United States
Department of
Agriculture

Forest Service

Stanislaus
National Forest

R5-MB-183

February 2009

Motorized Travel Management (17305)

Draft Environmental Impact Statement

Stanislaus National Forest

Motorized Travel Management

Draft Environmental Impact Statement

Stanislaus National Forest

Lead Agency: USDA Forest Service

Cooperating Agencies: None

Responsible Official: Susan Skalski, Forest Supervisor
Stanislaus National Forest
19777 Greenley Road
Sonora, CA 95370
(209) 532-3671

Information Contact: Sue Warren, Team Leader
Stanislaus National Forest
19777 Greenley Road
Sonora, CA 95370
(209) 532-3671 ext. 321
swarren@fs.fed.us

Abstract: This Draft Environmental Impact Statement (DEIS) describes the environmental effects of a proposal by the Stanislaus National Forest to: (1) prohibit motor vehicle travel off designated National Forest Transportation System (NFTS) roads and trails by the public except as allowed by permit or other authorization (excluding snowmobile use); (2) add 157.39 miles of existing unauthorized routes to the NFTS of trails currently open to the public for motor vehicle use; and, (3) make vehicle class changes to the existing NFTS on 623.28 miles of roads. Season of use on all routes based on elevation and wet weather closures on native surfaced routes replaces all existing closures. These actions are needed in order to implement the 2005 Travel Management Rule (36 CFR Part 212) while providing for a diversity of motor vehicle recreation opportunities, and providing motorized access to dispersed recreation opportunities on the Stanislaus National Forest. The DEIS discloses environmental impacts associated with the proposed action, a no action alternative and 3 additional action alternatives developed in response to issues raised by the public. Of the alternatives under consideration at this stage, Alternative 1 (Proposed Action) is preferred by the responsible official.

Mail Comments to: Stanislaus National Forest
Attn: **Motorized Travel Management**
19777 Greenley Road
Sonora, CA 95370

E-mail Comments to: comments-pacificsouthwest-stanislaus@fs.fed.us [Subject: **Motorized Travel Management**]

Comment Period: Comment period starts the day after the Environmental Protection Agency publishes a Notice of Availability for the DEIS in the Federal Register.

Reviewer's Note: It is important that reviewers provide their comments at such times and in such a way that they are useful to the Agency's preparation of the EIS. Therefore, comments should be provided prior to the close of the comment period and should clearly articulate the reviewer's concerns and contentions. The submission of timely and specific comments can affect a reviewer's ability to participate in subsequent administrative review or judicial review. Comments received in response to this solicitation, including names and addresses of those who comment, will be part of the public record for this proposed action. Comments submitted anonymously will be accepted and considered; however, anonymous comments will not provide the respondent with standing to participate in subsequent administrative review or judicial review.

Cover Photos

<table>
<tr><td>Clavey River looking north from 3N01</td><td>Wheeled Over Snow use</td><td>Developed Camping</td></tr>
<tr><td>4WD on trail</td><td>Dardanelles overlook from 6N38Y</td><td>Motorcycle trail</td></tr>
<tr><td rowspan="2">Bourland Creek Trestle</td><td>Motorcycle trail</td><td>Developed Camping</td></tr>
<tr><td>Administrative use</td><td rowspan="2">ATV trail</td></tr>
<tr><td>Tuolumne Fawn Lily</td><td>Log truck</td></tr>
</table>

Table of Contents

List of Tables

List of Figures

Summary

The Forest Service prepared this Draft Environmental Impact Statement (DEIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This DEIS discloses the direct, indirect and cumulative environmental impacts that would result from the proposed action, a no action alternative and 3 additional action alternatives developed in response to issues raised by the public. Of the alternatives under consideration at this stage, Alternative 1 (Proposed Action) is preferred by the responsible official.

Purpose and Need

The following needs were identified for this proposal:

1. There is a need for regulation of unmanaged wheeled motor vehicle travel by the public.

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

2. There is a need for limited changes to the National Forest Transportation System to:

   a. Maintain motor vehicle access to dispersed recreation opportunities (camping, hunting, fishing, hiking, horseback riding, etc.).
   b. Provide a diversity of motorized recreation opportunities (4WD, motorcycles, ATVs, passenger vehicles, etc.).

Proposed Action

The Stanislaus National Forest proposes to: (1) prohibit motor vehicle travel off designated National Forest Transportation System (NFTS) roads and trails by the public except as allowed by permit or other authorization (excluding snowmobile use); (2) add 157.39 miles of existing unauthorized routes to the NFTS of trails currently open to the public for motor vehicle use; and, (3) make vehicle class changes to the existing NFTS on 623.28 miles of roads. Season of use on all routes based on elevation and wet weather closures on native surfaced routes replaces all existing closures. These actions are needed in order to implement the 2005 Travel Management Rule (36 CFR Part 212) while providing for a diversity of motor vehicle recreation opportunities and providing motorized access to dispersed recreation opportunities on the Stanislaus National Forest.

Significant Issues

An issue is a matter of public concern regarding the proposed action and its environmental impacts. Scoping identified issues which are a point of discussion, dispute, or debate with the Proposed Action. An issue is an effect on a physical, biological, social, or economic resource. An issue is not an activity; instead, the predicted effects of the activity create the issue. The Forest Service separated the issues into two groups: significant and non-significant. Significant issues are defined as those directly or indirectly caused by implementing the proposed action.

Significant Issues are used to formulate alternatives, prescribe mitigation measures, or analyze environmental effects. Issues are significant because of the extent of their geographic distribution, the duration of their effects, or the intensity of interest or resource conflicts. The Forest used the following significant issue statements to formulate and compare alternatives, prescribe mitigation measures, or analyze and compare the environmental effects of each alternative.

Significant Issue Statements

1. Changes to NFTS routes that reduce motorized opportunities, increase restrictions on vehicle class and season of use, and prohibit cross-country travel, may affect forest visitors.

Issue/Element	Cause and Effect
1.1 Motorized Opportunities	a. Changing the vehicle class and season of use may affect available camping opportunities. b. Route designations may not provide adequate motorized opportunities. c. Route designations may not provide adequate distinction between vehicle classes. d. Route designations may not provide adequate opportunities for motorized special use events. e. Vehicle class, season of use and cross-county travel restrictions may limit motorized access for big game retrieval and dispersed camping.

2. Changes to NFTS routes that increase motorized opportunities, reduce restrictions on vehicle class and season of use, and allow cross-country travel, may affect forest resources, private property and forest visitors.

Issue/Element	Cause and Effect
2.1 Administration	a. Increasing motorized use may result in increased non-compliance, unsafe conditions near private residences and unsafe encounters between forest visitors. b. Current and future budgets may not provide adequate funding for maintenance, administration and enforcement of the proposed road and trail system. c. Route designations may cause environmental impacts requiring more maintenance. d. Allowing mixed use on system routes may result in unsafe recreation opportunities.
2.2 Private Property	a. Allowing motorized use near private property may result in noise, dust, trespass and other conflicts with private property owners. b. Some private property owners are unwilling to grant public right of way, thereby limiting motorized route opportunities.
2.3 Recreation	a. Increasing motorized use may result in noise disturbance affecting quiet recreation opportunities. b. Increasing motorized use may result in user conflicts between forest visitors.
2.4 Resources	a. Increasing motorized use may increase fire risk and the spread of noxious weeds. b. Increasing motorized use may affect heritage resources, recreation, sensitive plants, soils, vegetation, watershed and wildlife. c. Allowing motorized access for big game retrieval and dispersed camping may affect forest resources. d. Authorizing travel corridors allowing cross-country travel within 100’ of roads and trails, or allowing parking greater than one car length from the road may affect forest resources. e. Increasing motorized use may result in undesirable road densities. f. Proposed seasonal closures may not adequately protect natural resources g. Motorized use may not be compatible with Roadless Areas, Wild and Scenic Rivers, Wilderness and Yosemite National Park.

Alternatives Considered in Detail

The action alternatives (Alternatives 1, 3, 4 and 5) and the no action alternative (Alternative 2) are considered in detail (see Map Package and project record for detailed maps of each alternative). The no action alternative represents the continuation of cross-country travel including continued use of all unauthorized routes by motor vehicles. Alternative 2, required by the implementing regulations of the National Environmental Policy Act (NEPA), serves as a baseline for comparison among the alternatives (73 Federal Register 143, July 24, 2008; p. 43084-43099). Table S.01-1 shows a side-by-side comparison of the features of each alternative.

Alternative 1 (Proposed Action)

This is the Proposed Action, as described in the Notice of Intent (72 Federal Register 222, November 19, 2007; p. 64988- 64991), with corrections based on updated data and map information and refinements responding to the administration, motorized recreation, private property, recreation and resource issues raised during scoping (Chapter 1). These corrections and refinements provide additional motorized recreation opportunities, reduce conflicts and provide additional resource protection. Motor vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length off of NFTS routes unless otherwise prohibited. 157.39 miles of unauthorized routes would be added to the NFTS as trails. Vehicle class changes would occur on 623.28 miles of NFTS roads. Season of use on all routes based on elevation and wet weather closures on native surfaced routes replaces all existing closures. Alternative 1 (Proposed Action) is the Forest Service preferred alternative.

Alternative 2 (No Action)

The No Action Alternative provides a baseline for comparing the other alternatives. Under the No Action alternative, current management plans would continue to guide management of the project area. This alternative would **not** change the use of any NFTS roads and would **not** add any miles of NFTS motorized trails. Under this alternative the agency would take no affirmative action (no change from current management or direction) and cross country travel with continued use of unauthorized routes would occur. It would include only existing closures and would **not** include any restrictions on motorized dispersed recreation access. No changes would be made to the current NFTS and no cross country travel prohibition would be put into place. The Travel Management Rule would not be implemented and no MVUM would be produced. Motor vehicle travel by the public would not be limited to NFTS routes. Unauthorized routes would continue to have no status or authorization as NFTS facilities.

Alternative 3 (Cross Country Prohibited)

Alternative 3 responds to the administration and resource issues by prohibiting cross country travel without adding any new facilities 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 and trails). None of the currently unauthorized routes would be added to the National Forest System under this alternative. Alternative 3 would not change the use of the NFTS and would not add any miles to the NFTS. It would include seasonal closures on routes with existing closures and prohibit motorized access beyond existing NFTS routes. Motor vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length off of NFTS routes unless otherwise prohibited.

Alternative 4 (Recreation)

Alternative 4 responds to the motorized recreation opportunities issue by providing additional routes and reducing restrictions. This alternative would maximize motorized recreation opportunities (including those accessing dispersed recreation activities thereby partially replacing the need for travel corridors). Motor vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length off of NFTS routes unless otherwise prohibited. 181.72 miles of unauthorized routes would be added to the NFTS as trails. Vehicle class changes would occur on 371.32 miles of NFTS roads. Season of use on all routes based on elevation and wet weather closures on native surfaced routes replaces all existing closures.

Alternative 5 (Resources)

Alternative 5 responds to the administration, private property, recreation and resource issues by limiting additions to the NFTS and increasing restrictions that would reduce conflicts and provide additional resource protection. This alternative would limit motorized recreation opportunities (including those accessing dispersed recreation activities) by providing greater protection for forest resources. Motor vehicle travel off NFTS roads and NFTS trails by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length off of NFTS routes unless otherwise prohibited. 31.51 miles of unauthorized routes would be added to the NFTS as trails. Vehicle class changes would occur on 531.39 miles of NFTS roads. Season of use on all routes based on elevation and wet weather closures on native surfaced routes replaces all existing closures.

Table S.01-1 Comparison of Alternatives: Alternative Components and Outputs

Component		Alternative 1 (Proposed Action)	Alternative 2 (No Action)	Alternative 3 (X-C Prohibited)	Alternative 4 (Recreation)	Alternative 5 (Resources)
Cross Country Travel		prohibited	**not** prohibited	prohibited	prohibited	prohibited
Parking allowed off NFTS		one vehicle length	no restriction	one vehicle length	one vehicle length	one vehicle length
Add existing unauthorized routes to the NFTS (miles)		157.39	0.00	0.00	181.72	31.51
Convert NFTS roads to NFTS trails (miles)		63.06	0.00	0.00	99.86	21.51
Change NFTS roads from Closed to Open (miles)		67.96	0.00	0.00	101.83	11.66
Change NFTS Roads from Open to Closed (miles)		51.40	0.00	0.00	13.13	64.45
Change NFTS roads from HLO to ALL (miles)		93.59	0.00	0.00	99.76	0.00
Change NFTS roads from ALL to HLO (miles)		400.49	0.00	0.00	145.76	441.10
Existing Closures and Restrictions		replaced	remain	remain	replaced	replaced
Season of Use	Elevation 1	all year	none	none	all year	all year
	Elevation 2	4/1-11/30	none	none	4/1-12/31	4/15-11/15
	Elevation 3	5/15-11/30	none	none	4/1-12/31	5/15-11/15
Wet Weather Closures (native surface routes)		during the season of use when 1 inch of rain occurs in a 24 hour period and allowing for 72 hours of drying	none	none	same as Alternative 1	same as Alternative 1
Wheeled Over Snow Use		prohibited except on routes identified or where allowed by permit or other authorization	prohibited on groomed snowmobile routes and marked cross country ski trails	same as Alternative 2	same as Alternative 1	prohibited except where allowed by permit or other authorization
Non-significant Forest Plan amendments (miles)		10.63	0.00	0.00	14.52	0.00

Summary of Environmental Consequences

Table S.01-2 shows a summary of the environmental effects of the alternatives.

Table S.01-2 Comparison of Alternatives: Summary of Effects

	Alternative 1 (Proposed Action)	**Alternative 2** (No Action)	**Alternative 3** (X-C Prohibited)	**Alternative 4** (Recreation)	**Alternative 5** (Resources)
Botanical	mileage and number of routes increases effects to sensitive plants and suitable habitat; greatest risk to sensitive plants affected by routes within 200 feet of areas infested with noxious and invasive plants	greatest effects to sensitive plants and suitable habitats along existing routes and to lava cap and moist habitat types	reduction in routes and mileage concentrates use increasing effects to roadside occurrences; least overall impacts to sensitive plants	mileage and number of routes increases effects to sensitive plants and suitable habitat; highest impacts to known sensitive plants	reduction in routes and mileage concentrates use increasing effects to roadside occurrences; least impacts to unique habitats such as lava caps and meadows
Cultural	additions to the NFTS and opening closed roads could adversely effect cultural resources	cross country travel with continued route proliferation adversely effects cultural resources	none	same as Alternative 1	none
Recreation	third highest mileage available to motorized use; reduces impacts to non-motorized activities; reduces motorized access to dispersed recreation sites	highest mileage available to motorized use with fewest limitations; greatest conflicts with adjacent landowners; alters recreation settings; highest impacts on non-motorized or quiet recreation activities; continues motorized access to all dispersed recreation sites	lowest mileage available to motorized use; least conflicts with adjacent landowners; recreation setting changes from predominately motorized to predominately non-motorized; highest reduction of motorized access to dispersed recreation sites	second highest mileage available to motorized use; conflicts with adjacent landowners may occur; second greatest impacts to non-motorized activities; reduces motorized access to dispersed recreation sites	second lowest mileage available to motorized use; few loops and very limited riding opportunities; reduces conflicts with adjacent landowners; reduces motorized access to dispersed recreation sites
Roadless and Special Areas	roadless characteristics and special area values improve over time as unauthorized routes passively restore to natural conditions; additions to the NFTS and opening closed roads reduce opportunities for solitude in the Carson-Iceberg, Mt. Reba, North Mountain, Raymond Peak and Tuolumne River roadless areas	noise and more evidence of human activity due to cross country travel with continued route proliferation reduce roadless character in all roadless areas; cross country travel with continued route proliferation could reduce values in all Special Areas (Proposed Wilderness, SIAs, RNAs, Wild and Scenic Rivers and Proposed Wild and Scenic Rivers) outside of Wilderness	roadless characteristics and special area values improve over time as unauthorized routes passively restore to natural conditions	roadless characteristics and special area values over time as unauthorized routes passively restore to natural conditions; additions to the NFTS and opening closed roads reduce opportunities for solitude in the Carson-Iceberg, Mt. Reba, North Mountain, Raymond Peak and Tuolumne River roadless areas	roadless characteristics and special area values improve over time as unauthorized routes passively restore to natural conditions; additions to the NFTS reduce opportunities for solitude in the Carson-Iceberg and Raymond Peak roadless areas
Transportation	greatest risks to public safety with the most miles where motorized mixed use occurs on roads	none	none	same as Alternative 1	least risk to public safety with the lowest miles where motorized mixed use occurs on roads

	Alternative 1 (Proposed Action)	Alternative 2 (No Action)	Alternative 3 (X-C Prohibited)	Alternative 4 (Recreation)	Alternative 5 (Resources)
Society, Culture and Economy	does not meet demand for motorized access to dispersed recreation sites; proliferation of new sites impacts land and driving experiences	cross country travel and route proliferation degrade the quality of the recreation setting	does not meet demand for motorized routes displacing use to other locations; does not meet demand for motorized access to dispersed recreation sites; proliferation of new sites impacts land and driving experiences	same as Alternative 1	same as Alternative 3
Soil	128 miles of additions to the NFTS occur on high MEHR soils; 55 miles of additions to the NFTS occur on soils with HFC concerns; opens 29 miles of closed roads prone to loss of hydrologic function and water control	204 miles of unauthorized routes occur on high MEHR soils with route proliferation adding another 22 miles over 10 years representing a loss of soil productivity on 158 acres	vegetation growth on most unauthorized routes stabilizes them to background erosion rates	151 miles of additions to the NFTS occur on high MEHR soils; 68 miles of additions to the NFTS occur on soils with HFC concerns; opens 45 miles of closed roads prone to loss of hydrologic function and water control	24 miles of additions to the NFTS occur on high MEHR soils; 8.6 miles of additions to the NFTS occur on soils with HFC concerns; opens 2.9 miles of closed roads prone to loss of hydrologic function and water control
Visual	high positive effect on the overall scenery by prohibiting cross country travel; parking and camping along NFTS roads makes roads appear less natural and more congested	negative effect on the overall scenery by continued cross country travel and route proliferation resulting in loss of natural character and a inconsistency with VQOs; parking and camping remain hidden from view in most locations	same as Alternative 1 except: highest positive effect on the overall scenery; reduced motorized touring and enjoyment of the scenery at many locations; increased parking along NFTS roads makes roads appear least natural and most congested	same as Alternative 1 except: lower positive effect on the overall scenery; maximizes motorized viewing opportunities at the expense of some non-motorized	same as Alternative 1 except: higher positive effect on the overall scenery although less access to early spring (wildflowers) and fall (peak fall color) scenery at some locations
Watershed	reduces direct, indirect and cumulative watershed effects by prohibiting cross country travel; water quality is good to excellent; meets beneficial uses of water; sediment, water temperature and oil and grease are consistent with water quality objectives	cross country travel and route proliferation slightly increase sedimentation but do not adversely affect beneficial uses	same as Alternative 1 except: most reduction in direct, indirect and cumulative watershed effects	same as Alternative 1 except: less reduction in direct, indirect and cumulative watershed effects	same as Alternative 1 except: more reduction in direct, indirect and cumulative watershed effects
Wildlife	additions to the NFTS and opening closed roads adversely affects individuals of numerous wildlife species over the short and long-term	cross-country travel impacts individuals of numerous wildlife species; continued route proliferation exacerbates long-term impacts	beneficial effects to all wildlife species	same as Alternative 1 except more additions to the NFTS and opening more closed roads increases impacts on the number of individuals for each species	same as Alternative 1 except fewer additions to the NFTS without opening closed roads decreases impacts on the number of individuals for each species

1. Purpose of and Need for Action

The Forest Service prepared this Environmental Impact Statement (EIS) 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.

1.01 Document Structure

The document is organized into the following chapters and sections:

- **Chapter 1 -** Purpose of 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: 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 summary tables 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.
- **Index -** the index provides page numbers by document topic.
- **Appendices -** the appendices provide more detailed information to support the analyses presented in the environmental impact statement.

Additional documentation, including more detailed analyses of project area resources, may be found in the project planning record located at:

Stanislaus National Forest
Forest Supervisor's Office
19777 Greenley Road
Sonora, CA 95370

1.02 Background

Over the past few decades, the availability and capability of motor vehicles, particularly off-highway vehicles (OHVs) and sport utility vehicles (SUVs) increased tremendously. Nationally, the number of OHV users 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 ATVs and OHV motorcycles registered in 2004, an increase of 330% since 1980. Annual sales of ATVs and OHV motorcycles in California were the highest in the U.S. for the last 5 years. From 1989 to 2002, four-wheel drive vehicle sales in California also increased by 1500% to 3,046,866 vehicles (Kordell 2005).

