptable service and achieves its

expected life. Maintenance excludes activities aimed at expanding the capacity of an asset or otherwise upgrading it to serve needs different from, or significantly greater than, those originally intended. Maintenance includes work needed to meet laws, regulations, codes, and other legal direction as long as the original intent or purpose of the fixed asset is not changed.

Maintenance Level: Defines the level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria.

Maintenance Level 1: Assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed 1 year. Basic custodial maintenance is performed to keep damage to adjacent resource to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are "prohibit" and "eliminate". Roads receiving level 1 maintenance may be of any type, class or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic, but may be open and suitable for non-motorized uses.

Maintenance Level 2: Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either (1) discourage or prohibit passenger cars or (2) accept or discourage high clearance vehicles.

Maintenance Level 3: Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either "encourage" or "accept." "Discourage" or "prohibit" strategies may be employed for certain classes of vehicles or users.

Maintenance Level 4: 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. 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 5: Assigned to roads that provide a high degree of user comfort and convenience. Normally, roads are double-lane, paved facilities. Some may be aggregate surfaced and dust abated. The appropriate traffic management strategy is "encourage."

MIS: Management Indicator Species.

Mitigation: Measures that avoid, minimize, reduce, rectify, or compensate for impacts to the physical environment resulting from Federal actions. (Council on Environmental Quality's (CEQ) Regulations, for Implementing the Procedural Provisions of NEPA-1508.20: (49 Fed. Reg. 49750, December 21, 1984))

ML: Maintenance Level.

ML 3+: Identifies a group of Forest Service roads that are Maintenance Level 3, 4, and 5.

MMBF: Millions of Board Feet.

MOI: Memorandum of Intent.

Motorized Mixed Use: Designation of a NFS road for use by both highway-legal, and non-highway-legal motor vehicles.

Motor Vehicle: Any vehicle which is self-propelled, other than; a vehicle operated on rails, and any wheelchair or mobility device, including one that is battery-powered, that is designed solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area.

Motorized Mixed Use: Designation of a NFS road for use by both highway-legal, and non-highway-legal motor vehicles.

Motorized Vehicles Greater than 50 Inches in Width: A new class created to include non-highway and highway-licensed motorcycles; highway-licensed and non-highway licensed full-sized vehicles; non-highway licensed OHVs and non-highway licensed ATVs/UTVs.

Motorized Vehicles Less than 50 Inches in Width: (Replaces ATV class) The class of motorized vehicles that includes non-highway and highway licensed motorcycles; non-highway licensed OHVs; and, non-highway licensed ATVs/UTVs.

Motor Vehicle Use Map (MVUM): A map reflecting designated roads; trails; and areas on an administrative unit or a Ranger District of the National Forest System.

MOU: Memorandum of Understanding.

MVUM: Motor Vehicle Use Map.

National Forest System (NFS): As defined in the Forest Rangeland Renewable Resources Planning Act, the "National Forest System" includes all National Forest lands reserved or withdrawn from the public domain of the United States, all National Forest lands acquired through purchase, exchange, donation, or other means, the National Grasslands and land utilization projects administered under title III of the Bankhead-Jones Farm Tennant Act (50 Stat. 525, 7 USC 1010-1012), and other lands, waters or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system.

National Forest System Road (NFS Road): A forest road other than a road which has been authorized by a legally documented right-of-way held by a state, county, or other local public road authority.

National Forest System Trail (NFS Trail): A forest trail other than a trail which has been authorized by a legally documented right-of-way held by a state, county, or other local public road authority.

NEPA: National Environmental Policy Act.

NF: National Forest.

NFMA: National Forest Management Act.

NFS: National Forest System.

NFTS: National Forest Transportation System

NHD: National Hydrography Dataset.

NHPA: National Historic Preservation Act.

NOI: Notice of Intent.

Non-highway-legal vehicle: Any motor vehicle including the operator that is not licensed or certified for general operation on public roads within the state.

Noxious: Harmful. Example: Noxious weeds are harmful to other plant communities.

NP: National Park.

NRCS: Natural Resources Conservation Service.

NRHP: National Register of Historic Places.

NVUM: National Visitor Use Monitoring Program.

NWFP: Northwest Forest Plan.

Objective Maintenance Level: 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.

Off-Highway: Cross-country travel on, or immediately over land, water, sand, snow, ice, marsh swampland, or other natural terrain.

Off-Highway Vehicle: Any motor vehicle designed for off-highway travel.

Off-Road: See Off-Highway.

OHV: Off-Highway Vehicle.

Open To Public Travel: A road that is available, except during scheduled periods, extreme weather, or emergency conditions; passable by four-wheel standard passenger cars, and open to the general public for use without restrictive gates, prohibitive signs, or regulation other than restrictions based on size, weight, or class of registration. Generally, Forest Service maintenance level 3, 4, & 5 roads are operated as open to public travel.

Operational Maintenance Level: The maintenance level currently assigned to a road considering today's needs, road condition, budget constraints, and environmental concerns. It defines the level to which the road is currently being maintained.

ORV: Off-Road Vehicle.

Over-Snow Vehicle: A motor vehicle that is designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow.

PAC(s): Protected Activity Center(s)

PCE: Primary Constituent Elements.

PCT: Pacific Crest Trail.

Perennial: A plant that lives for two years or more.