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

On August 11, 2003, the Pacific Southwest Region of the Forest Service entered into a Memorandum of Intent (MOI) with the California Off-Highway Motor Vehicle Recreation Commission, and the Off-Highway Motor Vehicle Recreation Division of the California Department of Parks and Recreation. That MOI set in motion a region-wide effort to "*Designate OHV roads, trails, and any specifically defined open areas for motorized vehicles on maps of the 19 National Forests in California by 2007*"(see project record).

On November 9, 2005, the Forest Service published final travel management regulations (70 Federal Register 216, November 9, 2005; p. 68264-68291). Subpart B of the final Travel Management Rule (36 CFR 212), 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 (36 CFR 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 some National Forest System (NFS) lands, long managed as open to cross-country motor vehicle travel, repeated use resulted in unplanned and unauthorized roads and trails. These routes generally developed without environmental analysis or public involvement, and do not possess the same status as roads and trails included in the NFTS. Nevertheless, some unauthorized routes are well-sited, provide excellent opportunities for outdoor recreation by motorized and non-motorized users, and would enhance the NFTS. Other unauthorized routes are poorly located and cause unacceptable impacts. Only NTFS roads and NTFS trails can be designated for motor vehicle use. In order for an unauthorized route to be designated, the route must first be added to the forest transportation system.

In 2006, the Stanislaus completed an inventory of unauthorized routes on NFS lands as described in the MOI and identified approximately 226.3 miles of unauthorized routes. The 2006 Inventory also showed an additional 61.2 miles of unauthorized use on Maintenance Level 1 roads closed to the public. In addition to the 2006 Inventory, analysis work was going on in other project planning which identified an additional 207.6 miles of unauthorized roads. The Stanislaus used an interdisciplinary process to conduct travel analysis that included working with the public to identify proposals for changes to the existing Stanislaus transportation system. Roads and trails that are currently part of the 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 restrictions, additional motorized trails, etc.) to the NFTS roads and trails on NFS lands in accordance with the Travel Management Rule (36 CFR 212, Subpart B).

In accordance with Subpart B of the Travel Management Rule (36 CFR 212.56), following a decision on this proposal, the Stanislaus will publish a Motor Vehicle Use Map (MVUM) identifying all 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 Stanislaus National Forest

This proposal is just one project among many in the long term goal of managing the transportation system in a sustainable and cost effective manner. Previous administrative decisions reduced the number of miles of NFTS roads available for motorized use. These previous decisions resulted in 21.2 miles of roads closed and 488.7 miles of road decommissioned. These restoration efforts were accomplished through vegetation management projects, watershed restoration projects, fuel treatment projects, trail construction projects, trail management decisions, and OHV projects. All of these efforts helped identify and manage the current transportation system. Other ongoing efforts include efforts to reduce the impacts associated with unauthorized routes and impacts associated with the current NFTS. Implementation of this proposal and subsequent designation of motorized routes through publication of the MVUM are only one step in the overall management of the NFTS.

Project Location

The project location is on the Stanislaus National Forest (see Figure 1.02-1). The Forest contains 898,099 acres located in the central Sierra Nevada. The Forest is bounded on the north by the Mokelumne River and the Eldorado National Forest, to the east by parts of the Humboldt-Toiyabe National Forest and to the south by Yosemite National Park, the Merced River and the Sierra National Forest. The western portions are on the edge of the foothills.

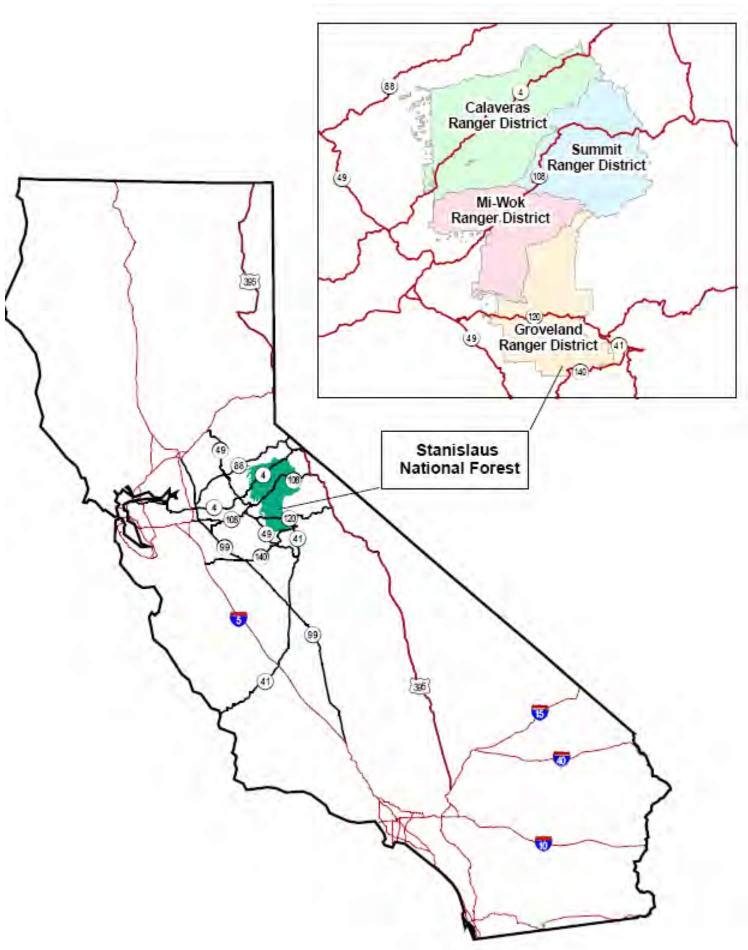


Figure 1.02-1 Stanislaus National Forest Vicinity Map

1.03 PURPOSE AND NEED

The following needs were identified for this proposal:

1. **There is a need for regulation of unmanaged wheeled motor vehicle travel by the public**.

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

2. **There is a need for limited changes to the National Forest Transportation System to:**

   a. **Maintain 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

   b. **Provide a diversity of motorized recreation opportunities (4WD, motorcycles, ATVs, passenger vehicles, etc.)**. It is Forest Service policy to provide a diversity of road and trail opportunities for experiencing a variety of environments and modes of travel consistent with the National Forest recreation role and land capability (FSM 2353.03(2)). Implementation of Subpart B of the Travel Management Rule will severely reduce acres and miles of motorized recreation opportunities relative to current levels. As a result, there is a need to consider limited changes to the NFTS.

   In making any limited changes to the NFTS, the Stanislaus will consider criteria contained in Subpart B of the Travel Management Rule, which include the following:

   a. Impacts to natural and cultural resources.
   b. Public safety.
   c. Access to public and private lands.
   d. Availability of resources for maintenance and administration of roads trails and areas that would arise if the uses under consideration are designated.
   e. Minimizing damage to soil, watershed, vegetation, and other forest resources.
   f. Minimizing harassment of wildlife and significant disruption of wildlife habitat.
   g. Minimizing conflicts between motor vehicles and existing or proposed recreational uses of NFS lands or neighboring federal lands.
   h. Minimizing conflicts among different classes of motor vehicle uses of NFS lands or neighboring federal lands.
   i. Compatibility of motor vehicle use with existing conditions in populated areas, taking into account sound, emissions, and other factors.

When making any limited changes to NFTS roads, the Stanislaus will also consider the following:

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

Table 1.03-1 provides a summary of the Purpose and Need details related to the four components of the Proposed Action.

Table 1.03-1 Purpose and Need

What	Where	Why	How
1. Cross Country Travel			
Travel and Parking	forestwide outside of Wilderness	implement 36 CFR 212, Subpart B limiting motorized use to the NFTS system; protect resources by preventing route proliferation; provide parking for dispersed recreation	prohibit cross country travel; parking allowed one vehicle length off of NFTS routes unless otherwise prohibited
2. Additions to the NFTS			
Add existing unauthorized routes to the NFTS	specific routes (157.39 miles) shown in Appendix I	provide a variety of motorized trail opportunities; enhance loop opportunities; access destinations; reduce conflicts between different uses; include most past managed trails	add unauthorized routes to the trail system; show on MVUM pending completion of mitigations
3. Changes to the Existing NFTS			
Convert NFTS roads to NFTS trails	specific routes (63.06 miles) shown in Appendix I	road not maintained; don't need as a road; road never physically closed to public motorized use; access to popular destinations	remove from road system; add to trail system; show on MVUM
Change NFTS roads from Closed to Open	specific routes (67.96 miles) shown in Appendix I	existing NFTS roads; access destinations or private property; enhance loop opportunities by connecting trails	open any existing gates or remove barriers as needed; show on MVUM
Change NFTS Roads from Open to Closed	specific routes (51.40 miles) shown in Appendix I	protect facilities; not needed for recreation; reduce conflicts between different uses	close any existing gates
Change NFTS roads from Highway Legal Only (HLO) to All Vehicles (ALL)	specific routes (93.59 miles) shown in Appendix I	provide a variety of motorized mixed use opportunities; enhance loop opportunities by connecting trails; reduce maintenance needs	show on MVUM as open to all vehicles pending completion of combined use and mixed use mitigations
Change NFTS roads from ALL to HLO	specific routes (400.49 miles) shown in Appendix I	county roads; private property; short roads; no connection to non-highway legal opportunities; reduce incursions into adjacent non-motorized areas; reduce conflicts between different uses	show on MVUM as open to highway legal only
Season of Use	forestwide outside of Wilderness	protect resources including road and trail surfaces during the normal winter season	native and non-native surfaced routes open by elevation zone; show on MVUM
Wet Weather Closures	forestwide outside of Wilderness	protect resources including road and trail surfaces in storm events during the normal season of use	during the season of use all native surfaced routes are subject to closure when 1 inch of rainfall occurs in a 24 hour period and allowing for 72 hours of drying; show on MVUM
Wheeled Over Snow Use	specific routes (111.07 miles) shown in Table 2.02-2	protect resources including road and trail surfaces; provide a variety of motorized winter recreation; reduce conflicts with other winter recreation uses	prohibited except on routes identified or where allowed by permit or other authorization; show on MVUM
4. Forest Plan Amendments			
Non-significant amendments	specific routes (10.63 miles); cross country travel prohibition	allow continued existing motorized use on routes where it is not compatible with current Forest Plan direction; update cross country travel prohibition to comply with 36 CFR 212	Forest Plan Amendment for route specific exceptions allowing motorized routes; show on MVUM

1.04 PROPOSED ACTION

This is the Proposed Action, as described in the NOI, with corrections based on updated data and map information and refinements responding to the administration, motorized recreation, private property, recreation and resource issues raised during scoping. These corrections and refinements provide additional motorized recreation opportunities, reduce conflicts and provide additional resource protection.

The Stanislaus currently manages and maintains approximately 3,260 miles of NFTS roads of which 2,164 miles are open to public motorized use; and, 95 miles of NFTS trails open to public motorized use (see Table 2.02-4). Based on the stated Purpose and Need for action, and as a result of the recent travel analysis process, the Stanislaus proposes to:

1. **Cross Country Travel**: Motor vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length off of NFTS routes.
2. **Additions to the NFTS**: 157.39 miles of unauthorized routes would be added to the NFTS as motorized trails (see Table 2.05-3). Appendix I (Route Data) shows the specified vehicle class, season of use and required mitigations.
3. **Changes to the existing NFTS**: Vehicle class changes would occur on 623.28 miles of NFTS roads. Season of use on all routes based on elevation and wet weather closures on native surfaced routes replaces all existing closures. Appendix I (Route Data) shows the specified vehicle class, season of use and required mitigations.

   Vehicle Class Changes

   Vehicle class changes would occur on 623.28 miles of NFTS roads including: opening 67.96 miles of closed roads; converting 5.42 miles of closed roads to administrative use only; closing 45.98 miles of open roads; converting 93.59 miles of roads from highway legal only to all vehicles; and, converting 400.49 miles of roads from all vehicles to highway legal only. This alternative also converts 63.06 miles of the 623.28 miles of NFTS roads to trails (the mileage overlaps with the other changes described above and shown in Table 2.02-1 and Table 2.05-5).

   Season of Use

   Except as allowed by permit or other authorization (i.e. routes identified for wheeled over snow use), **native** surface and **non-native** (aggregate and paved) surfaced NFTS motorized routes are open to motorized use only during the season of use shown below, unless specifically prohibited (see Season of Use Map).

   1. Lower Elevations Open all year
   2. Middle Elevations Open April 1 – November 30
   3. Upper Elevations Open May 15 – November 30

   Wet Weather Closures: During the season of use, all **native** surface routes are subject to wet weather closure when 1 inch of rainfall occurs in a 24 hour period and allowing for 72 hours of drying.

   Wheeled Over Snow Use: Wheeled over snow (WOS) use would be prohibited except by 4WD and ATVs when 12 inches or more of snow is present: on the routes listed in Table 2.02-2; or, where allowed by permit or other authorization.

4. **Forest Plan Amendments**: includes the non-significant route specific amendments shown in Tables 2.02-3, 2.02-4, and 2.02-5.

1.05 PRINCIPLE LAWS AND REGULATIONS

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

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

1.06 DECISION FRAMEWORK

As the Responsible Official, the Forest Supervisor may decide to: (1) select the proposed action; (2) select one of the alternatives; (3) select one of the alternatives after modifying the alternative with additional mitigating measures or combination of activities from other alternatives; or, (4) select the no action alternative, choosing to take no action at this time to prohibit cross country motor vehicle travel by the public off the designated system and make changes to the existing Stanislaus National Forest Transportation System.

1.07 PUBLIC INVOLVEMENT

The Interdisciplinary Team (IDT) relied on public involvement to ensure that a full range of alternatives, representing a broad array of perspectives, would be analyzed in this DEIS. Public involvement occurred during three key periods: first, in 2003 when a group of concerned publics held a community forum in to discuss OHV recreation on the Stanislaus National Forest. Over 150 individuals attended to identify issues and possible management solutions for OHV recreation. As a result of the forum, a group called the Stanislaus Recreation Stakeholders (SRS) formed with the Forest Service as an ad hoc member to discuss OHV and associated recreational issues; second, a broadened public collaboration process for Travel Management that began in 2005, and third, during the 60-day public scoping period for the proposed action.

In 2005, the Forest Service requested the SRS, with the assistance of the Center for Collaborative Policy, Sacramento State University, to serve as a design team to help develop the process for public involvement, identification of key stakeholders, and act as a sounding board for critical issues associated with motorized recreation. In 2007, they assisted in designing all the workshops for the development of the Proposed Action, and designing the workshops for rolling out the Notice of Intent. In late 2005, the Forest held three public meetings in Sonora, Greeley Hill and Arnold, sharing the route designation process developed with the State of California MOI and OHV inventory process with 240 attendees. The Forest completed the OHV inventory (step 1) in June 2006, with CD copies of the OHV Inventory mailed to 500 individuals.

In late 2006 and early 2007, the Forest held seven meetings and three open houses in Sonora, Greeley Hill, Arnold, and West Point presenting a series of “discussion proposals” to 340 attendees. Rather than start with a “blank palette”, the Forest presented an initial look at what the transportation system changes and additions might be and sought public feedback on those ideas. District personnel also met with individuals and OHV clubs, identifying important trails that were needed for the OHV recreational experience. The Forest also met with individuals and representatives of groups who identified environmental effects of motorized use. Informal briefings were also held with the Tuolumne Band of Mi-Wuk Indians.

The Forest Service first listed the Motorized Travel Management project in the January 2007 issue of the Stanislaus National Forest Schedule of Proposed Actions (SOPA). The Forest distributes the SOPA to about 160 parties and it is available on the internet [http://www.fs.fed.us/r5/stanislaus/projects/sopa].

PUBLIC SCOPING PERIOD (60-DAYS) FOR THE NOTICE OF INTENT

On November 13, 2007 the Forest sent a scoping letter to 950 individuals, permittees, organizations, agencies, and Tribes interested in this project. The letter requested comments on the Proposed Action. The Forest Service published a Notice of Intent (NOI) that asked for public comment on the proposal between November 19, 2007 and January 18, 2008 (72 Federal Register 222, November 19, 2007; p. 64988-64991). In addition, as part of the public involvement process, the agency held five public meetings attended by 237 individuals and four open houses attended by fourteen individuals. In April, 2008, the Forest sent an informational mailing to the public, containing information on how to obtain a copy of the Scoping report.

1.08 ISSUES

Comments from the public, other agencies, and the Tuolumne Band of Mi-Wuk Indians were used to formulate issues concerning the proposed action (see project record, Public Comment Summary). An issue is a matter of public concern regarding the proposed action and its environmental impacts. Scoping identified issues which are a point of discussion, dispute, or debate with the Proposed Action. An issue is an effect on a physical, biological, social, or economic resource. An issue is not an activity; instead, the predicted effects of the activity create the issue. The Forest Service separated the issues into two groups: significant and non-significant. Significant issues are defined as those directly or indirectly caused by implementing the proposed action.

Significant Issues are used to formulate alternatives, prescribe mitigation measures, or analyze environmental effects. Issues are significant because of the extent of their geographic distribution, the duration of their effects, or the intensity of interest or resource conflicts. Non-Significant Issues were identified as those that were: 1) outside of the scope of the proposed action; 2) already determined through law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; 4) conjectural and not supported by scientific fact; 5) a comment, opinion, or position statement; or, 6) a question for clarification or information. Although non-significant issues are not used to formulate alternatives or prescribe mitigation measures, the EIS will disclose all significant environmental effects including any related to non-significant issues.

The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, “…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)...” A list of non-significant issues and reasons why they were found non-significant may be found in the project record.

As described above, issues are significant because of the extent of their geographic distribution, the duration of their effects, or the intensity of interest or resource conflicts. The IDT used the following significant issue statements to formulate and compare alternatives, prescribe mitigation measures, or analyze and compare the environmental effects of each alternative. The significant issue statements identify elements (individual or groups of significant issue topics) along with a cause and effect based on public comments. Based on public comment, the IDT identified the significant issues shown in Table 1.08-1.

Table 1.08-1 Significant Issue Statements

Issue/Element	Cause and Effect
Significant Issue Statement 1: Changes to NFTS routes that reduce motorized opportunities, increase restrictions on vehicle class and season of use, and prohibit cross-country travel, may affect forest visitors.	
1.1 Motorized Opportunities[1]	a. Changing the vehicle class and season of use may affect available camping opportunities. b. Route designations may not provide adequate motorized opportunities. c. Route designations may not provide adequate distinction between vehicle classes. d. Route designations may not provide adequate opportunities for motorized special use events. e. Vehicle class, season of use and cross-county travel restrictions may limit motorized access for big game retrieval and dispersed camping.
Significant Issue Statement 2: Changes to NFTS routes that increase motorized opportunities, reduce restrictions on vehicle class and season of use, and allow cross-country travel, may affect forest resources, private property and forest visitors.	
2.1 Administration	a. Increasing motorized use may result in increased non-compliance, unsafe conditions near private residences and unsafe encounters between forest visitors. b. Current and future budgets may not provide adequate funding for maintenance, administration and enforcement of the proposed road and trail system. c. Route designations may cause environmental impacts requiring more maintenance. d. Allowing mixed use on system routes may result in unsafe recreation opportunities.
2.2 Private Property	a. Allowing motorized use near private property may result in noise, dust, trespass and other conflicts with private property owners. b. Some private property owners are unwilling to grant public right of way, thereby limiting motorized route opportunities.
2.3 Recreation	a. Increasing motorized use may result in noise disturbance affecting quiet recreation opportunities. b. Increasing motorized use may result in user conflicts between forest visitors.
2.4 Resources[2]	a. Increasing motorized use may increase fire risk and the spread of noxious weeds. b. Increasing motorized use may affect heritage resources, recreation, sensitive plants, soils, vegetation, watershed and wildlife. c. Allowing motorized access for big game retrieval and dispersed camping may affect forest resources. d. Authorizing travel corridors allowing cross-country travel within 100' of roads and trails, or allowing parking greater than one car length from the road may affect forest resources. e. Increasing motorized use may result in undesirable road densities. f. Proposed seasonal closures may not adequately protect natural resources g. Motorized use may not be compatible with Roadless Areas, Wild and Scenic Rivers, Wilderness and Yosemite National Park.

[1] This element groups significant issues from the Routes, Special Uses and Travel Corridor topics.
[2] This element groups significant issues from the Resources, Routes, Special Areas, and Travel Corridor topics.

2. The Alternatives

This chapter describes and compares the alternatives under consideration for the Stanislaus National Forest Motorized Travel Management Draft Environmental Impact Statement (DEIS). It describes both alternatives considered in detail and those considered but eliminated from detailed study.

Based on the issues identified through public comment on the proposed action, the Forest Service developed other 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 proposed action, no action and the other action alternatives are described in detail.

The chapter is divided into five parts:

- Part 1 describes how the alternatives were developed.
- Part 2 presents the alternatives considered in detail.
- Part 3 describes the mitigation measures that are common to all action alternatives.
- Part 4 presents the alternatives that were considered, but eliminated from detailed analysis, including the rationale for eliminating them.
- Part 5 compares the alternatives based on their environmental, social and economic consequences including a comparative display of the projected effects of the alternatives.

Definitions

This chapter contains the following terminology and abbreviations.

ADM	administrative use only; closed to public motorized use
ALL	full width roads or trails open to all vehicles, but not maintained for conventional highway vehicles
ATV	narrow double track trails open only to vehicles less than 50 inches wide (Motorcycles and ATVs only)
CU	portions of high standard (passenger car) roads available for Combined Use by highway legal and non-highway legal vehicles
FR	Forest Road
MC	narrow single track trails open only to single track vehicles less than 24 inches wide (Motorcycles only)
ML1	maintenance level one; closed to motorized use
MU	high clearance roads available for Mixed Use by both highway legal and non-highway legal motor vehicles
NFTS	National Forest Transportation System
PER	routes available by permit only
S&G	Standard and Guideline
HLO	full width roads open to highway legal vehicles only
t-ALL	convert road to All Vehicle trail
t-ATV	convert road to ATV trail
t-MC	convert road to MC trail
t-4WD	convert road to 4WD trail
ROS	Recreation Opportunity Spectrum
WOS	routes identified as an exception to the normal season of use restrictions allowing for Wheeled Over Snow (WOS) travel by ATVs when 12 inches or more of snow is present; these routes are dual designated as Snow Trails

2.01 How the Alternatives Were Developed

The action alternatives represent a wide range of perspectives designed to address the issues identified through scoping and described in the purpose and need (Chapter 1).

Refining Alternatives Submitted by the Public during Scoping

During the 60-day public scoping process many different groups and individuals submitted alternatives for consideration. The Forest Service reviewed and considered each proposal. The alternatives considered in detail incorporate portions of those proposals. The alternatives considered but eliminated from detailed study address the remaining portions of those proposals. Also important in this process, the Forest Service gathered information in consultation and discussions with tribal representatives, local counties and Forest Service employees. State and Federal agencies advised the process through numerous informal contacts.

Implementation Monitoring

Implementation 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, and must meet regional and/or national standards. If monitoring determines additional resource damage is occurring, steps to prevent further damage may be taken. If the mitigations are not effective or are not possible, additional road or trail closures may be required, subject to additional NEPA analysis. The Forest Service will conduct implementation monitoring based on the Monitoring and Evaluation plan (see Table 2.01-1) included in the Stanislaus National Forest Motor Vehicle Travel Management (MVTM) Forest Plan Amendment (USDA 1998).

Table 2.01-1 Monitoring and Evaluation Plan

Indicator	Standard	Monitoring Method	Monitoring Personnel	Reporting Frequency
Conflicts with Private Property, other Motorized Users or Non-Motorized Users	No than one conflict presenting immediate threat to life or property per National Forest System Watershed. No conflicts in non-motorized areas.	Field observations and photos during patrols. Reports from property owners, motorized users and non-motorized users.	OHV Patrols	Annual
Designated Route Miles	No more than +/- 20% total miles difference between designated route goals and achievements.	20% annual sample of the motorized portions of the Forest.	OHV Patrols	5 years
Trail Condition Rating	No more than 20% of the total trail miles per National Forest System Watershed rated as Red	Annual sample of motorized routes in selected watersheds.	Trail Condition Rating Teams	Annual

2.02 Alternatives Considered in Detail

The action alternatives (Alternatives 1, 3, 4 and 5) and the no action alternative (Alternative 2) are considered in detail. The no action alternative represents the continuation of cross-country travel including continued use of all unauthorized routes by motor vehicles. Alternative 2, required by the implementing regulations of the National Environmental Policy Act (NEPA), serves as a baseline for comparison among the alternatives (73 Federal Register 143, July 24, 2008; p. 43084-43099).

The planning area includes National Forest System lands, on the Stanislaus National Forest, outside of Wilderness. 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 and Yosemite National Park will be managed according to existing management plans and applicable federal laws. Each alternative also assumes that private lands will meet applicable local, state and federal land use regulations.

The following sections describe each of the alternatives considered in detail (see Map Package and project record for detailed maps of each alternative). The alternatives are described in four parts:

1. **Cross country travel**: All of the action alternatives prohibit cross-country travel.
2. **Additions to the NFTS**: Each action alternative includes unauthorized roads and trails (routes) proposed for addition to the NFTS as trails with each identified by a trail number. Resource specialists conducted their site specific review of each proposed route. Appendix H (Resource Analysis Summary) presents a summary of the resource analysis with additional details in the Route Analysis Database Summary Report (see project record). All proposed additions will receive the appropriate level of routine maintenance such as brushing, signing, cleaning and clearing debris. For some routes, no work beyond routine maintenance is needed. For others, additional mitigation is needed to bring the route up to a safe and environmentally sustainable condition. The specific mitigations must be completed prior to designation of the route for public motorized use. All proposed route additions have assigned trail management objectives. Appendix I (Route Data) shows the specified vehicle class, season of use and mitigations for all proposed route additions.
3. **Changes to the existing NFTS**: The alternatives vary in changes to the existing National Forest Transportation System (NFTS) in terms of vehicle class, season of use and wheeled over snow use. Appendix I (Route Data) shows the specified vehicle class, season of use and mitigations for all proposed changes to the existing NFTS.
4. **Forest Plan Amendments**: Some of the alternatives include non-significant Forest Plan Amendments.

Alternative 1 (Proposed Action)

This is the Proposed Action, as described in the Notice of Intent (72 Federal Register 222, November 19, 2007; p. 64988-64991), with corrections based on updated data and map information and refinements responding to the administration, motorized recreation, private property, recreation and resource issues raised during scoping (Chapter 1). These corrections and refinements provide additional motorized recreation opportunities, reduce conflicts and provide additional resource protection.

Alternative 1 (Proposed Action) is the Forest Service preferred alternative.

1. **Cross Country Travel**: Motor vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length off of NFTS routes unless otherwise prohibited.
2. **Additions to the NFTS**: 157.39 miles of unauthorized routes would be added to the NFTS as trails (see Table 2.05-2). Appendix I (Route Data) shows the specified vehicle class, season of use and required mitigations.
3. **Changes to the existing NFTS**: Vehicle class changes would occur on 623.28 miles of NFTS roads. Season of use on all routes based on elevation and wet weather closures on native surfaced routes replaces all existing closures. Appendix I (Route Data) shows the specified vehicle class, season of use and required mitigations.

    #### Vehicle Class

    Table 2.02-1 shows vehicle class changes would occur on 623.28 miles of NFTS roads including: opening 67.96 miles of closed roads; converting 5.42 miles of closed roads to administrative use only; closing to public use 45.98 miles of open roads; converting 93.59 miles of roads from highway legal only to all vehicles; and, converting 400.49 miles of roads from all vehicles to highway legal only. This alternative also converts 63.06 miles of the 623.28 miles of NFTS roads to trails (the mileage overlaps with the other changes described above and shown in Table 2.02-1 and Table 2.05-5).

Table 2.02-1 Vehicle Class Changes: Alternative 1

From↓	Vehicle Class Changes To↓ (miles)								Total
	ADM	ALL	ML1	HLO	t-ALL	t-ATV	t-MC	t-4WD	
ALL	27.37	0.00	15.94	400.49	0.30	0.00	1.98	7.56	453.65
ML1	5.42	12.57	0.00	2.17	26.43	1.94	1.58	23.27	73.38
HLO	2.66	93.59	0.00	0.00	0.00	0.00	0.00	0.00	96.26
Total	**35.46**	**106.16**	**15.94**	**402.66**	**26.73**	**1.94**	**3.56**	**30.83**	**623.28**

ADM and **ML1** are closed to public motorized use

Season of Use

Except as allowed by permit or other authorization (i.e. routes identified for wheeled over snow use), **native** surface and **non-native** (aggregate and paved) surfaced NFTS motorized routes are open to motorized use only during the season of use shown below, unless specifically prohibited (see Figure 2.02-1).

1. Lower Elevations Open all year
2. Middle Elevations Open April 1 – November 30
3. Upper Elevations Open May 15 – November 30

Wet Weather Closures: During the season of use, all **native** surface routes are subject to wet weather closure when 1 inch of rainfall occurs in a 24 hour period and allowing for 72 hours of drying.

Wheeled Over Snow Use: Wheeled over snow (WOS) use would be prohibited except by ATVs when 12 inches or more of snow is present:

a. on the routes listed in Table 2.02-2 (see Figure 2.02-1); or,
b. where allowed by permit or other authorization.

Table 2.02-2 Wheeled Over Snow Routes

Route	District	Miles[1]
03N01	Mi-Wok	24.99
03N01	Groveland	20.60
04N12	Summit	19.37
04N34Y	Summit	0.02
05N17	Summit	1.01
05N40Y	Summit	3.87
07N05	Calaveras	4.62
07N09	Calaveras	25.05
07N17	Calaveras	2.79
07N23	Calaveras	5.98
08N02	Calaveras	1.82
08N12	Calaveras	0.56
18EV306	Summit	0.41
	total	111.09

[1] National Forest System lands

4. **Forest Plan Amendments**: includes the non-significant amendments shown in Tables 2.02-3, 2.02-4, and 2.02-5.

Table 2.02-3 Forest Plan Amendments: Alternative 1

Practice	Existing S&G	Amendment
Forestwide S&Gs Restricted Motor Vehicle Management [10-G-2, C1i2] (USDA 2005a, p. 55-56)	Permit motor vehicle travel up to 100 feet from roads, routes and established travel ways for direct access to campsites, parking, woodcutting, or gathering forest products provided that: a. no resource damage occurs; and, b. such access is not otherwise prohibited.	Prohibit public wheeled motor vehicle travel off NFTS routes except as allowed by permit or other authorization. Allow parking within one vehicle length off of NFTS routes unless otherwise prohibited.

Table 2.02-4 Forest Plan Amendments: Alternative 1

Practice	Existing S&G	Amendment	Route	Miles
Forestwide S&Gs Restricted Motor Vehicle Management [10-G-2, B3a4c1] (USDA 2005a, p. 52)	In areas adjacent to waters with known populations of western pond turtle: Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist.	In areas adjacent to waters with known populations of western pond turtle: Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist except for the routes identified in this table.	17EV192	0.63
			17EV192A	0.06
			17EV192B	0.15
			17EV194	0.39
			17EV195	0.50
			17EV196	0.19
			17EV197	0.35
			17EV197	0.46
			17EV197A	0.05
			17EV901	0.37
			1S1727	0.87
			1S17E35B	0.34
			1S17M	1.13
			1S1902	0.24
			1S1929	0.15
			1S1929C	0.19
			2S1727	0.22
			FR8516	0.05
			FR8601	0.47
			FR10178	0.64
			FR98482	0.06
			FR98486	0.21
			FR98488	0.05
			FR98504	0.07
			FR98508	0.06
			FR98509	0.03
			FR98510	0.04
			FR98511	0.15
			FR98513	0.03
			FR98514	0.04
			FR98515	0.09
			FR98520	0.03
			FR98537	0.09
			FR98539	0.10
			FR98541	0.07
			FR98548	0.04
			FR98554	0.04
			FR98560	0.06
			FR98566	0.05
			FR98575	0.13
			FR98599	0.04
			total	**8.93**

Table 2.02-5 Forest Plan Amendments: Alternative 1

Practice	Existing S&G	Amendment	Route	Miles
Forestwide S&Gs				
ROS Semi-primitive Non-motorized [10-B-2] (USDA 2005a, p. 51)	Motorized use is normally prohibited.	Motorized use is normally prohibited, except for the routes identified in this table.	4N80Y 5N02R **total**	0.20 1.50 **1.70**
Closed Motor Vehicle Travel Management [10-G-1a] (USDA 2005a, p. 51)	Closed to motorized use.	Closed to motorized use except for the routes identified in this table.		
Restricted Motor Vehicle Management [10-G-2, C1a] (USDA 2005a, p. 55)	Prohibit motorized use and close motorized routes in non-motorized areas.	Prohibit motorized use and close motorized routes in non-motorized areas, except for the routes identified in this table.		
Wild and Scenic River				
ROS Semi-primitive Non-motorized [10-B-2] (USDA 2005a, p. 105)	Manage to the ROS Class of Semi-primitive Non-motorized.	Manage to the ROS Class of Semi-primitive Non-motorized, except for the routes identified in this table.		
Closed Motor Vehicle Travel Management [10-G-1] (USDA 2005a, p. 105)	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management.	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management, except for the routes identified in this table.		

Alternative 2 (No Action)

The No Action Alternative provides a baseline for comparing the other alternatives. Under the No Action alternative, current management plans would continue to guide management of the project area. This alternative would **not** change the use of any NFTS roads and would **not** add any miles of NFTS motorized trails. Under this alternative the agency would take no affirmative action (no change from current management or direction) and cross country travel with continued use of unauthorized routes would occur. It would include only existing closures and would **not** include any restrictions on motorized dispersed recreation access.

No changes would be made to the current NFTS and no cross country travel prohibition would be put into place. The Travel Management Rule would not be implemented, and no MVUM would be produced. Motor vehicle travel by the public would not be limited to NFTS routes. Unauthorized routes would continue to have no status or authorization as NFTS facilities.

1. **Cross Country Travel**: Motor vehicle travel off NFTS routes by the public would continue except where prohibited by existing Forest Orders.
2. **Additions to the NFTS**: No unauthorized routes would be added to the NFTS.
3. **Changes to the existing NFTS**: No changes are made to the NFTS (see Table 2.02-6) or existing closures and restrictions based on current Forest Orders (see Table 2.02-7).

Table 2.02-6 Existing NFTS Public Motorized Opportunities

Motorized Opportunity[1]		Miles
NFTS	**Vehicle Class**	
Road	All Vehicles (ALL)	1734.91
Road	Highway Legal Only (HLO)	429.17
Trail	All Vehicles (ALL)	61.35
Trail	All Terrain Vehicle (ATV)	21.00
Trail	Motorcycle (MC)	12.94
	total	**2259.37**

[1] Baseline

Table 2.02-7 Existing NFTS Closures and Restrictions

Route	RD	MI	Order	Closure	Closure/Restriction
1N14	GR	5.50	82-22	Year round	Use by any motorized vehicle or other mechanical transport
1N14-A	GR	1.50	82-22	Year round	Use by any motorized vehicle or other mechanical transport
1N45Y	GR	2.50	82-22	Year round	Use by any motorized vehicle or other mechanical transport
1N97	GR	4.00	82-22	Year round	Use by any motorized vehicle or other mechanical transport
1S16A	GR	0.20	82-13	Year round	Use by any motorized vehicle or other mechanical transport
2N24	GR	0.10	82-08	Year round	Use by any motorized vehicle or other mechanical transport
2S13	GR	0.10	82-08	Year round	Use by any motorized vehicle or other mechanical transport
2S32	GR	3.00	82-08	Year round	Use by any motorized vehicle or other mechanical transport
3N08	MW	4.00	80-07	Year round	Use by any motorized vehicle or other mechanical transport
3N09	MW	0.05	80-07	Year round	Use by any motorized vehicle or other mechanical transport
3N56Y	MW	0.75	80-07	Year round	Use by any motorized vehicle or other mechanical transport
3N86	MW	0.50	80-07	Year round	Use by any motorized vehicle or other mechanical transport
4N12M	SU	0.20	81-17	Year round	Use by any motorized vehicle or other mechanical transport
4N50Y	MW	3.00	80-07	Year round	Use by any motorized vehicle or other mechanical transport
4N70	SU	1.00	84-14	Year round	Use by any motorized vehicle or other mechanical transport
4N85	SU	3.00	84-14	Year round	Use by any motorized vehicle or other mechanical transport
4N88	SU	3.50	84-14	Year round	Use by any motorized vehicle or other mechanical transport
5N01Y	SU	8.80	77-05	Year round	Use by any motorized vehicle or other mechanical transport
5N01YA	SU	0.50	77-05	Year round	Use by any motorized vehicle or other mechanical transport
5N02Y	SU	5.00	77-05	Year round	Use by any motorized vehicle or other mechanical transport
5N03Y	SU	2.40	77-05	Year round	Use by any motorized vehicle or other mechanical transport
5N03YA	SU	0.70	77-05	Year round	Use by any motorized vehicle or other mechanical transport
5N06	SU	2.80	80-10	Year round	Use by any motorized vehicle or other mechanical transport
5N06Y	SU	0.50	81-17	Year round	Use by any motorized vehicle or other mechanical transport
5N10Y	SU	0.20	81-17	Year round	Use by any motorized vehicle or other mechanical transport
5N59Y	SU	0.50	81-17	Year round	Use by any motorized vehicle or other mechanical transport
5N92C	SU	1.25	82-30	Year round	Use by any motorized vehicle or other mechanical transport
	total	**55.55**			
Cedar Ridge	MW	NA	92-08	NA	OHVs must stay on designated OHV routes

4. **Forest Plan Amendments**: none.

Alternative 3 (Cross Country Prohibited)

Alternative 3 responds to the administration and resource issues by prohibiting cross country travel without adding any new facilities 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 and trails). None of the currently unauthorized routes would be added to the National Forest System under this alternative.

Alternative 3 would not change the use of the NFTS and would not add any miles to the NFTS. Under this alternative the agency will prohibit cross country travel eliminating continued use of unauthorized routes. It would include seasonal closures on NFTS routes with existing closures and prohibit motorized access beyond existing NFTS routes.

1. **Cross Country Travel**: Motor vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length off of NFTS routes unless otherwise prohibited.
2. **Additions to the NFTS**: No unauthorized routes would be added to the NFTS.
3. **Changes to the existing NFTS**: No changes are made to the NFTS (see Table 2.02-6) or existing closures and restrictions based on current Forest Orders (see Table 2.02-7).
4. **Forest Plan Amendments**: none.

Alternative 4 (Recreation)

Alternative 4 responds to the motorized recreation opportunities issue by providing additional routes and reducing restrictions. This alternative would maximize motorized recreation opportunities (including those accessing dispersed recreation activities thereby partially replacing the need for travel corridors).

1. **Cross Country Travel**: Motor vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length off of NFTS routes unless otherwise prohibited.
2. **Additions to the NFTS**: 181.72 miles of unauthorized routes would be added to the NFTS as trails (see Table 2.05-2). Appendix I (Route Data) shows the specified vehicle class, season of use and required mitigations.
3. **Changes to the existing NFTS**: Vehicle class changes would occur on 371.32 miles of NFTS roads. Season of use on native surfaced routes based on elevation and wet weather closures on native surfaced routes replaces all existing closures. Appendix I (Route Data) shows the specified vehicle class, season of use and required mitigations.

Vehicle Class

Table 2.02-8 shows vehicle class changes would occur on 371.32 miles of NFTS roads including: opening 101.83 miles of closed roads; converting 2.47 miles of closed roads to administrative use only; closing to public use 10.66 miles of open roads; converting 99.76 miles of roads from highway legal only to all vehicles; and, converting 145.76 miles of roads from all vehicles to highway legal only. This alternative also converts 99.86 miles of the 371.32 miles of NFTS roads to trails (the mileage overlaps with the other changes described above and shown in Table 2.02-8 and Table 2.05-5).

Table 2.02-8 Vehicle Class Changes: Alternative 4

From↓	Vehicle Class Changes To↓ (miles)								Total
	ADM	ALL	ML1	HLO	t-ALL	t-ATV	t-MC	t-4WD	
ALL	5.18	0.00	2.81	145.76	2.21	0.00	1.98	6.65	164.59
ML1	2.47	12.08	0.00	0.73	74.60	2.09	2.34	10.00	104.30
HLO	2.66	99.76	0.00	0.00	0.00	0.00	0.00	0.00	102.43
Total	**10.32**	**111.84**	**2.81**	**146.49**	**76.81**	**2.09**	**4.32**	**16.65**	**371.32**

ADM and **ML1** are closed to public motorized use

Season of Use

Except as allowed by permit or other authorization (i.e. routes identified for wheeled over snow use), **native** surface and **non-native** (aggregate and paved) surfaced NFTS motorized routes are open to motorized use only during the season of use shown below, unless specifically prohibited (see Figure 2.02-1).

1. Lower Elevations — Open all year
2. Middle Elevations — Open April 1 – December 31
3. Upper Elevations — Open April 1 – December 31

Wet Weather Closures: During the season of use, all **native** surface routes are subject to wet weather closure when 1 inch of rainfall occurs in a 24 hour period and allowing for 72 hours of drying.

Wheeled Over Snow Use: Wheeled over snow (WOS) use would be prohibited except by ATVs when 12 inches or more of snow is present:

a. on the routes listed in Table 2.02-2 (see Figure 2.02-1); or,
b. where allowed by permit or other authorization.

4. **Forest Plan Amendments**: includes the non-significant amendments shown in Tables, 2.02-9, 2.02-10 and 2.02-11.