PG&E: Pacific Gas and Electric.

Propagules: A propagule is any plant material used for the purpose of plant propagation. In asexual reproduction, a propagule may be a woody, semi-hardwood, or softwood cutting, leaf section, or any number of other plant parts. In sexual reproduction, a propagule is a seed.

Public Road: A road under the jurisdiction of, and maintained by a public road authority and open to public travel. (23 USC 101 (a))

RAP: Road Analysis Plan.

RCA: Riparian Conservation Area.

RCO: Riparian Conservation Objective.

Rill: A small channel formed by concentrated water and displacement of soil. Rills are defined as being 2 inches deep and 20 feet in length.

RMO: Road Management Objectives.

RN: Roaded Natural.

RNA: Research Natural Areas.

Road: A motor vehicle route over 50 inches wide, unless identified, and managed as a trail.

Road Decommissioning: Activities that result in the stabilization and restoration of unneeded roads to a more natural state. (36 CFR § 212.1, FSM 7705: Transportation System)

Road Maintenance: Road maintenance includes any expenditure in the repair or upkeep of a road necessary to perpetuate the road and provide for its safe use. Work items may include surface rock replacement, seal coats and asphalt overlays, bridge replacement, slide removal, and other items that contribute to the preservation of the existing road. Road maintenance is not intended to substantially improve conditions above those originally constructed; however, there may be a need for adding to or modifying the original conditions without increasing service provided. Typical examples of these activities include installing additional minor culverts and traffic control devices, implementing traffic management strategies, placing small quantities of spot surfacing, and re-vegetating cut and fill slopes. (FSH 7709.59, WO Amendment 7709.59-2009-1)

Road-effect zone (zone of influence): an area of a route equal distance on either side from center used for analysis.

Road(way) Prism: The area of the ground containing the road surface, cut slope, fill slope and drainage features.

Road construction or reconstruction: Supervising, inspecting, actual building, and incurrence of all costs incidental to the construction or reconstruction of a road. (36 CFR § 212.1, FSM 7705: Transportation System)

ROD: Record of Decision.

ROS: Recreation Opportunity Spectrum.

Route: A generic term for roads, trails, travel-ways, and corridors regardless of their classification or designation.

Route Prism: Same definition as “Road(way) Prism”, but applicable to any route as defined above.

Rut: A groove or furrow in a soft road, caused by wheels. Usually, tire ruts form on wet roads that have a native surface.

S: Forest Service sensitive.

Scoping: Preliminary analysis and consultation to determine the scope of the EIS.

Scoping Report: Documentation of a project scoping process.

Sediment/Sedimentation: Material eroded from roads and tracks that is transported by water, wind, or ice and deposited in creek and stream channels.

Seep: Discharge point of subterranean water at the surface of the ground or directly into the bed of a stream, lake, or sea. Water that emerges at the surface without a perceptible current is called a seep.

Seral Stage: Each step or stage in the development of a plant community is called a sere. Any of these stages is known as a Seral Stage.

Short-Term (effects): Direct and indirect effects of an action or project, usually showing up within the first year after the action.

SHPO: State Historic Preservation Office.

SIA: Special Interest Areas.

Silvics: The natural science which deals with the principles underlying the growth and development of single trees and of the forest as a biological unit.

Silviculture: The art of producing and tending a forest.

Sixth field watershed: A watershed that has an area between 10,000 and 40,000 acres (1-63 square miles).

SNFPA: Sierra Nevada Forest Plan Amendment

SPM: Semi-Primitive Motorized.

SPNM: Semi-Primitive, Non-Motorized.

Talus Slope: An accumulation of rock debris at the base of a cliff or steep mountain slope.

TAP: Travel Analysis Plan.

Taxa/Taxanomic/Taxonomy: The hierarchy of biological classification’s eight major taxonomic ranks.

TE: Threatened or Endangered species.

TES: Threatened, Endangered, or Sensitive species.

TIM: Timber Information Management.

TMO: Transportation Management Objectives.

TOC: Threshold of Concern.

Trail: A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail.

USC: United States Code.

Unauthorized Routes: These may be roads, trails, or user-created tracks that were never intended to be part of the managed Forest Transportation System, are not scheduled for maintenance, and not intended for public use. These are often spurs created for logging and not decommissioned.

Unauthorized Road or Trail: A road or trail that is not a forest road or trail or a temporary road or trail and that is not included in a forest transportation atlas. (36 CFR § 212.1, FSM 7705: Transportation System)

US: United States.

USDA: United States Department of Agriculture.

USDI: United States Department of Interior.

USFS: United States Forest Service.

USFWS: United States Fish and Wildlife Service.

Vehicle Classes Available for FS Designation:

Road open to all motor vehicles.

Road open to highway-legal vehicles only.

Trail open to all motor vehicles.

Trail open to motor vehicles ≤ 50 inches wide only.

Trail open to motorcycles only.

Vernal (vernally): Of, relating to, or occurring in the spring.

VES: Visual Encounter Surveys.

View-shed: The natural environment that is visible from one or more viewing points.

VQO: Visual Quality Objectives.

Watershed: A drainage basin or catchment area. Watersheds drain into other watersheds in a hierarchical form, larger ones breaking into smaller ones or sub-watersheds with the topography determining where the water flows.

CHAPTER 6. CITED REFERENCES

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