Table 2.02-9 Forest Plan Amendments: Alternative 4

Practice	Existing S&G	Amendment
Forestwide S&Gs		
Restricted Motor Vehicle Management [10-G-2, C1i2] (USDA 2005a, p. 55-56)	Permit motor vehicle travel up to 100 feet from roads, routes and established travel ways for direct access to campsites, parking, woodcutting, or gathering forest products provided that: a. no resource damage occurs; and, b. such access is not otherwise prohibited.	Prohibit public wheeled motor vehicle travel off NFTS routes except as allowed by permit or other authorization. Allow parking within one vehicle length off of NFTS routes unless otherwise prohibited.

Table 2.02-10 Forest Plan Amendments: Alternative 4

Practice	Existing S&G	Amendment	Route	Miles
Forestwide S&G				
ROS Semi-primitive Non-motorized [10-B-2] (USDA 2005a, p. 51)	Motorized use is normally prohibited.	Motorized use is normally prohibited, except for the routes identified in this table.	4N80Y 5N02R 1N09	0.20 1.50 3.50
Closed Motor Vehicle Travel Management [10-G-1a] (USDA 2005a, p. 51)	Closed to motorized use.	Closed to motorized use except for the routes identified in this table.	**total**	**5.20**
Restricted Motor Vehicle Management [10-G-2, C1a] (USDA 2005a, p. 55)	Prohibit motorized use and close motorized routes in non-motorized areas.	Prohibit motorized use and close motorized routes in non-motorized areas, except for the routes identified in this table.		
Wild and Scenic River				
ROS Semi-primitive Non-motorized [10-B-2] (USDA 2005a, p. 105)	Manage to the ROS Class of Semi-primitive Non-motorized.	Manage to the ROS Class of Semi-primitive Non-motorized, except for the routes identified in this table.		
Closed Motor Vehicle Travel Management [10-G-1] (USDA 2005a, p. 105)	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management.	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management, except for the routes identified in this table.		
Near Natural				
ROS Semi-primitive Non-motorized [10-B-2] (USDA 2005a, p. 110)	Manage to ROS Class of SPNM.	Manage to ROS Class of SPNM, except for the routes identified in this table.		
Closed Motor Vehicle Travel Management [10-G-1] (USDA 2005a, p. 110)	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management.	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management, except for the routes identified in this table.		

Table 2.02-11 Forest Plan Amendments: Alternative 4

Practice	Existing S&G	Amendment	Route	Miles
Forestwide S&Gs				
Restricted Motor Vehicle Management [10-G-2, B3a4c1] (USDA 2005a, p. 52)	In areas adjacent to waters with known populations of western pond turtle: Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist.	In areas adjacent to waters with known populations of western pond turtle: Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist except for the routes identified in this table.	17EV192	0.63
			17EV192A	0.06
			17EV192B	0.15
			17EV194	0.39
			17EV195	0.50
			17EV196	0.19
			17EV197	0.35
			17EV197	0.46
			17EV197A	0.05
			17EV901	0.37
			1S1727	0.87
			1S17E35B	0.34
			1S17M	1.13
			1S1902	0.24
			1S1907A	0.39
			1S1929	0.15
			1S1929C	0.19
			2S1727	0.22
			FR8516	0.05
			FR8601	0.47
			FR10178	0.64
			FR98482	0.06
			FR98486	0.21
			FR98488	0.05
			FR98504	0.07
			FR98508	0.06
			FR98509	0.03
			FR98510	0.04
			FR98511	0.15
			FR98513	0.03
			FR98514	0.04
			FR98515	0.09
			FR98520	0.03
			FR98537	0.09
			FR98539	0.10
			FR98541	0.07
			FR98548	0.04
			FR98554	0.04
			FR98560	0.06
			FR98566	0.05
			FR98575	0.13
			FR98599	0.04
			total	**9.32**

Alternative 5 (Resources)

Alternative 5 responds to the administration, private property, recreation and resource issues by limiting additions to the NFTS and increasing restrictions that would reduce conflicts and provide additional resource protection. This alternative would limit motorized recreation opportunities (including those accessing dispersed recreation activities) by providing greater protection for forest resources.

1. **Cross Country Travel**: Motor vehicle travel off NFTS roads and NFTS trails by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length off of NFTS routes unless otherwise prohibited.
2. **Additions to the NFTS**: 31.51 miles of unauthorized routes would be added to the NFTS as trails (see Table 2.05-2). Appendix I (Route Data) shows the specified vehicle class, season of use and required mitigations.
3. **Changes to the existing NFTS**: Vehicle class changes would occur on 531.39 miles of NFTS roads. Season of use on all routes based on elevation and wet weather closures on native surfaced routes replaces all existing closures. Appendix I (Route Data) shows the specified vehicle class, season of use and required mitigations.

Vehicle Class

Table 2.02-12 shows vehicle class changes would occur on 531.39 miles of NFTS roads including: opening 11.66 miles of closed roads; converting 5.42 miles of closed roads to administrative use only; closing to public use 59.03 miles of open roads; and, converting 441.10 miles of roads from all vehicles to highway legal only. This alternative also converts 21.51 miles of the 531.39 miles of NFTS roads to trails (the mileage overlaps with the other changes described above and shown in Table 2.02-12 and Table 2.05-5).

Table 2.02-12 Vehicle Class Changes: Alternative 5

From↓	Vehicle Class Changes To↓ (miles)								Total
	ADM	**ALL**	**ML1**	**HLO**	**t-ALL**	**t-ATV**	**t-MC**	**t-4WD**	
ALL	27.37	0.00	28.99	441.10	5.77	0.00	1.69	6.71	511.64
ML1	5.42	2.88	0.00	1.44	5.52	1.82	0.00	0.00	17.08
HLO	2.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.66
Total	**35.46**	**2.88**	**28.99**	**442.55**	**11.29**	**1.82**	**1.69**	**6.71**	**531.39**

ADM and **ML1** are closed to public motorized use

Season of Use

Except as allowed by permit or other authorization, **native** surface and **non-native** (aggregate and paved) surfaced NFTS motorized routes are open to motorized use only during the season of use shown below, unless specifically prohibited (see Season of Use Map).

1. Lower Elevations Open all year
2. Middle Elevations Open April 15 – November 15
3. Upper Elevations Open May 15 – November 15

<u>Wet Weather Closures</u>: During the season of use, all **native** surface routes are subject to wet weather closure when 1 inch of rainfall occurs in a 24 hour period and allowing for 72 hours of drying.

<u>Wheeled Over Snow Use</u>: Wheeled over snow use would be prohibited except where allowed by permit or other authorization.

4. **Forest Plan Amendments**: includes the non-significant amendments shown in Table 2.02-13.

Table 2.02-13 Forest Plan Amendments: Alternative 5

Practice	Existing S&G	Amendment
Forestwide S&Gs		
Restricted Motor Vehicle Management [10-G-2, C1i2] (USDA 2005a, p. 55-56)	Permit motor vehicle travel up to 100 feet from roads, routes and established travel ways for direct access to campsites, parking, woodcutting, or gathering forest products provided that: a. no resource damage occurs; and, b. such access is not otherwise prohibited.	Prohibit public wheeled motor vehicle travel off NFTS routes except as allowed by permit or other authorization. Allow parking within one vehicle length off of NFTS routes unless otherwise prohibited.

2.03 Mitigation and Other Requirements Common to All Action Alternatives

Based on their site specific review of each proposed route, resource specialists identified mitigation measures and other requirements to reduce some of the potential impacts caused by the various alternatives (see Resource Analysis Database Summary Report in the project record). Appendix I (Route Data) lists routes with mitigations and other requirements by alternative, while the specific mitigations and requirements are further defined in Appendix F (Maintenance and Mitigation Definitions). Specific mitigations (see Table 2.05-7) must be completed prior to designation of the route for public motorized use.

Mitigation Measures

Mitigation activities may use one or more of the following hand tools or mechanized equipment depending on route location and accessibility:

- Mechanized equipment: ATV, auger, chainsaw, compactor, pole saw, rock rake, tractor, trailer, etc.
- Hand tools: hand saw, McLeod, pick, posthole digger, pruning shear, rake, shovel, etc.

The following mitigation measures apply to the action alternatives:

1. **Annual Maintenance**: maintenance and repair of a route annually due to less favorable soil type, steeper tread gradient, and/or higher trail use.
2. **Boardwalk**: trail tread reinforcement structure resembling a low bridge and constructed over wet or otherwise unstable soil.
3. **Cattleguard**: motorcycle/ATV cattleguard (width 60 inches or less) installed along existing fence line, causing minimal ground disturbance as structure requires leveling of surface only.
4. **Combined Use Sign Plan**: prepare and implement sign plan for identified portions of high standard (passenger car) roads for Combined Use by highway legal and non-highway legal vehicles.
5. **Drain Dips**: Constructed erosion control technique which reverses the grade of a trail for a distance of 15-20 feet before returning to the prevailing grade. The change in grade forces water to run off the trail surface rather than gaining additional velocity and volume. Hardened drain dips include additional tread hardening.
6. **Fence Barrier**: wood fence constructed using 4 to 6 inch vertical posts with horizontal rails bolted through posts, 30 inches above ground surface. Requires digging up to 8 inch wide by 24 inch deep hole for installation of post.
7. **Full Bench**: trail resting entirely on an excavation into a steep side slope, no fill is used to support the trail.

8. **Log Barrier**: logs placed in a shallow trench along a travel way restricting vehicle traffic to desired locations.
9. **Low Impact Barrier**: low resource impact, vehicle barrier constructed by placing full-length railroad ties on top of 24 inch ties, held in place by driving rebar through ties into ground approximately 24 inches. Requires no digging of holes, but sometimes leveling of ground is required for placement.
10. **Mixed Use Sign Plan**: prepare and implement sign plan for identified portions of certain (high clearance) roads available for use by both highway legal and non-highway legal motor vehicles.
11. **No Vehicles Sign**: small standard traffic signs posted alongside routes to control and direct traffic.
12. **Padding**: fabric placed on native surface and covered with a layer of soil to protect sensitive resources.
13. **Rock Barrier**: large rock boulders, usually 36 to 48 inch diameter, placed in shallow holes along a travel way to restrict vehicle traffic to desired locations.
14. **Tread Harden**: tread or stream crossing treatment using concrete blocks, geosynthetics, logs, mechanical compaction, rock ballast, soil cement or timbers to protect the trail surface.
15. **Waterbars**: constructed log, rock or soil berm that diverts water from the trail tread.

Other Requirements

The following requirements apply to the action alternatives:

1. **RLF Surveys**: conduct surveys to determine presence/absence of the California red-legged frog using the United States Fish and Wildlife Service (USFWS) protocol.
2. **RLF USFWS Consultation**: Forest Service consultation with the USFWS to comply with Section 7 of the Endangered Species Act.
3. **SHPO Consultation**: Forest Service consultation with the State Historic Preservation Officer (SHPO) to comply with Section 106 of the National Historic Preservation Act.

2.04 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

NEPA requires that federal agencies rigorously explore and objectively evaluate all reasonable alternatives and briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments and internal scoping suggested the alternatives briefly described below along with a brief response discussing the reasons for eliminating them from detailed study.

a. Prohibit OHV (non-highway legal) use

This alternative would prohibit all non-highway legal use and allow only highway legal vehicles on the Stanislaus National Forest.

Response: Prohibiting all non-highway legal vehicles does not meet the purpose and need for this project to provide a diversity of motorized recreation. Also, it is not consistent with California Vehicle Code or Forest Service policy.

b. Add all unauthorized routes to the system

This alternative would add all existing unauthorized routes to the NFTS. It would also include contingent motorized access based on acquiring right-of-way.

Response: Adding all unauthorized routes to the system does not meet the purpose and need for this project to make limited changes to the existing NFTS and identify existing routes for addition to the NFTS. Also, it is not consistent with the Forest Plan direction for Restricted Motor Vehicle

Travel Management (USDA 2005a, p. 51-56). Not all unauthorized routes are properly located to sustain motorized use and protect resources. The Forest Service does not have the authority to add routes to the system without a public right of way and current policy does not provide for adding routes contingent on future right-of-way acquisition.

c. Authorize open (cross-country travel allowed) OHV play areas

This alternative (developed through internal scoping based on public comments) would include several motor vehicle open play areas. A mapping exercise identified the following 12 quarries as potential open play areas:

- Mi-Wok Ranger District: Bourland Quarry; Clavey Quarry; Coffin Quarry
- Calaveras Ranger District: Candy Rock Quarry; Flat Quarry; Ganns Quarry; Shovel Grave Quarry
- Summit Ranger District: Donnell Quarry
- Groveland Ranger District: Cherry Borrow; Grizzly Quarry; Jawbone Quarry; Sawmill Quarry

Response: Open cross-country travel play areas are outside the scope of the purpose and need for this project to make limited changes to the existing NFTS and identifying existing routes for addition to the NFTS. Also, it is not consistent with Forest Plan direction prohibiting cross-country overland OHV travel (USDA 2005a, p. 55).

d. Trigger seasonal closure on and off throughout the wet season

This alternative would close native surfaced roads when 1 inch of rain or more fell within a 24 hour time period. The roads would remain closed for 48 hours and then re-open. This closure would only occur during the wet season, generally November through mid May on the STF.

Response: Seasonal closures are used to reduce wildlife disturbance; reduce soil compaction during wet weather; and, provide for public safety by closing routes during wet winter weather conditions when general motorized travel is considered unsafe. This type of triggered closure does not address rain events outside of the wet season. It does not respond to wildlife or soil resource protection issues, and it does not provide for public safety. Alternatives 1, 4 and 5 incorporate this concept to deal with rain events during the proposed season of use.

e. No Seasonal Closures

This alternative (developed through internal scoping based on public comments) would remove all existing closures and would not replace them.

Response: Seasonal closures are used to reduce wildlife disturbance; reduce soil compaction during wet weather; and, provide for public safety by closing routes during wet winter weather conditions when general motorized travel is considered unsafe. Removal of all seasonal closures does not respond to those resource protection issues and safety concerns.

f. New Route Construction

This alternative (developed through internal scoping based on public comments) would identify and include new route construction to complete loops, connect trails and bypass private property where no public right of way exists.

Response: New route construction is outside the scope of the purpose and need for this project to make limited changes to the existing NFTS and identifying existing routes for addition to the NFTS. New trail construction is identified as a potential future project and discussed in the cumulative effects analysis in Alternatives 1 and 4.

g. Non-Motorized

This alternative would prohibit motorized use on the National Forest.

Response: The prohibition of motorized use across the entire National Forest is outside the scope of the purpose and need for this project to provide a diversity of motorized recreation and make limited changes to the existing NFTS. Also, it is not consistent with Forest Service policy (FSM 7702) which states in part: "The objectives of managing the forest transportation system and motor vehicle use on NFS roads, on NFS trails, and in areas on NFS lands are: 1. To provide sustainable access in a fiscally responsible manner to NFS lands for administration, protection, utilization, and enjoyment of NFS lands and resources consistent with the applicable land management plan. 2. To manage the forest transportation system and motorized and non-motorized uses on NFS roads, on NFS trails, and in areas on NFS lands within the environmental capabilities of the land."

h. "Grandfather User-created Routes into the NFTS and Conditionally Add Routes Pending Further Analysis and Mitigation

Suggested by the Blue Ribbon Coalition and other advocates of motorized recreation, this alternative would consider that many so-called "user-created" routes are actually Forest Service "facilities" since the agency expended appropriated funds to place them on previous or current maps or are/were maintained by federal agents. Hence, these facilities are by definition actually system routes and should not be analyzed as unauthorized or "user-created" routes. This alternative would also convert "roads-to-single track trails" or "roads-to-motorized trails less than 50 inches in width" and "roads managed as motorized trails greater than 50 inches in width" to help achieve FS budget objectives while still providing a substantive recreational route network. It would also include a second tier group of routes that are "conditionally approved/designated" once certain issues are addressed.

Response: Creating a second tier group of routes that are conditionally approved is outside the purpose and need for this project to make limited changes to the existing NFTS and identifying existing routes for addition to the NFTS. Also, it is against Forest Service policy to add routes to its transportation system that do not have legal access. Adding all unauthorized routes to the system is not feasible as many do not currently meet Forest Plan direction. Routes are considered in two categories: either they were authorized through an environmental evaluation process and added to the transportation system or they were created by recreational use. This latter group of routes is considered unauthorized. Even though many of these routes have been in existence for a number of years, they were not evaluated for suitability as OHV trails and were not added to the system. They cannot be "grandfathered" into the system. Alternative 4 incorporates many of the proposed additions and other components of this alternative.

i. Add All Routes Receiving OHV Use

Suggested by the Blue Ribbon Coalition and other advocates of motorized recreation, this alternative would 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 affect." It would designate the maximum number of important and historic user-created routes as identified by the public and re-open old existing trails that connect to worthwhile destinations. If a considerable adverse effect is found, review for mitigation (re-route, maintenance, closure, etc.).

Response: In addition to the Response to alternative "h" (above), adding all routes receiving current OHV use is not consistent with the Forest Plan direction for Restricted Motor Vehicle Travel Management (USDA 2005a, p. 51-56). Some roads were identified in the 2006 OHV inventory as having OHV use. These roads previously closed under other NEPA decisions will not be re-opened. Alternative 4 incorporates some components of this alternative.

j. Protect Yosemite National Park

Suggested by Yosemite National Park, this alternative would exclude OHV use on existing NFTS roads, close some roads and not add any trails adjacent to Yosemite National Park to reduce OHV incursions into the Park.

Response: Closing existing NFTS roads is outside the scope of the purpose and need for this project to make limited changes to the existing NFTS. Alternative 5 includes some components of this alternative. The Forest Service already evaluated and implemented some of the recommendations in other previous NEPA decisions.

k. Close and Decommission NFTS Roads and Trails to Reduce Resource Impacts

Suggested by the Wilderness Society and others, this alternative would close and decommission a number of roads and trails to reduce road density and disturbance to wildlife; prevent incursions into Wild and Scenic River corridors through road closures; reduce access adjacent to Wilderness through road closures; not add trails that are in Roadless Areas; implement a seasonal closure for the protection of wildlife; and, allow some number of motorized trails to be added to the NFTS.

Response: Decommissioning existing NFTS roads is outside the scope of the purpose and need for this project to make limited changes to the existing NFTS. Alternative 5 includes some components of this alternative.

l. Maximum Resource Protection

Suggested by the Central Sierra Environmental Resource Center (CSERC), this alternative would close and decommission a number of roads and trails to reduce road density and disturbance to wildlife; implement a seasonal closure for the protection of wildlife; and, allow some number of trails to be added to the system.

Response: Closing and decommissioning existing NFTS roads is outside the scope of the purpose and need for this project to make limited changes to the existing NFTS. Alternative 5 includes other components of this alternative.

m. Maximum Recreation

Suggested by the Merced Dirt Riders, Stewards of the Sequoia and Stewards of the Sierra, this alternative would add a number of the existing unauthorized trails identified in the OHV inventory, conducted and finalized in June, 2006 as well as adding trails that have been established in the past and were not inventoried. In addition, several trails would be added to the NFTS as “permit only” trails. A wet weather seasonal closure, triggered by a certain amount of rainfall in a 24 hour time period, would be implemented.

Response: The Forest Service evaluated the trails recommended for addition and incorporated some into Alternative 4. Other trails did not meet the Forest Plan direction for inclusion into the NFTS. The wet weather closure does not address rain events outside of the wet season and it does not respond to wildlife or soil resource protection issues and it does not provide for public safety. Alternatives 1, 4 and 5 incorporate this concept to deal with rain events during the proposed season of use. Alternative 4 includes some other components of this alternative.

n. Prohibit unlicensed OHV use

This alternative would require that all drivers are State licensed.

Response: Prohibiting unlicensed drivers on all NFTS routes does not meet the purpose and need for this project to provide a variety of managed motorized recreation opportunities. It is not consistent with the California Vehicle Code and Forest Service policy. Requiring that all drivers are state licensed is under the purview of the State of California, California Highway Patrol and the legislature to regulate the licensing of drivers.

o. *Limit OHV use to several OHV parks run by concessionaires*

This alternative would identify areas where limited OHV activities could occur. These "park areas" would charge fees and be managed by a concessionaire under contract with the Forest Service. OHV recreation would be confined to these park areas and not allowed on any other trails on the Forest. OHV travel would be allowed on NFTS roads and other previously authorized trails.

Response: Analyzing for new concessionaire recreational opportunities is outside the scope of the purpose and need for this project to provide a diversity of motorized recreation and make limited changes to the existing NFTS. Limiting OHV recreation to "park areas" suggests only one kind of recreational riding exists. The Forest Service should provide a range of OHV riding opportunities and challenges, including roads and trails.

p. *Travel Corridors*

This alternative (developed through internal scoping based on public comments and developed as part of the proposed action described in the NOI) would prohibit cross-country motor vehicle travel off NFTS roads and NFTS trails by the public except to allow vehicle access and parking up to 100' off NFTS routes for motorized dispersed camping.

Response: Allowing travel corridors on all routes as an exception to prohibition of cross-country motor vehicle travel was proposed in the NOI as a way to possibly implement Forest Plan direction. Further review of this concept and public comments revealed a necessity to complete a more detailed and time consuming site-specific analysis covering thousands of acres where motor vehicles would be allowed to travel off NFTS roads. Potential impacts to cultural resources, threatened and endangered species, wildlife and other resources would need to be analyzed. Based on recent evaluations of the timeline, budget and organizational capacity constraints, it is not feasible for the Forest to complete the required site-specific analysis needed to implement a travel corridor concept at this time. In its place, the Forest developed a strategy to provide access by proposing as many unauthorized recreational access spur routes as possible within the limited timeframe to complete this analysis. A limited number of routes were inventoried, evaluated and incorporated into Alternatives 1 and 4. Further inventory of recreational access routes is ongoing and is not precluded from future consideration in a subsequent NEPA analysis.

2.05 Comparison of the Alternatives

Chapter 3 describes the environmental consequences of the alternatives. This section compares the alternatives by summarizing key differences between them and provides a summary of the effects analysis.

While Table 2.02-6 previously showed the existing condition (Baseline), Table 2.05-2 compares the alternatives in terms of additions to the NFTS (Additions); Table 2.05-3 compares the alternatives in terms of changes to existing NFTS (Changes); and, Table 2.05-1 presents the general themes used to develop the alternatives.

Table 2.05-1 Comparison of Alternatives: Alternative Themes

Component	**Alternative 1** (Proposed Action)	**Alternative 2** (No Action)	**Alternative 3** (X-C Prohibited)	**Alternative 4** (Recreation)	**Alternative 5** (Resources)
1. Cross Country Travel					
Travel and Parking	implement 36 CFR 212 limiting motorized use to the NFTS system; protect resources by preventing route proliferation; provide parking for dispersed recreation	cross country travel **not** prohibited	same as Alternative 1	same as Alternative 1	same as Alternative 1
2. Additions to the NFTS					
Add existing unauthorized routes to the NFTS	provide a variety of motorized trail opportunities; enhance loop opportunities; access destinations; reduce conflicts between different uses; include most past adopted or managed trails	none	none	similar to Alternative 1 with changes to **add**: trails based on comments; past adopted or managed trails	similar to Alternative 1 with changes to **reduce**: trails based on comments; trail density in sensitive wildlife areas; resource impacts
3. Changes to the Existing NFTS					
Convert NFTS roads to NFTS trails	road not maintained; don't need as a road; road never physically closed to public motorized use; access to popular destinations	none	none	similar to Alternative 1 with changes to convert more roads	none
Change NFTS roads from Closed to Open	existing NFTS roads; access destinations or private property; enhance loop opportunities by connecting trails	none	none	similar to Alternative 1 with changes to open more ML1 roads	none
Change NFTS Roads from Open to Closed	protect facilities; not needed for recreation; reduce conflicts between different uses	none	none	close roads only for public safety, homeland security, and private land	similar to Alternative 1
Change NFTS roads from HLO to ALL	provide a variety of motorized mixed use opportunities; enhance loop opportunities by connecting trails; reduce maintenance needs	none	none	similar to Alternative 1 with changes to open most ML2 roads to all vehicles	none
Change NFTS roads from ALL to HLO	county roads; private property; short roads; no connection to non-highway legal opportunities; reduce incursions into adjacent non-motorized areas; reduce conflicts between different uses	none	none	none	similar to Alternative 1 with changes to reduce conflicts
Season of Use	protect resources including road and trail surfaces during the normal winter season	existing closures and restrictions with forest orders	same as Alternative 2	same as Alternative 1	same as Alternative 1
Wet Weather Closures	protect resources including road and trail surfaces in storm events during the normal season of use	none	none	same as Alternative 1	same as Alternative 1
Wheeled Over Snow Use	protect resources including road and trail surfaces; provide a variety of motorized winter recreation; reduce conflicts with other winter recreation uses	prohibited on groomed snowmobile routes and marked cross country ski trails	same as Alternative 2	same as Alternative 1	prohibited except where allowed by permit or other authorization
4. Forest Plan Amendments					
Non-significant amendments	allow continued existing motorized use on routes where it is not compatible with current Forest Plan direction; update cross country travel prohibition	none	none	same as Alternative 1	update cross country travel prohibition

Table 2.05-2 Comparison of Alternatives: Additions to the NFTS

Vehicle Class[1]	**Alternative** (miles)				
	1	**2**	**3**	**4**	**5**
All Vehicles (ALL)	48.67	0.00	0.00	59.96	10.61
All Terrain Vehicle (ATV)	37.11	0.00	0.00	48.86	5.66
Motorcycle (MC)	54.72	0.00	0.00	57.20	11.89
Permit Only (PER)	1.38	0.00	0.00	1.38	0.54
4 Wheel Drive (4WD)	15.50	0.00	0.00	14.33	2.81
total	**157.39**	**0.00**	**0.00**	**181.72**	**31.51**

[1] Additions

Table 2.05-3 Comparison of Alternatives: Changes to Existing NFTS

Vehicle Class[2]	**Alternative** (miles)				
	1	**2**	**3**	**4**	**5**
Administrative (ADM)	35.46	0.00	0.00	10.32	35.46
All Vehicles (ALL)	106.16	0.00	0.00	111.84	2.88
Maintenance Level 1 (ML1)	15.94	0.00	0.00	2.81	28.99
Highway Legal Only (HLO)	402.66	0.00	0.00	146.49	442.55
Trail - All Vehicles (t-ALL)	26.73	0.00	0.00	76.81	11.29
Trail - All Terrain Vehicle (t-ATV)	1.94	0.00	0.00	2.09	1.82
Trail - Motorcycle (t-MC)	3.56	0.00	0.00	4.32	1.69
Trail – 4 Wheel Drive (t-4WD)	30.83	0.00	0.00	16.65	6.71
total	**623.28**	**0.00**	**0.00**	**371.32**	**531.39**

[2] Changes

Table 2.05-4 compares the alternatives in terms of Forestwide issues and indicators (Baseline with Changes and Additions); Table 2.05-5 compares the alternatives in terms of the actions resulting from the changes to the existing NFTS; and, Table 2.05-6 compares the alternatives in terms of components and outputs.

Table 2.05-4 Comparison of Alternatives: Forestwide Issues and Indicators

Issue	Indicator[3] (miles unless specified otherwise)	**Alternative**				
		1	**2**	**3**	**4**	**5**
Motorized Opportunities	All Vehicles (ALL) Road	1387.43	1734.91	1734.91	1682.16	1226.15
	Highway Legal Only (HLO) Road	735.58	429.17	429.17	473.23	869.05
	All Vehicles (ALL) Trail	136.76	61.35	61.35	198.11	83.25
	All Terrain Vehicle (ATV) Trail	60.05	21.00	21.00	71.95	28.48
	Motorcycle (MC) Trail	71.22	12.94	12.94	74.46	26.52
	Permit Only (PER) Trail	1.38	0.00	0.00	1.38	0.54
	4 Wheel Drive (4WD) Trail	46.02	0.00	0.00	30.97	9.45
	total	**2438.44**	**2259.37**	**2259.37**	**2532.26**	**2243.45**
	Distance off of NFTS for parking (vehicle length)	1	NA	1	1	1
Administration	Combined Use Roads (CU)	16.51	0.00	0.00	18.44	0.00
	Mixed Use Roads (MU)	70.56	0.00	0.00	74.79	0.00
	total	**87.06**	**0.00**	**0.00**	**93.23**	**0.00**
Private Property	ALL within ¼ mile of residential	63.18	185.22	156.85	129.58	52.93
	ATV and MC within ¼ mile of residential	4.06	1.86	1.86	6.99	2.51
	total	**67.24**	**187.07**	**158.70**	**136.56**	**55.43**
Recreation	NFTS roads changed from closed to open	67.96	0.00	0.00	101.83	11.66
	NFTS roads changed from open to closed	51.40	0.00	0.00	13.13	64.45

[3] Baseline with Changes and Additions

Table 2.05-5 Comparison of Alternatives: Actions Resulting from Changes to the Existing NFTS

Action	Alternative (miles)				
	1	2	3	4	5
Convert Road to Trail[1]	63.06	0.00	0.00	99.86	21.51
Closed to Open	67.96	0.00	0.00	101.83	11.66
Closed to Administrative	5.42	0.00	0.00	2.47	5.42
Open to Closed	45.98	0.00	0.00	10.66	59.03
Highway Legal Only to All Vehicles	93.59	0.00	0.00	99.76	0.00
All Vehicles to Highway Legal Only	400.49	0.00	0.00	145.76	441.10
All Vehicles Road to Trail	9.84	0.00	0.00	10.84	14.17
total	**623.28**	**0.00**	**0.00**	**371.32**	**531.39**

[1] mileage overlaps with other actions shown below

Table 2.05-6 Comparison of Alternatives: Alternative Components and Outputs

Component		Alternative 1 (Proposed Action)	Alternative 2 (No Action)	Alternative 3 (X-C Prohibited)	Alternative 4 (Recreation)	Alternative 5 (Resources)
Cross Country Travel		prohibited	**not** prohibited	prohibited	prohibited	prohibited
Parking allowed off NFTS		one vehicle length	no restriction	one vehicle length	one vehicle length	one vehicle length
Add existing unauthorized routes to the NFTS (miles)		157.39	0.00	0.00	181.72	31.51
Convert NFTS roads to NFTS trails (miles)		63.06	0.00	0.00	99.86	21.51
Change NFTS roads from Closed to Open (miles)		67.96	0.00	0.00	101.83	11.66
Change NFTS Roads from Open to Closed (miles)		51.40	0.00	0.00	13.13	64.45
Change NFTS roads from HLO to ALL (miles)		93.59	0.00	0.00	99.76	0.00
Change NFTS roads from ALL to HLO (miles)		400.49	0.00	0.00	145.76	441.10
Existing Closures and Restrictions		replaced	remain	remain	replaced	replaced
Season of Use	Elevation 1	all year	none	none	all year	all year
	Elevation 2	4/1-11/30	none	none	4/1-12/31	4/15-11/15
	Elevation 3	5/15-11/30	none	none	4/1-12/31	5/15-11/15
Wet Weather Closures (native surface routes)		during the season of use when 1 inch of rain occurs in a 24 hour period and allowing for 72 hours of drying	none	none	same as Alternative 1	same as Alternative 1
Wheeled Over Snow Use		prohibited except on routes identified or where allowed by permit or other authorization	prohibited on groomed snowmobile routes and marked cross country ski trails	same as Alternative 2	same as Alternative 1	prohibited except where allowed by permit or other authorization
Non-significant Forest Plan amendments (miles)		10.63	0.00	0.00	14.52	0.00

Table 2.05-7 compares the alternatives in terms of the required mitigation measures. The mitigation mileage represents the individual work items that often overlap on the same piece of ground. The routes with mitigation mileage represent route segments with specific mitigations that must be completed prior to designation of the route for public motorized use.

Table 2.05-7 Comparison of Alternatives: Mitigation Measures

Mitigation	Alternative				
	1	2	3	4	5
Annual Maintenance	8.137	0.000	0.000	8.137	3.309
Bench Tread	0.000	0.000	0.000	0.114	0.000
Bridge	0.002	0.000	0.000	0.002	0.000
Cattleguard	0.002	0.000	0.000	0.002	0.000
Drain Dip	43.409	0.000	0.000	52.490	9.192
Fill over Culvert	0.002	0.000	0.000	0.002	0.000
Low Impact Barrier	1.364	0.000	0.000	1.411	0.000
No Vehicle Sign	0.142	0.000	0.000	0.142	0.000
Padding	0.125	0.000	0.000	0.125	0.000
Rock Barrier	0.471	0.000	0.000	0.611	0.070
Rock, Log or Fence Barrier	0.692	0.000	0.000	0.700	0.000
Tread Harden	7.679	0.000	0.000	9.379	1.470
Waterbar	0.606	0.000	0.000	0.985	0.606
total mitigation (miles)	63.512	0.000	0.000	74.989	14.646
Routes with Mitigation (miles)	74.118	0.000	0.000	87.981	12.733

Summary Comparison of Alternatives by Environmental Effects

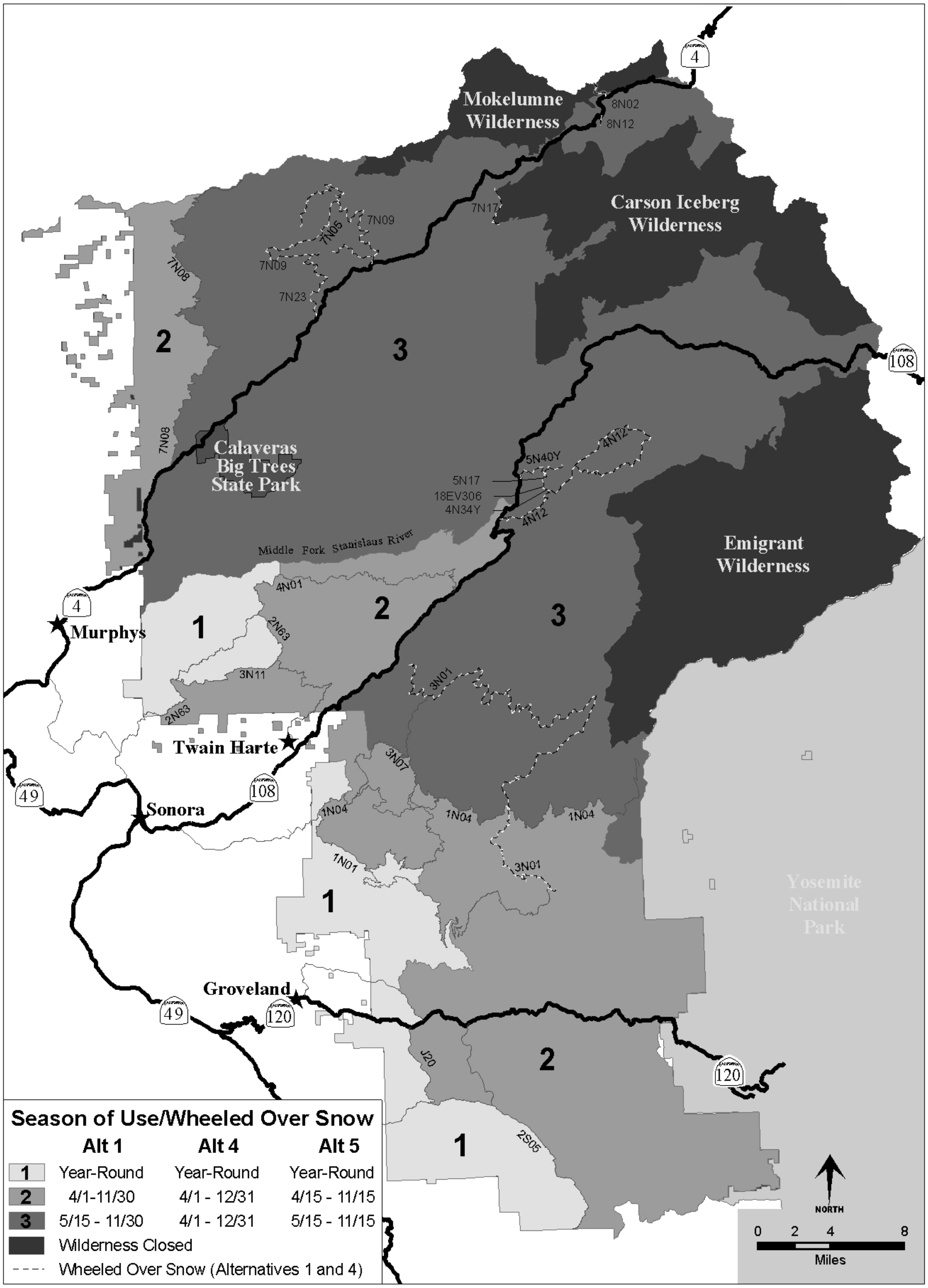
Table 2.05-8 compares the alternatives by summarizing their environmental effects.

Table 2.05-8 Comparison of Alternatives: Summary of Effects

	Alternative 1 (Proposed Action)	**Alternative 2** (No Action)	**Alternative 3** (X-C Prohibited)	**Alternative 4** (Recreation)	**Alternative 5** (Resources)
Botanical	mileage and number of routes increases effects to sensitive plants and suitable habitat; greatest risk to sensitive plants affected by routes within 200 feet of areas infested with noxious and invasive plants	greatest effects to sensitive plants and suitable habitats along existing routes and to lava cap and moist habitat types	reduction in routes and mileage concentrates use increasing effects to roadside occurrences; least overall impacts to sensitive plants	mileage and number of routes increases effects to sensitive plants and suitable habitat; highest impacts to known sensitive plants	reduction in routes and mileage concentrates use increasing effects to roadside occurrences; least impacts to unique habitats such as lava caps and meadows
Cultural	additions to the NFTS and opening closed roads could adversely affect cultural resources	cross country travel with continued route proliferation adversely affects cultural resources	none	same as Alternative 1	none
Recreation	third highest mileage available to motorized use; reduces impacts to non-motorized activities; reduces motorized access to dispersed recreation sites	highest mileage available to motorized use with fewest limitations; greatest conflicts with adjacent landowners; alters recreation settings; highest impacts on non-motorized or quiet recreation activities; continues motorized access to all dispersed recreation sites	lowest mileage available to motorized use; least conflicts with adjacent landowners; recreation setting changes from predominately motorized to predominately non-motorized; highest reduction of motorized access to dispersed recreation sites	second highest mileage available to motorized use; conflicts with adjacent landowners may occur; second greatest impacts to non-motorized activities; reduces motorized access to dispersed recreation sites	second lowest mileage available to motorized use; few loops and very limited riding opportunities; reduces conflicts with adjacent landowners; reduces motorized access to dispersed recreation sites
Roadless and Special Areas	roadless characteristics and special area values improve over time as unauthorized routes passively restore to natural conditions; additions to the NFTS and opening closed roads reduce opportunities for solitude in the Carson-Iceberg, Mt. Reba, North Mountain, Raymond Peak and Tuolumne River roadless areas	noise and more evidence of human activity due to cross country travel with continued route proliferation reduce roadless character in all roadless areas; cross country travel with continued route proliferation could reduce values in all Special Areas (Proposed Wilderness, SIAs, RNAs, Wild and Scenic Rivers and Proposed Wild and Scenic Rivers) outside of Wilderness	roadless characteristics and special area values improve over time as unauthorized routes passively restore to natural conditions	roadless characteristics and special area values over time as unauthorized routes passively restore to natural conditions; additions to the NFTS and opening closed roads reduce opportunities for solitude in the Carson-Iceberg, Mt. Reba, North Mountain, Raymond Peak and Tuolumne River roadless areas	roadless characteristics and special area values improve over time as unauthorized routes passively restore to natural conditions; additions to the NFTS reduce opportunities for solitude in the Carson-Iceberg and Raymond Peak roadless areas
Transportation	greatest risks to public safety with the most miles where motorized mixed use occurs on roads	none	none	same as Alternative 1	least risk to public safety with the lowest miles where motorized mixed use occurs on roads

	Alternative 1 (Proposed Action)	**Alternative 2** (No Action)	**Alternative 3** (X-C Prohibited)	**Alternative 4** (Recreation)	**Alternative 5** (Resources)
Society, Culture and Economy	does not meet demand for motorized access to dispersed recreation sites; proliferation of new sites impacts land and driving experiences	cross country travel and route proliferation degrade the quality of the recreation setting	does not meet demand for motorized routes displacing use to other locations; does not meet demand for motorized access to dispersed recreation sites; proliferation of new sites impacts land and driving experiences	same as Alternative 1	same as Alternative 3
Soil	128 miles of additions to the NFTS occur on high MEHR soils; 55 miles of additions to the NFTS occur on soils with HFC concerns; opens 29 miles of closed roads prone to loss of hydrologic function and water control	204 miles of unauthorized routes occur on high MEHR soils with route proliferation adding another 22 miles over 10 years representing a loss of soil productivity on 158 acres	vegetation growth on most unauthorized routes stabilizes them to background erosion rates	151 miles of additions to the NFTS occur on high MEHR soils; 68 miles of additions to the NFTS occur on soils with HFC concerns; opens 45 miles of closed roads prone to loss of hydrologic function and water control	24 miles of additions to the NFTS occur on high MEHR soils; 8.6 miles of additions to the NFTS occur on soils with HFC concerns; opens 2.9 miles of closed roads prone to loss of hydrologic function and water control
Visual	high positive effect on the overall scenery by prohibiting cross country travel; parking and camping along NFTS roads makes roads appear less natural and more congested	negative effect on the overall scenery by continued cross country travel and route proliferation resulting in loss of natural character and a inconsistency with VQOs; parking and camping remain hidden from view in most locations	same as Alternative 1 except: highest positive effect on the overall scenery; reduced motorized touring and enjoyment of the scenery at many locations; increased parking along NFTS roads makes roads appear least natural and most congested	same as Alternative 1 except: lower positive effect on the overall scenery; maximizes motorized viewing opportunities at the expense of some non-motorized	same as Alternative 1 except: higher positive effect on the overall scenery although less access to early spring (wildflowers) and fall (peak fall color) scenery at some locations
Watershed	reduces direct, indirect and cumulative watershed effects by prohibiting cross country travel; water quality is good to excellent; meets beneficial uses of water; sediment, water temperature and oil and grease are consistent with water quality objectives	cross country travel and route proliferation slightly increase sedimentation but do not adversely affect beneficial uses	same as Alternative 1 except: most reduction in direct, indirect and cumulative watershed effects	same as Alternative 1 except: less reduction in direct, indirect and cumulative watershed effects	same as Alternative 1 except: more reduction in direct, indirect and cumulative watershed effects
Wildlife	additions to the NFTS and opening closed roads adversely affects individuals of numerous wildlife species over the short and long-term	cross-country travel impacts individuals of numerous wildlife species; continued route proliferation exacerbates long-term impacts	beneficial effects to all wildlife species	same as Alternative 1 except more additions to the NFTS and opening more closed roads increases impacts on the number of individuals for each species	same as Alternative 1 except fewer additions to the NFTS without opening closed roads decreases impacts on the number of individuals for each species

Figure 2.02-1 Season of Use/Wheeled Over Snow Map



3. Affected Environment and Environmental Consequences

3.01 INTRODUCTION

This chapter summarizes the physical, biological, social, and economic environments that are affected by the proposed action and alternatives and the effects on that 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.

The "Affected Environment" section under each resource topic describes the existing condition against which environmental effects were evaluated and from which progress toward the desired condition can be measured. Environmental consequences form the scientific and analytical basis for comparison of alternatives, including the proposed action, through compliance with standards set forth in the Stanislaus National Forest Land and Resource Management Plan, as amended (Forest Plan). The environmental consequences discussion centers on direct, indirect and cumulative effects, along with applicable mitigation measures. Effects can be neutral, beneficial or adverse. The "Irreversible and Irretrievable Commitments of Resources" section is located at the end of this chapter. These terms are defined as follows:

- Direct effects are caused by the action and occur at the same place and time as the action.
- Indirect effects are caused by the action and are later in time, or further removed in distance, but are still reasonably foreseeable.
- Cumulative effects are those that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.

Analysis Process

The environmental consequences presented in Chapter 3 address the impacts of the actions proposed under each alternative. This effects analysis was done at the forest scale (the scale of the proposed action as discussed in Chapter 1). However, the effects findings in this chapter are based on site-specific analyses of each route proposed for addition to the National Forest Transportation System (NFTS) and any changes in vehicle class and/or season of use for existing NFTS roads and trails.

Resource specialists reviewed each affected route proposed in the alternatives. Readers seeking information concerning the environmental effects associated with a specific route are directed to the Resource Analysis Database, which documents details concerning mitigation measures and other findings. This report is part of the project record on file at the Forest Supervisor's Office in Sonora, California and copies are available by request.

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

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

2. **Addition of new facilities to the NFTS**: As described above, the impacts of new facilities (roads or trails) are addressed in sum total in this chapter while impacts of individual routes or areas are addressed in appendix A. 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.
3. **Changes to vehicle class and season of use on the existing NFTS**: Impacts caused by changes to vehicle class and season of use on the existing NFTS are described generally by alternative. For some impacts (for example public safety), impacts are also addressed by route. Where impacts associated with individual routes are warranted, the reader is directed to appendices or project files where this data is located.

Alternatives 1, 4 and 5 (see Chapter 2) include a fourth action item for non-significant Forest Plan Amendments. The proposed amendments make certain additions to the NFTS and changes to the existing NFTS compliant with the Forest Plan. The analysis discloses the effects of these additions or changes under action items 2 and 3 above.

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 under each resource, but in most cases includes the entire Stanislaus National Forest including private and other public lands that lie within the Forest boundary. Past activities are considered part of the existing condition and are discussed in the “Affected Environment (Existing Conditions)” and “Environmental Consequences” section under each resource.

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. Existing conditions reflect the aggregate impact of all prior human actions and natural events that 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 for three reasons.

First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Innumerable actions over the last century (and beyond) impacted current conditions and trying to isolate the individual actions with 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 information on the environmental impacts of individual past actions is limited, and one can not reasonably identify each and every action over the last century that contributed to current conditions. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects.

Finally, the Council on Environmental Quality (CEQ) issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, “agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions” (CEQ 2005).

The cumulative effects analysis in this EIS is also consistent with Forest Service National Environmental Policy Act (NEPA) Regulations (73 Federal Register 143, July 24, 2008; p. 43084-43099), which state, in part:

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

For these reasons, the analysis of past actions in this section is based on current environmental conditions. Appendix B (Cumulative Effects Analysis) lists present and reasonably foreseeable future actions potentially contributing to cumulative effects.

Affected Environment Overview

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

Located on the western slope of the Central Sierra Nevada, the Stanislaus National Forest contains about 1.1 million acres within its boundary, of which 898,000 acres is National Forest System (NFS) lands. The Forest's topography is characterized by a series of broad sloping benches separated by river canyons and numerous tributary drainages. The dominant aspect is west towards the Central Valley and Pacific Ocean. Elevation varies from 1,100 feet in the Tuolumne River canyon to 11,575 feet at Leavitt Peak along the Sierra crest. Four major rivers (Merced, Mokelumne, Stanislaus and Tuolumne) occupy deep canyons that drain west into the Central Valley. A fifth river, the Clavey, flows southward into the Tuolumne. Elevation differences in these canyons can range from 1,000 to 2,000 feet within a half-mile or less. Slopes along the river canyons are steep with gradients of 60-100 percent.

The Forest contains a number of small to medium-sized lakes, mostly man-made. Cherry Lake (1,800 acres) is the largest while Pinecrest Lake (300 acres) and Lake Alpine (180 acres) are the most popular for recreation use. The only naturally occurring lakes are at the higher elevations. Granite, the most common rock type on the Forest, is especially evident at the higher elevations. Volcanic rocks once covered much of the Forest, but eroded away in many areas. The Dardanelles and nearby Table Mountain are remnants of these volcanic rocks.

Forest climate is directly related to elevation. Below 4,000 feet, mild rainy winters and hot dry summers prevail, with an average 30-35 inches annual precipitation. Above 4,000 feet summers are cooler, winters are cold and snowy, and annual precipitation is 40 to 65 inches. Snow accumulates on protected exposures, and surface runoff from snowmelt, which feeds the rivers and higher elevation creeks, normally occurs from March through July.

The Stanislaus National Forest contains a mosaic of vegetation distributed and controlled primarily by climate and soils. The dominant vegetation types occur as broad bands oriented northwest-southeast across the Forest occupying general elevation zones. The annual grass-oak woodland-digger pine vegetation type is found up to about 3,000 feet along the steep sides of the major river canyons where it is confined primarily to the south-facing slopes. The chaparral vegetation type occurs higher, from about 1,500 to 3,500 feet elevation. Most of the forested land occurs between 3,500 to 7,500 feet, with some as high as 8,500 feet. Evergreen and deciduous hardwoods are scattered throughout all elevation zones. The sub-alpine zone with a mixture of conifers and low growing shrubs exists above 7,500-8,500 feet.

Unmanaged OHV use resulted in unplanned roads and trails, erosion, watershed and habitat degradation and impacts to cultural resources. On some portions of the Stanislaus National Forest long managed as open to cross-country motor vehicle travel, repeated use resulted in unplanned, unauthorized roads and trails. These routes generally developed without environmental analysis or public involvement and do not possess the same status as NFTS roads and trails (see 1.02, Background).

Assumptions and Limitations

The following assumptions and limitations apply to the effects analysis in each section:

1. No NEPA decision is necessary to continue use of the NFTS (i.e. OHV and transportation) as currently managed under the No Action alternative. These decisions were made previously.
2. User-created roads, trails and areas are not NFTS facilities. They are unauthorized. Proposals to add these to the NFTS require a NEPA decision.
3. Temporary roads, trails and areas built to support emergency operations or temporarily authorized in association with contracts, permits or leases are not intended for public use. They are not NFTS facilities (e.g. they are unauthorized for public use). Any proposal to add these temporary roads to the NFTS will require a NEPA decision.
4. Any unauthorized routes not included in the Proposed Action are not precluded from consideration for addition to the NFTS in future travel management actions.
5. The Agency will continue to make changes to the NFTS on an ‘as needed basis’. It will also continue to make decisions about temporary roads or trails on an ‘as needed’ basis associated with contract, permit, lease or other written authorization.
6. 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 (i.e. fuelwood permits, motorized SUP permits, mining activity etc.). Such actions are subject to separate NEPA analysis.
7. “Designation’ is an administrative act which does not trigger NEPA. Designation technically occurs with printing of the Motor Vehicle Use Map (MVUM). NEPA is not required for printing a map.
8. For travel management, the federal action triggering NEPA, is any change to current restrictions or prohibitions regarding motorized travel by the public (for example: prohibiting cross-country travel, changing management - changing vehicle class or season of use, and any additions or deletions of facilities (roads and trails) to the National Forest Transportation System (NFTS).
9. Previous decisions on the NFTS do not need to be revisited to implement the Travel Management Rule or the MVUM. That is, the NFTS contains existing facilities (roads and trails) that either underwent NEPA or pre-date NEPA. Allowing continued motorized use of the facilities in the NFTS in accordance with existing laws and regulations, does not require NEPA.
10. Dispersed recreation activities (i.e. activities which 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 and the analysis focus on motor vehicle use.
11. Travel analysis is a pre-NEPA planning exercise for transportation planning which informs travel management. Until new directives are published, the agency continues to follow existing policy

related to transportation planning and analysis. For example, some Roads Analysis Process requirements in FSM 7700 and 7710 are still applicable.

12. 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.
13. The system will be maintained to standard and all additions or changes to the NFTS will meet standards prior to availability for public use.

Resource Analysis

Each resource specialist assessed every unauthorized route proposed as an addition to the NFTS in any alternative at a level sufficient to support their effects analysis and identify any necessary site-specific mitigation. Appendix H (Resource Analysis Summary) presents a summary of this resource analysis with each specialist indicating one of the four options listed below for every route. The Resource Analysis Database (project record) contains additional details.

1. The route was considered; a field visit was not necessary; the effects of adding the route to the NFTS are acceptable (meet law, regulation, and policy; routine maintenance is assumed).
2. The route was considered, a field visit was made and the effects are acceptable (meet law, regulation, and policy; routine maintenance is assumed).
3. The route was considered, a field visit was made and site-specific mitigation is prescribed to reduce the effects to acceptable (meet law, regulation, and policy; routine maintenance is assumed).
4. The route was considered, a field visit was made and a determination was made that the effects could not be mitigated. The route is not recommended by the specialist for inclusion.

Resource Reports

Most resource sections in this chapter provide a summary of the project-specific reports, assessments, and other documents prepared by Forest Service specialists. These reports are part of the project record on file at the Forest Supervisor’s Office in Sonora, California and they are available by request. The following reports, assessments and other documents are incorporated by reference:

Botany: Botanical Resources Report; Biological Evaluation for Sensitive Plants and Other Botanical Resources; Weed Risk Assessment

Geology: Geologic Assessment for Asbestos Occurrence; Abandoned Mine Lands Report

Cultural: Cultural Resources Report; Cultural Resource Management Report (05-16-1305)

Recreation: Recreation Resources Report

Transportation: Transportation Facilities Report; Mixed Use Analysis

Roadless and Special Areas: Roadless and Special Areas Report

Social: Society, Culture and Economy Report

Soil: Soil Resource Report

Visual: Visual Resources Report

Water: Water Resources Report; Cumulative Watershed Effects; Riparian Conservation Objectives Analysis

Wildlife: Terrestrial and Aquatic Biota Report; Biological Assessment/Biological Evaluation (BA/BE) for Fish and Wildlife; Management Indicator Species Report

Route Data

During the planning stages of the travel management project for the Stanislaus National Forest, the public recommended additions and changes to the existing NFTS with a focus on adding unauthorized routes. Comments regarding specific routes were also received during the public scoping period for the Notice of Intent (72 Federal Register 222, November 19, 2007; p. 64988-64991). The disposition of these routes fell into two categories: routes brought forward for detailed study in the alternative and routes eliminated from detailed study. The responsible official made these decisions based upon the purpose and need, the scope of the EIS and issues.

The action alternatives consider a number of additions to the NFTS and changes to the existing NFTS. The Forest developed a route data listing of all additions and changes considered in an alternative, shown in Appendix I (Route Data). The route data identifies:

- the alternative(s) under which the additions to the NFTS or changes to the existing NFTS is proposed;
- the type of vehicles allowed;
- season when the route would be open; and,
- mitigation measures that would be implemented on the route prior to publication on a MVUM and allowing public use (see Appendix F, Maintenance and Mitigation Definitions).

Regular operation and maintenance activities (e.g. brushing, signing, cleaning and maintaining existing drainage structures patrolling routes, etc.) are a part of regular maintenance and management strategies for the NFTS and covered under separate NEPA.

Law Enforcement

Appendix E (Law Enforcement) details the law enforcement authority and jurisdiction, cooperation, implementation and tracking, implementation strategy, assumptions and measures of success.

Enforcement Assumptions

Enforcement of the laws and regulations related to 36 CFR 212 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, a transitional period is usually allowed for the public to understand the changes. A higher number of violations to CFR 212.51 is anticipated the first few years and the number of violations will decline as the users understand and comply with the rules. It is assumed:

- Users in communities adjacent to the Forest will comply within 1-2 years.
- Frequent users but further in distant from the Forest will comply within 2-3 years.
- Infrequent users regardless of distance may take up to 5 years to comply.
- Law enforcement officer and agency personnel’s presence and enforcement actions will positively affect OHV users’ behaviors and attitudes.
- The MVUM clearly defines the designated routes; therefore, making violations to CFR 212 unequivocal.
- Once the MVUM is published, the implementation of the established dedicated network of roads and trails with signs, and user education programs, will reduce the number of violations.
- Forest Protection Officers spend a large percentage of their time on Travel Management issues, and depending on the Forest the estimate range from 30 to 50 percent. Law Enforcement Officers spend approximately 10-20% of their time on enforcement of off-highway vehicle issues.
- The proposal to provide additional facilities to the NFTS through some action alternatives is anticipated to assist enforcing the shift from an “open to cross country motor vehicle travel’ management situation to one where such use is prohibited. These actions provide opportunities and access where such use was occurring in key popular dispersed locations based upon

recreation analysis and public input. Providing opportunities in popular, key areas will help relieve pressure to travel off of designated routes.

Information on Other Resource Issues

The alternatives considered in detail do not affect these resource issues or localized effects are disclosed under other resource sections. A brief summary on why they are not further discussed in Chapter 3 is provided based upon input received during scoping.

Air Quality

Actions proposed are in compliance with state air quality regulations and the Forest Plan. Air emissions are generally managed and analyzed spatially by air basins (http://www.arb.ca.gov/knowzone/basin/basin.swf) where topographic features delineate common air quality characteristics. Air quality conditions are highly controlled by short and long term meteorological and climate conditions.

Generally, the number of vehicle miles traveled annually by forest users is not expected to change in any alternatives through the prohibition of cross country travel and the redirection of motorized use onto a designated system of roads and trails. As a result, no adverse effects are anticipated to air quality. Where seasonal restrictions are put into place, a slight benefit to air quality may occur as a result of the actions. Where action alternatives propose adding routes to the NFTS, any air quality related issues are offset by the reduction of cross country travel. These routes were pulled from the inventory of unauthorized routes open to public use as part of cross country travel prior to this proposal. The following analysis led to a determination that no adverse effects to air quality would result from any of the action alternatives: none of the proposed routes pass through serpentine soils (see Geologic Assessment for Asbestos Occurrence, project record); none of the alternatives propose routes or terminal facilities that would result in a significant increase or change in concentration of use; and, none of the alternatives propose routes located in federal (national) non-attainment areas for pm2.5 and ozone 8 hour. Tailpipe emissions accounted for by CARB in the green/red sticker program suggest that CARB regulates these emissions to achieve state implementation plan targets. No adverse change in attainment status is expected to occur as a result of these projects. The San Bernardino National Forest Travel Route Designation Project Air Quality Report indicates no significant impacts to air quality and is generally representative of the Region’s travel management proposals (project record).

Calaveras Big Trees State Park

The Stanislaus National Forest shares a common boundary with the Calaveras Big Trees State Park. California State Park regulations prohibit any disturbance or destruction of natural resources. The alternatives considered in detail do not affect this resource where motorized travel is confined to designated roadways. The Forest Service will regulate motorized travel adjacent to Calaveras Big Trees according to the decision implementing this project.

Climate Change

The State of California controls tailpipe emissions and therefore greenhouse gasses and ozone emissions are outside the scope of this project (see Air Quality).

Fire

The lower elevations of the Stanislaus National Forest support a combination of weather, fuel types, topography and fire occurrence that create a significant fire environment. Arson, campfire escapes, debris burning and smoking continue as the leading causes of human-caused fire on the Forest. Lightning is common during summer months and in most cases precipitation accompanies the thunderstorms. Dry thunderstorms occur frequently, but not usually of the magnitude or under the conditions that existed during the drought of 1987 resulting in the massive Stanislaus Complex Fire, which burned approximately 145,500 acres.

From 1970 through 2007, lightning is the number one cause of wildland fire starts with 2,259 fires followed by escaped campfires in second with 628 fires. During that time, mechanical (motor vehicles, chainsaws, hot saws, heavy equipment, etc) causes accounted for 165 fire starts with 5,293 acres burned, representing less than 4% of the total fire starts and less than 2% of the acres burned on the Forest (B. Shindelar, personal communication, November 14, 2008).

Fire and fuels planning is an integral part of the overall resource management on the Forest. Fire suppression, fire prevention and fuels management programs provide the balanced program needed to keep wildfire acreages below maximum fire size objectives. Multi-funded resource enhancement projects provide many opportunities to avoid fire problems by manipulating fuel beds to lower hazard levels. Fuel breaks, fuel modification zones, water source development, large-scale mosaic prescribed burn activities and activity fuel treatments lessen the chance for large and damaging wildfires.

Data is not readily available which specifically identifies fires caused by motor vehicle use. It is assumed that visitors who use motor vehicles on the Forest will:

- comply with such laws as using approved and operating spark arrestors;
- obtain campfire permits for camping outside of developed sites;
- stay on authorized routes during appropriate season of use; and,
- adhere to any fire restrictions in effect.

The alternatives considered in detail do not change the number of human-caused fires or affect emergency access. Continued Forest Service access is available on administrative use only and special use permit roads. In emergency situations, the Forest Service can access federal land where no public right of way exists.

Geology

Granite, the most common rock type on the Stanislaus National Forest, is especially evident at the higher elevations. Volcanic rocks once covered much of the Forest, but eroded away in many areas. The Dardanelles and nearby Table Mountain are remnants of these volcanic rocks. The alternatives considered in detail do not affect geology. The Geologic Assessment for Asbestos Occurrence (project record) shows that none of the proposed routes pass through serpentine soils (see Air Quality). The Abandoned Mine Lands (AML) Report (project record) shows that 6 routes (1.03 miles), proposed as additions to the NFTS in Alternatives 1 and 4, intersect or are within 200’ of AML sites. The AML report recommends that these routes not be available to the public until the Forest AML program develops site specific mitigations. The Resource Analysis Database Summary Report (project record) contains additional details.

Noxious Weeds

The Stanislaus National Forest maintains a list of noxious weeds and non-native, invasive pest plants of concern that currently infest 2,623 acres and 30 miles of motorized routes within the analysis area. The botany section and the Noxious Weed Risk Assessment (project record) disclose the effects of noxious weeds on specific resources.

Private Property

About 200,000 acres of private property exists within the boundary of the Stanislaus National Forest. California regulates timber harvest on private land under the Forest Practice Rules. County plans address other private land uses including management of private roads available for use by the public consistent with the California Vehicle Code. Sierra Pacific Industries (SPI) owners of the largest portion of private land opposes public motorized travel on their lands. For the purpose of estimating environmental effects this analysis assumes that private roads will not be available for public motorized use. The alternatives considered in detail do not affect private roads or use on private property. The recreation and society, culture and economy sections disclose any localized effects on private property.

Range

The Stanislaus National Forest contains 356,200 acres of land suitable for grazing. The alternatives considered in detail do not affect grazing permittees since the proposed prohibitions and restrictions include exceptions as allowed by permit or other authorization. The botany, soils, visual, water and wildlife sections disclose any localized effects on specific vegetation components of the range resource.

Special Events

During scoping, some comments suggested that route designations may not provide adequate opportunities for motorized special use events. Actions proposed comply with the Travel Management Rule (36 CFR 212) and do not authorize any future permits for special events. The alternatives considered in detail do not affect special events because permit issuance is subject to additional site-specific NEPA that could consider and authorize temporary special event use on routes other than those designated through this analysis.

Vegetation

The Stanislaus National Forest contains a mosaic of vegetation distributed and controlled primarily by climate and soils. The dominant vegetation types occur as broad bands oriented northwest-southeast across the Forest occupying general elevation zones. The alternatives considered in detail do not affect the distribution of vegetation across the Forest for these reasons: motorized trail use occurs over only 274 acres or less than 0.04% of the project area; no new construction is proposed; disturbance already occurred since the alternatives consider only existing routes. The botany, soils, visual, water and wildlife sections disclose any localized effects on specific vegetation resources.

Wilderness

The Stanislaus National Forest manages all or portions of the Carson-Iceberg, Emigrant and Mokelumne Wildernesses. Actions proposed comply with Wilderness designations and the Wilderness Act of 1964. The alternatives considered in detail do not affect this resource where motorized activity is prohibited under all the alternatives per the Wilderness Act.

Yosemite National Park

The Stanislaus National Forest shares a common boundary, much of which is Wilderness, with Yosemite National Park to the east. The National Park Service manages park resources and values to leave them unimpaired for the enjoyment of future generations. The alternatives considered in detail do not affect this resource where motorized travel is confined to designated roadways. The Forest Service will regulate motorized travel adjacent to Yosemite according to the decision implementing this project.

Analysis Framework

This section provides the statutes, regulations, Forest Plan and other direction that apply to this analysis. NEPA at 40 CFR 1502.25(a) directs “to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders.” Each resource section lists the applicable laws, regulations, policies and Executive Orders relevant to that resource. Surveys, analyses and findings required by those laws are addressed in the resource reports in the project record.

National Forest Management Act

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 the NFS lands.

2005 Travel Management Rule 36 CFR 212

Title 36, Code of Federal Regulations, Part 212 (36 CFR 212) is the implementing regulation for the Travel Management Rule (70 Federal Register 216, November 9, 2005; p. 68264-68291). Part 212 provides criteria for designation of roads and trails. The alternatives are designed specifically to implement the requirements of the travel management rule. In particular, it addresses the requirements of 36 CFR 212 Designation of roads, motorized trails, and motorized areas which states in part “Motor vehicle use on National Forest System roads, on National Forest System trails, and in areas on National Forest System lands shall be designated by vehicle class and, if appropriate, by time of year by the responsible official on administrative units or Ranger Districts of the National Forest System.”

Forest Plan Direction

The Stanislaus National Forest Land and Resource Management Plan (Forest Plan), as amended, directs the management of the Stanislaus National Forest. Table 3.01-1 shows the Forest Plan management area allocations to Motor Vehicle Travel Management (MVTM) and Recreation Opportunity Spectrum (ROS), the primary Forest Plan direction for managing motorized use on the Stanislaus National Forest (USDA 2005a). Appendix C (Forest Plan Direction) lists the Forest Plan Standards and Guidelines (S&Gs) that specifically apply to Motorized Travel Management.

Table 3.01-1 MTVM and ROS Allocations

#	Management Area	MVTM	ROS
1	Wilderness and Proposed Wilderness	Closed	Primitive
2	Wild and Scenic Rivers and Proposed Wild and Scenic Rivers	Closed (Wild)	Primitive (within Wilderness) Semi-Primitive Non-Motorized
		Restricted (Scenic and Recreational)	Roaded Natural
3	Near Natural	Closed	Semi-Primitive Non-Motorized
4	Wildlife	Restricted	Semi-Primitive Motorized Roaded Natural
5	Special Interest Areas	Closed (within Wilderness)	Primitive (within Wilderness)
		Restricted	Semi-Primitive Motorized Roaded Natural
6	Research Natural Areas	Closed	Semi-Primitive Non-Motorized
7	Experimental Forest	Restricted	Roaded Natural
8	Scenic Corridor	Restricted	Roaded Natural
9	General Forest	Restricted	Roaded Natural
10	Developed Recreation Sites	Restricted	Roaded Natural Rural
11	Winter Sports Sites	Restricted	Roaded Natural Rural
12	Developed Non-Recreation	Restricted	Rural

3.02 BOTANICAL RESOURCES

Of the Forest Service Regions, the Pacific Southwest Region contains the largest assemblage of sensitive plant species in comparison to its land base. Of the more than 8,000 vascular plant species occurring in California, well over half are known to occur on NFS lands. This is due to topography, geography, geology and soils, climate and vegetation. These same factors account for the exceptionally high endemic flora of the State. Over 100 plant species are found only on FS lands and found no where else in the world (Powell 2001).

Management of plant species and habitat and maintenance of a diversity of plant communities is an important part of the mission of the Forest Service (Resource Planning Act of 1974, National Forest Management Act of 1976). Management activities on National Forest System (NFS) lands must be planned and implemented so that they do not jeopardize the continued existence of threatened or endangered species or lead to a trend toward listing or loss of viability of Forest Service Sensitive species. In addition, management activities should be designed to maintain or improve habitat for rare plants and natural communities to the degree consistent with multiple-use objectives established in each Forest Plan. Key parts of these activities 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 Pacific Southwest Region has over 425 rare plant species on National Forest lands.

Management decisions related to motorized travel can affect plant species, their habitats, and natural communities. Effects include, but are not limited to, death or injury to plants, habitat modification, habitat fragmentation, and degraded habitat quality caused by increased risk of weed introduction and spread, change in hydrology, increased erosion, compaction, and sedimentation, 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 2353.03(2)). Management decisions related to motorized travel on NFS lands must consider effects to plant species and their habitats.

Vehicle travel is a major factor/vector in the introduction and spread of noxious weeds, so this project affects the population and distribution of these species. Additionally, the Chief of the Forest Service has determined that invasive species are one of four significant threats to forests and rangelands. The presence of these invaders affects many other resources, such as soil, wildlife habitat, and sensitive plants, so it is important to analyze and understand the effects of the project on noxious weed populations

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

Direction relevant to the proposed action as it pertains to botanical resources includes:

Forest Plan - General direction for management of Sensitive Plants under the Forest Plan is to "provide for and manage plant habitats and activities for threatened and endangered species to achieve recovery objectives so that special protection measures provided under the Endangered Species Act (ESA) are no longer necessary” (FSM 2670.21). Section 7 of the ESA directs Federal departments and agencies to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats. The Standards and Guidelines outlined in the General Direction of the Sensitive Plants Interim and Recovery Management (USDA 2005c) includes: 1) Protect sensitive plants from activities which might cause them to become Federally listed as Threatened or Endangered; 2) Identify populations of sensitive plants which occur in areas planned for timber sales or “other” projects; 3) Modify planned projects to avoid or minimize adverse impacts to sensitive plants; 4)Where projects may jeopardize a sensitive plant species, perform a Biological Evaluation, botanical investigation and develop management guidelines, as necessary for the species involved; and 5) Conduct surveys and monitoring necessary to detect potentially damaging disturbances, changes in known populations and locations of new populations.

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 United States Fish and Wildlife Service (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.

E.O. 13112 Invasive Species 64 FR 6183 (February 8, 1999) **-** To prevent and control the introduction and spread of invasive species.

Forest Service Manual and Handbooks (FSM/H 2670) **-** Forest Service Sensitive (FSS) species are 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 (USDA 2004c):

- 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 (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.

Sensitive Plant Surveys (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 (FSH 2609.25.11). If additional field surveys are to be conducted as part of project implementation, survey results must be documented in the project file. (Management S&G 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.

Direction relevant to the proposed action that is relevant to the management and prevention of noxious weeds includes:

FSM 2081.03 requires that a weed risk assessment be conducted when any ground disturbing activity is proposed. Determine the risk of introducing or spreading noxious weeds associated with the proposed action. 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 it 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.

Effects Analysis Methodology

GIS data was used to analyze existing routes open for public wheeled motor vehicle use, including the parking of a vehicle within one vehicle length of the travel way or within 200 feet of sensitive plant sites, and the additional routes added to the system within the action alternatives. 200 feet was chosen as an indicator because vehicle and human use on and immediately adjacent to travel routes affect or have the potential to affect rare plant population either directly by damage or death to individual plants (crushing, stem breaking, etc.) or indirectly by altering the habitat through soil disturbance, changes in hydrologic functioning, or by the introduction of non-native, invasive plants.

The rationale for a 200-foot buffer around the route is a judgment related to the potential extent of damage to individual plants or habitat from vehicles and human use. Even though most motorized users do not leave their vehicles and walk more than 200 feet from the travel route, exceptions occur at vistas, points of interest (for example fishing sites), and dispersed campsites. At these locations foot traffic may affect plants and their habitat more than 200 feet from the motorized travel route. Little information is available to definitively quantify the distance from route edge in which direct and indirect effects occur within different habitats. The establishment of a 200-foot buffer represents a method to allow comparison between alternatives.

The Biological Evaluation uses presence of sensitive species detected during on-the-ground surveys and an analysis of the existing data for unsurveyed potential habitat to make final determinations of effects to sensitive plants. Since surveys of trails not authorized for motorized use are not complete, this analysis assumes that the species is present within the identified potential habitat until surveys are complete. Sensitive species may or may not be in unsurveyed potential habitat. In addition, it is possible for certain sensitive species to go undetected in any given area because the species did not produce aboveground structures that were visible at the time of the survey. For example, *Lewisia kelloggii var. kellogii* is only visible for a few weeks after the snow melts. In many instances, the access to those potential habitats is not open because the snow has not melted in the more shaded areas of the road or trail that provides access. If the timing of the survey is not right, the sensitive plant could go undetected.

Direct effects consist of documented disturbances from motor vehicles that resulted in damage to sensitive plants by either driving off-road, or parking. Under these conditions, 30 feet from routes edge was judged a likely distance for limits of potential direct effects, such as trampling and crushing to sensitive plants. Plant sites and occurrences within 30 feet on either side of the route’s edge are assumed to be affected.

Lava caps are unique habitats and a watchlist plant community for the STF. Open areas, such as lava caps or granitics and volcanic balds do not provide natural barriers to motor vehicle use or limit vehicle movement. Lava caps are relatively level, open habitats comprised of low herbaceous vegetation and scattered low shrubs. In addition, these habitats tend to be highly roaded. Two sensitive plant taxa (i.e., three-bracted onion and Stebbin's lomatium) are known to occur on the STF in open habitat on rocky ridges and outcrops adjacent to additions to the NFTS or within 200 feet of the routes. These local endemics grow on very thin soils in open habitat that is quite vulnerable to OHV activity (M. Willits, personal communication, January 16, 2009). Damage to lava caps and to sensitive plant occurrences on lava caps were documented on the STF. The number of native surface routes within lava caps is a useful means of comparing potential effects to sensitive plant habitat between the alternatives.

Data for meadows, fens, and riparian areas was collected from individual district records for project specific activities, and surveys in these areas are incomplete. Meadows, fens, and riparian areas provide habitat for seventeen sensitive species, including six mosses, one lichen, five moonworts, and subalpine fireweed, Pilot Ridge fawn lily, Tuolumne fawn lily, Hetch-Hetchy monkeyflower and pansy monkeyflower; all of which may be directly/or indirectly affected by routes open for public wheeled motor vehicle use through wet areas. Habitat is susceptible to changes in hydrology, sedimentation, compaction, rutting, and exposure of bare soil. Damage to meadow habitat and to sensitive plant sites within meadow habitats has been documented on the STF. For instance, on the Calaveras Ranger District, 2 areas within fen features were found to be heavily impacted by OHV users, creating tracks and rutted scars with in the middle of the wettest habitats (C. Meyers, personal communication August 13, 2008). The miles of native surface routes within these habitats provide a means of comparing potential effects to sensitive plant habitat between alternatives.

Data for noxious weeds was collected from GIS records. Routes infested with invasive plant species (noxious weeds) have the potential for direct and indirect effects to sensitive plant habitat. The rationale for a 200-foot distance for the limit of potential indirect effects included a judgment that effects from compaction, changes to drainage patterns, and spread of invasive species that compete with sensitive plants were most likely to occur within 200 feet. Noxious weeds and other invasive plant species may cause indirect effects to sensitive plants through competition. Invasive plant species also may have dramatic direct effects on sensitive plant habitats as well as to species bio-diversity across the analysis area.

Assumptions Specific to Botanical Resources

1. Motor vehicle use on and off established routes has affected or has the potential to affect sensitive plant populations, either directly by damage or death to individual plants from wheel-traffic (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.
2. Motor vehicle use is unlikely to impact sensitive plant occurrences and habitats on steep or extremely rocky terrain. Motor vehicle use is more likely to impact rare plant occurrences and suitable habitat areas, such as meadows and lava caps, with gentle slopes and/or flat terrain with little or no vegetation or natural barriers to motor vehicles.
3. Without specific prevention and control measures, invasive non-native plants (weeds) will continue to spread along surfaced and native surfaced motor vehicle roads and trails, and into adjacent areas.
4. Motor vehicle use of native surface routes increases sediment production and erosion, thereby potentially adversely affecting sensitive plant habitat (for more detail, see soils or water resources sections).

5. Impacts to native vegetation including sensitive/watchlist species do not vary significantly by alternative when vehicle class is changed. Effects from all types of motor vehicles are assumed equal.
6. Based on the assumption that route proliferation will occur only in Alternative 2, future route proliferation is projected to be about 2 miles per year.
7. The effects to plant communities of implementing seasonal or wet weather closures were not compared because they cannot be quantified.
8. Unless indicated in the data, each "point" of weed infestation along a route was assumed to be within 200 feet of the route. This assumption is based on: 1) the fact that more than half of the weed data are five years or older; and 2) application of a conservative rate of average weed spread along a disturbed road-side, including occasional road maintenance.
9. Assume that the project is a ground-disturbing activity requiring a weed risk assessment. Assume infestations will continue. Assume high risk of spread where no information on weed populations exists.
10. Existing weed infestations will likely spread. Rate of spread will be increased by vehicular activity. Infestations located along routes where vehicles drive will spread further along the route. Motorized vehicles will bring weed seeds and propogative parts from home areas and other areas where they traveled.
11. Consider risk of spread to be medium if known populations of noxious weeds do not occur directly along travel routes, or occur on routes where travel is prohibited. Also, if the species that occur are in the B or C category or considered to be less invasive and already fairly well-distributed consider the risk to be medium. Risk of introduction or spread would be low if existing inventories show that noxious weed populations are not present on the routes in question.

Data Sources

1. Route-specific botanical data with a focus on additions to the NFTS (e.g., TE - species, meadows, lava cap features, habitats, etc. (Stanislaus Fen and Meadow survey report), including results of route-specific surveys of rare species.
2. Route specific inventories collected in Step 1 of Travel Management and associated tabular data sets.
3. GIS layers of the following data: routes, habitats, plant communities, soils, geology, meadows, etc.
4. Information on species status, distribution, and ecology was derived from general literature reviews, Forest Service documents and maps, California Department of Fish and Game, California Natural Diversity Database (CNDDB) (CDFG 2008), Nature Serve (CDFG 2007a), various field books, floras, and personal communications. The site surveys in conjunction with literature and input from the Forest botanists were used to determine the potential occurrence of each species and/or its habitat.

Botanical Resources Indicators

1. Number of sensitive plant sites/occurrences within 200 feet of wheeled motor vehicle
2. Number of documented direct impacts to sensitive plant sites/occurrences on either side of route's edge within 30 feet of motor vehicle routes
3. Miles of motorized routes passing through lava
4. Miles of motorized routes passing through meadows and riparian habitat
5. Miles of motorized routes infested with invasive plant species within 200 feet of sensitive plant occurrences/ and habitat

Botanical Resources Methodology by Action

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

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Forest

Indicators: Number of sensitive plant sites/occurrences within 200 feet of wheeled motor vehicle. Number of documented direct impacts to sensitive plant sites/occurrences on either side of route's edge within 30 feet of motor vehicle routes. Miles of motorized routes passing through lava. Miles of motorized routes passing through meadows and riparian habitat. Miles of motorized routes infested with invasive plant species within 200 feet of sensitive plant occurrences and habitat.

Methodology: GIS analysis of existing unauthorized routes in relation to sensitive plant sites and their habitat. Site-specific analysis is documented for surveyed and unsurveyed routes and is identified within each alternative, and described in detail of how they will be implemented.

2. Direct and indirect effects of adding facilities to the NFTS including identifying seasons of use and vehicle class.

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Forest.

Indicators: Number of sensitive plant sites/occurrences within 200 feet of wheeled motor vehicle. Number of documented direct impacts to sensitive plant sites/occurrences on either side of route's edge within 30 feet of motor vehicle routes. Miles of motorized routes passing through lava. Miles of motorized routes passing through meadows and riparian habitat. Miles of motorized routes infested with invasive plant species within 200 feet of sensitive plant occurrences and habitat.

Methodology: GIS analysis of existing unauthorized routes in relation to sensitive plant sites and habitat. Site-specific analysis is documented for surveyed and unsurveyed routes, and is identified within each alternative, and described in detail of how they will be implemented.

3. Direct and indirect effects of changes to the existing NFTS including identifying seasons of use and vehicle class.

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Forest.

Indicators: Number of sensitive plant sites/occurrences within 200 feet of wheeled motor vehicle. Number of documented direct impacts to sensitive plant sites/occurrences on either side of route's edge within 30 feet of motor vehicle routes. Miles of motorized routes passing through lava. Miles of motorized routes passing through meadows and riparian habitat. Miles of motorized routes infested with invasive plant species within 200 feet of sensitive plant occurrences and habitat.

Methodology: GIS analysis of existing unauthorized routes in relation to sensitive plant sites and habitat.

4. Cumulative Effects

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

Long-term timeframe: 20 years.

Spatial boundary: Forest.

Indicators: Number of sensitive plant sites/occurrences within 200 feet of wheeled motor vehicle. Number of documented direct impacts to sensitive plant sites/occurrences on either side of route's edge within 30 feet of motor vehicle routes. Miles of motorized routes passing through lava. Miles of motorized routes passing through meadows and riparian habitat. Miles of motorized routes infested with invasive plant species within 200 feet of sensitive plant occurrences and habitat.

Methodology: GIS analysis of all routes and sensitive plant sites and habitat.

Affected Environment

Within the analysis area, the dominant vegetation types, starting from lower elevations of Forest and moving upward, the Forest plant communities begin with a narrow band of Foothill-Woodland vegetation (blue oak, interior live oak, black oak, gray pine, and grasslands) with a mosaic of Chaparral (whiteleaf manzanita, buckbrush, and chamise); the Sierran Yellow Pine forests (ponderosa pine, Douglas fir, black oak, and incense cedar); Sierran Montane forests, which includes the Sierra Nevada mixed conifer type (ponderosa pine, sugar pine, Jeffrey pine, Douglas fir, white fir and black oak); the Upper Montane (red fir, Jeffrey pine, lodgepole pine, and western white pine), and Subalpine forests (mountain hemlock, western juniper, and whitebark pine) (Barbour 1977, Potter 1998).

The upper montane and subalpine areas include broad expanses of chaparral consisting of huckleberry oak, greenleaf, and pinemat manzanita, interspersed with extensive areas of rock outcrop as well as numerous wet meadows and springs. Within these larger communities exists a diversity of specialized ecosystems, including slate outcrops, lava caps, riparian drainages, subalpine lakes, montane meadows, and fens. These ecosystems provide habitat for STF sensitive plant species.

The difference between the current distribution and abundance of rare plant (threatened, endangered, proposed, sensitive, and/or watchlist) populations and historic levels is largely unknown (USDA 2004c). Plant species may be rare due to evolutionary history, basic population ecology, or were affected by human activities. Most likely, this situation is a combination of these factors. Human activities may or may not be responsible for the current distribution and abundance of the rare species.

Since the late 1980s sensitive plant monitoring on the STF has documented approximately 1,580 plant occurrences and the impacts to these species and their habitats. Within these occurrences are sites that may contain a number of plants (Project record). Impacts include damage from driving off-road through sensitive plant occurrences (STF sensitive plant files, 2007). These off-road impacts are especially notable in areas of gentle to moderately sloped terrain with low-growing vegetation, such as lava caps, granitic and volcanic balds, and meadows, which are suitable habitats for many STF sensitive plant species. Sensitive plant sites located on damp or wet cliff crevices, such as the brook pocket moss, are much less vulnerable to off-road vehicle travel.

The typical vegetation associated with habitat for a majority of the documented STF sensitive plant occurrences consists of low growing shrubs and/or herbaceous plants in areas of sparse or widely spaced trees. Meadow and riparian areas also provide habitat for documented STF sensitive plant occurrences. The types of associated vegetation and their distribution are important characteristics for this analysis because of the role that vegetation plays in: stabilizing the soil; and its capability to deter expansion of off road vehicular use. Vehicles can easily gain access into areas with low plant cover (i.e., lava caps, low chaparral, granitic and volcanic "balds", and meadows). Larger sized four-wheel vehicles have broken "trail" through natural shrub barriers as tall as 8 feet to gain access to selected local areas (OHV Wildlife Habitat Protection Plan 2004, Stanislaus OHV Grant Application). Areas with larger or denser vegetation are also accessed along little-used or abandoned roads, utility corridors, skid trails and temporary logging roads, which typically are not open for public motor vehicle travel.

Within the known range of the sensitive plant species known to or suspected to occur within the STF, the number of occurrences and amount of suitable habitat that were adversely affected by previous management activities and programs on private and federal lands has not been fully tabulated, but has been of consequence. For instance in the past decade alone, 52% of approximately 120,548 acres of completed and pending project has undergone timber/fuels reduction and other vegetation projects (Appendix B). Tables 3.02-1 and 3.02-2 summarize the Sensitive Plant and Moss Species and Habitat descriptions for Sensitive Plant Taxa known or with Potential to occur on the Stanislaus National Forest. No Fish and Wildlife Service listed plant species occur on the Stanislaus National Forest; therefore no consultation with the agency is required.

Table 3.02-1 Sensitive Plant Species and Habitat Description

Botanical Name	Common Name/Listings	Presence[2]	Occurrence[3]	Habitat Description/Landscape Group
Allium jepsonii[1]	Jepson's onion ALJE CNPS 1B.2	P	No	Upland and Mid Slopes
Allium tribracteatum	Three bracted onion ALTR CNPS 1B.2	K	Yes	Lower Montane, Chaparral and Woodlands, Upland and Mid Slope
Allium yosemitense	Yosemite onion ALYO CNPS 1B.3	K	No	Lower Montane, Chaparral and Woodlands, Upland and Mid Slope
Arctostaphylos nissenana[1]	Nissenan's longate ARNICNPS 1B.2	P	No	Lower Montane, Chaparral and Woodlands
Balsamorhiza macrolepis var. macrolepis	Big-scale balsamroot BAMAM CNPS 1B.2	K	Yes	Lower Montane, Chaparral and Woodlands
Botrychium ascendens[1]	Upswept moonwort BOAS2 CNPS 2.3	P	No	Lower Montane, Moist Habitats-Meadows and Riparian Areas
Botrychium crenulatum[1]	Scalloped moonwort BOCR CNPS 2.2	P	No	Lower Montane, Moist Habitats-Meadows and Riparian Areas
Botrychium lunaria[1]	Common moonwort BOLU CNPS 2.3	P	No	Moist Habitats-Meadows and Riparian Areas, Upland Slopes
Botrychium minganense[1]	Mingan's moonwort BOMI CNPS 2.2	P	No	Moist Habitats-Meadows and Riparian Areas, Upland Slopes
Botrychium montanum[1]	Western goblin BOMO CNPS 2.1	P	No	Moist Habitats-Meadows and Riparian Areas, Upland Mid Slopes, Lower Montane
Calochortus clavatus var. avius[1]	Pleasant Valley Mariposa lily CACLA CNPS 1B.2	P	No	Lower Montane, Upper Slopes
Clarkia australis	Small's southern clarkia CLAU2 CNPS 1B.2	K	Yes	Lower Montane, Chaparral and Woodlands
Clarkia biloba ssp. Australis	Mariposa clarkia CLBIA 1B.2	K	Yes	Lower Montane , Chaparral and Woodlands
Clarkia lingulata[1]	Merced clarkia CLLI CNPS 1B.1	P	No	Lower Montane , Chaparral and Woodlands
Cypripedium montanum	Mountain lady's slipper CYMO2 CNPS 4.2	K	Yes	Upland and Mid Slopes
Draba asterophora var. asterophora[1]	Tahoe draba DRASA2 CNPS 1B.2	P	No	Upland Slopes
Epilobium howellii	Subalpine fireweed EPHO3 CNPS 1B.3	K	No	Moist Habitats-Meadows and Riparian Areas
Eriophyllum congdonii	Congdon's woolly Sunflower ERCO16 CNPS 1B.2	K	No	Lower Montane, Chaparral and Woodlands, Upland and Mid Slopes
Eriophyllum nubigenum	Yosemite woolly sunflower	K	No	Lower Montane, Chaparral and Woodlands,

Botanical Name	Common Name/Listings	Presence[2]	Occurrence[3]	Habitat Description/Landscape Group
	ERNU6 CNPS 1B.3			Upland and Mid Slopes
Erythronium taylori	Taylor's fawn lily ERTA CNPS 1B.2	K	No	Moist Habitats-Meadows and Riparian Areas, Upland and Mid Slopes
Erythronium tuolumnense	Tuolumne fawn lily ERTU CNPS 1B.2	K	Yes	Moist Habitats-Meadows and Riparian Areas, Lower Montane
Horkelia parryi	Parry's horkelia HOPA CNPS 1B.2	K	Yes	Lower Montane, Chaparral and Woodlands
Hulsea brevifolia[1]	Short-leaved hulsea HUBR CNPS 1B.2	P	No	Lower Montane,
Upland and Mid Slopes				
Iris hartwegii ssp. Columbiana	Tuolumne iris IRHAC CNPS 1B.2	K	No	Lower Montane, Chaparral and Woodlands, Upland and Mid Slopes
Lewisia congdonii	Congdon's bitterroot LECO4 CNPS 1B.3	K	No	Lower Montane, Chaparral and Woodlands, Upland and Mid Slopes
Lewisia disepala[1]	Yosemite lewisia LEDI3 CNPS 1B.2	P	No	Lower Montane, Chaparral and Woodlands, Upland and Mid Slopes
Lewisia kelloggii ssp. Kelloggii	Kellogg's lewisia LEKEK GLOBAL.2	K	Yes	Upland and Mid Slopes
Lomatium stebbinsii	Stebbin's lomatium LOST CNPS 1B.1	K	Yes	Lower Montane, Chaparral and Woodlands, Upland and Mid Slopes
Lupinus gracilentus	Slender lupine LUGR CNPS 1B.3	K	No	Upland and Mid Slopes
Mimulus filicaulis	Hetch-Hetchy monkeyflower MIFI CNPS 1B.2	K	Yes	Moist Habitats-Meadows and Riparian Areas
Mimulus gracilipes[1]	Slender stalked monkeyflower MIGR CNPS 1B.2	P	No	Lower Montane, Chaparral and Woodlands
Mimulus pulchellus	Pansy monkeyflower MIPU CNPS 1B	K	Yes	Moist Habitats-Meadows and Riparian Areas

[1] These Regional Forest's Sensitive Plant Species are not yet known to occur on the Stanislaus National Forest. However, either they are suspected to occur within the boundaries of the forest, or the Forest is within the range of the species, or occurrences are near enough to the boundaries to warrant including them on this list.
[2] Presence on the Stanislaus National Forest; known occurrences (K); potential to occur (P). (USDA 2006, Sensitive Plant Species)
[3] Occurrence within or adjacent to an addition to the NFTS

Table 3.02-2 Sensitive Moss and Lichen Species and Habitat Description

Botanical Name	Common Name/Listings	Presence[2]	Occurrence[3]	Habitat Description/Landscape Group
Bruchia bolanderi	Bolander's bruchia' BRBO CNPS 2.2	K	Yes	Moist Habitats-Meadows and Riparian Areas
Fissidens aphelotaxifolius[1]	Brook pocket moss FIAP CNPS 2.2	P	No	Moist Habitats-Meadows and Riparian Areas, Upland and Mid Slopes
Helodium blandowii[1]	Blandow's bog moss HEBL CNPS 2.3	P	No	Moist Habitats-Meadows and Riparian Areas
Meesia triquetra	Three ranked Hump-moss METR CNPS 4.2	P	No	Moist Habitats-Meadows and Riparian Areas
Meesia uliginosa[1]	Broad nerved Hump-moss MEUL CNPS 2.2	P	No	Moist Habitats-Meadows and Riparian Areas
Mielichhoferia longate[1]	Elongate Copper-moss CNPS 2.2	P	No	Moist Habitats-Meadows and Riparian Areas
Hydrothyria venosa	Veiny aquatic lichen HYVE	K	Yes	Moist Habitats-Meadows and Riparian Areas

[1] These Regional Forest's Sensitive Plant Species are not yet known to occur on the Stanislaus National Forest. However, either they are suspected to occur within the boundaries of the forest, or the Forest is within the range of the species, or occurrences are near enough to the boundaries to warrant including them on this list.
[2] Presence on the Stanislaus National Forest; known occurrences (K); potential to occur (P). (USDA 2006, Sensitive Plant Species)
[3] Occurrence within or adjacent to an addition to the NFTS

Watchlist Plant Species

Watchlist plant species are those species that are locally rare, are of public concern, occur as disjunct populations, are newly described taxa, or lack sufficient information on population size, threats, trend or distribution to be included on the Regional Forester's Sensitive Plant List. Such species make an important contribution to forest biodiversity. The STF developed a watchlist of species (Table 3.02-3 and Table 3.02-4). These watchlists are dynamic and updated as the need arises to reflect changing conditions and new information. The creation of the lists of watchlist plant species is a key step in meeting our commitment, as an agency, to maintaining biologically diverse and healthy ecosystems.

Table 3.02-3 Stanislaus National Forest Watchlist Species

Botanical Name	Common Name
Acrostics humilis	mountain bent grass
Astragalus kentrophyta var. danaus	Sweetwater Mtns. milk-vetch
Bolandra californica	Sierra bolandra
Carex tompkinsii	Tompkin's sedge
Cryptantha crymophila	subalpine cryptantha
Delphinium hansenii ssp. ewanianum	Ewan's larkspur
Didymodon norrisii	Norris' beard-moss
Drosera rotundifolia	round-leaved sundew
Eriogonum ovalifolium var. eximium	brown-margined buckwheat
Eryngium pinnatisectum	Tuolumne button celery
Eryngium sp. nov.	button celery, coyote thistle
Helianthemum suffrutescens	Bisbee Peak rush-rose
Lilium humboltii ssp. humboltii	Humboldt lily
Madia yosemitana	Yosemite madia
Meesia longiseta	long-stalked hump moss
Mielichhoferia elongata	elongate copper-moss
Mimulus grayi	Gray's monkeyflower
Mimulus inconspicuos	small-flowered monkeyflower
Mimulus whipplei (extinct?)	Whipple's monkeyflower
Orthotrichum spjutii	Spjut's bristlemoss
Perideridia bacigalupii	Bacigalupi's yampah
Rhyncospora capitellata	beaked sedge
Silene invisa	short-petaled campion
Trichostema rubisepalum	Hernandez bluecurls

Table 3.02-4 Sensitive Taxa and Watchlist Species Occurrences

Common Name	Sensitive/Watchlist	Total
Big-scale balsamroot	Sensitive	6
Bolander's bruchia	Sensitive	1
Congdon's bitterroot	Sensitive	3
Congdon's woolly sunflower	Sensitive	24
Hetch-Hetchy monkeyflower	Sensitive	204
Kellogg's lewisia	Sensitive	10
Mariposa clarkia	Sensitive	152
Mountain lady's slipper	Sensitive	35
Parry's horkelia	Sensitive	129
Small's southern clarkia	Sensitive	484
Stebbin's lomatium	Sensitive	328
Taylor's fawn lily	Sensitive	1
Three bracted onion	Sensitive	47
Tuolumne fawn lily	Sensitive	42
Tuolumne iris	Sensitive	2
Veiny aquatic lichen	Sensitive	8
Yosemite onion	Sensitive	4
Yosemite woolly sunflower	Sensitive	3
Pansy monkeyflower	Sensitive	76
Beaked sedge	Watchlist	1
Button celery	Watchlist	2
Norris' beard moss	Watchlist	1
	total	**1,584**

Plant Community Groups

The following discussion groups STF Sensitive Plants by the general types of habitats where they occur and/or places them into a non-specific plant community group. The plant community/ habitat grouping approach are not all inclusive. Important habitat elements necessary to the viability of a particular species may be missed. However, this grouping provides an approximation of the type of habitat each species needs and allows an evaluation of how the potential habitat is impacted by motor vehicle use. Unauthorized motorized trails and NFTS roads and trails may or may not have sensitive and/or watchlist species growing within or adjacent to them. Several sensitive and watchlist plant and plant community occurrences are known to occur within and/or near NFTS roads and trails.

Habitat for the 39 Sensitive taxa in the analysis is unevenly distributed across the analysis area. Habitat is grouped into three broad landscape types: 1) Upland and midslope habitats supporting sensitive species consist of dry rocky sites, forest openings in mixed conifer forests where edaphic (soil or substrate) limitations affect plant growth and species composition (e.g. gravelly lahar, hard slate, granitic and volcanic balds, and serpentine soils); 2) Moist habitats and meadow and riparian areas including streamside zones, meadows, fens, seeps, and springs. Taxa included in this habitat type tend to be affected by changes in hydrology trends; and, 3) lower montane, chaparral and woodland habitats where the soils are derived from metasedimentary parent materials and support chaparral and oak woodland vegetation.

Upland and Mid Slope Habitat Descriptions for Sensitive Species

Twelve sensitive plant taxa are known or suspected to occur adjacent to additions to the NFTS on upland and mid slope landscapes (Tables 3.02-1 and 3.02-2). Upland and midslope habitats include volcanic ridges and openings. Volcanic openings are often referred to as lava caps (or lahars). These openings are suitable habitat for twelve sensitive plant species, including *Allium jepsonii*, *Allium tribracteatum*, *Allium yosemitense*, *Calochortus clavatus var. avius*, *Lomatium stebbinsii*, and *Mimulus pulchellus*. *Lewisia congdonii* and *Eriophyllum nubigenum* are found on metamorphic or granitic rock outcrops, while *Lewisia disepala* can be found in pans of granitic and sandy soils, adjacent to granite outcrops. *Lewisia kelloggii ssp. kelloggii* can occur on ridge tops with sandy soils or on volcanic lava caps. *Draba asterophora var. asterophora* (not on forest), and *Eriophyllum nubigenum* both can occur on granitic rock outcrops or metamorphic rock substrate.

In forested habitat, *Clarkia australis* inhabits openings in westside ponderosa pine forests and Sierran mixed-conifer forests. *Cypripedium montanum* is associated with deeper soils and mature dense forest stands on north-facing slopes, sometimes in cutslopes of roads. *Hulsea brevifolia* occurs in sandy or gravelly soils of the red fir forest, and *Lupinus gracilentus* occurs in subalpine, lodgepole pine forests.

Allium jepsonii (Jepson’s onion) has no known occurrences of this plant species on the STF. Jepson’s onion grows on basalt, volcanic and serpentine outcrops, at elevations ranging from 900 to 6,000 feet elevation. Jepson’s onion occurs in habitat similar to that of Stebbin’s lomatium, and has been surveyed for, along with other lava cap species. Although suitable habitat for this species may be affected by motorized routes, no known occurrences exist within 200 feet of the additions to the NFTS.

Allium tribracteatum (three bracted onion) is found in Tuolumne County and one occurrence has been confirmed in Calaveras County on private land. On the STF, 47 known plant sites occur primarily located in suitable habitats along the ridges near Crandall Peak and along Highway 108. Most of the sites occur on the Forest. All but one occurrence are found on thin volcanic soils, typically on lava caps. *Allium tribracteatum* grows in openings of chaparral and lower and upper montane coniferous forests on lava caps. Elevations range from 4,500 to 6,000’. Many of the additions to the NFTS pass through or are within 200 feet of plant sites and suitable habitat areas.

Allium yosemitense (Yosemite onion) occurs on lava caps and metamorphic rock ridges south of the Tuolumne River at elevations ranging from 1,500 to 7,000 feet. Four known occurrences of this plant species on the STF exist within the analysis area. Yosemite onion grows in chaparral, lower and upper montane coniferous forests on gravelly lahar. Lava caps are extremely fragile and subject to erosion and compaction when disturbed. Although suitable habitat areas for this species may be affected by motorized use, no known occurrences exist within 200 feet of the additions to the system.

Cypripedium montanum (mountain lady's slipper) is an uncommon orchid in California. Within California it occurs in 15 counties, reaching as far south as Santa Cruz County along the coast and down into Madera County in the Sierra Nevada, although it is not continuous within this range. *Cypripedium montanum* has adapted to multiple habitats, growing in both moist and dry conditions at elevations between 600 and 4,800 feet. It is found in mesic sites on deep loamy soils within montane coniferous forest and also in relatively dry conditions on hillsides with northerly aspects in mixed conifer forests. About 48 occurrences exist between the Eldorado, Plumas, Stanislaus and Sierra NF and Yosemite NP. The STF has 35 documented occurrences of this orchid species, each having fewer than ten plants each (Haas 2008). All occurrences are growing on slopes with north aspects, with less than 5 to over 45 degrees, in mixed conifer forest under 50-90 percent canopy. The occurrence areas are described as moist, at least in the early summer months, with deep, loamy soils derived from granite. Motorized routes affect suitable habitat areas for this species, and three known sites are within 200 feet of the existing unauthorized routes.

Draba asterophora var. asterophora (Tahoe draba) is an alpine perennial forming large mats through vegetation reproduction. These plants grow in rock crevices and granite talus slopes at high elevations between 8,000 and 10,200 feet. Slopes are typically north facing and frequently hold patches of snow throughout the summer months. The most frequently cited locations for Tahoe (star) draba are characterized by extensive scree slopes of granitic material ranging in size from sand to small boulders. Seven distinct populations occur within a discontinuous distribution between Washoe County, Nevada and to Mt. Gibbs near Tioga Pass in Yosemite, CA; Mt. Rose Ski Area/ Slide Mountain; Mt. Rose; Rose Knob; Heavenly Valley (Lake Tahoe Basin Management Unit); Job’s Peak (Lake Tahoe Basin Management Unit); Yosemite; and Echo Lake (El Dorado National Forest). No known occurrences of this plant species exist on the STF. Due to the lack of known occurrences, and the high elevation and inaccessible suitable habitat for this species, it will not be considered for further analysis.

Eriophyllum nubigenum (Yosemite woolly sunflower) has all known occurrences within the Merced River watershed, except three occurrences on the STF, located in the Tuolumne River watershed. The YNP occurrences are all south of the main fork Merced River and Yosemite Valley. A total of three occurrences of Yosemite wooly sunflower are known from the STF. *Eriophyllum nubigenum* tends to be limited to open, rocky, and shallow soils, on a metasedimentary substrate on the STF and on granitic substrates in YNP. It is found in plant communities comprised of montane manzanita chaparral and upper montane coniferous forest at elevations ranging from 5,000 to 7,800 feet. Although numerous suitable habitat areas for this species may be affected by motorized routes, no known occurrences exist within 200 feet of the additions to the NFTS.

Hulsea brevifolia (short-leaved hulsea) is known to occur in Yosemite NP. It grows in partial shade in red fir and upper montane coniferous forests, on sandy or gravelly soils. It ranges in elevation from 4,900 to 8,500 feet. It is found in Yosemite NP along roadsides, on shoulders, road cuts, and fill slopes. Numerous suitable habitat areas for this species were identified through GIS analysis and may be affected by use on motorized routes. No known occurrences exist within 200 feet of the additions to the NFTS.

Lewisia congdonii (Congdon’s lewisia) has 8 known occurrences within its geographic range. Congdon’s lewisia has a disjunct distribution between the Kings River Canyon and the Merced River

Canyon 50 miles to the north. All but one population are in the Merced River drainage. Elevation ranges from 2,000 to 7,000 feet. Plants are found on rock faces, cracks and ledges in rocky areas, on talus and screen, and on spoil piles of the abandoned barium mine. The Kings River population grows on granitics, while the other populations are found on metamorphics. It is found in plant communities ranging from chaparral to coniferous forest. On the Stanislaus NF, the only known occurrence is within the Trumbull Peak SIA. Population estimates range from less than 100 plants to over 10,000. The area can only be accessed by foot. No potential for impacts caused by motor vehicle access exists to the known occurrence and suitable habitat for this plant species.

Lewisia disepala (Yosemite lewisia) is not known on the STF. The nearest known occurrences are in Yosemite NP. It is found in pans and shelves of granitic and sandy soils adjacent to granite outcrop in upper and lower montane mixed coniferous forest and pinyon and juniper woodlands. Numerous suitable habitat areas for this species were identified through GIS analysis and may be affected by use on motorized routes. No known occurrences exist within 200 feet of the additions to the NFTS.

Lewisia kelloggii ssp. kelloggi (Kellogg's lewisia) is found on ridge tops or open flats with sandy granitic soils or on volcanic lava caps. Kellogg's lewisia has documented occurrences on the STF but has a larger range in California. This subspecies has at least 43 known occurrences, ranging from Madera County (Sierra NF) to Plumas County (Plumas NF), including 10 occurrences in Yosemite National Park (Regional Forester's List of Sensitive Plant Species Revision). Ten known occurrences of this plant species on the STF exist within the analysis area. Many of the additions to the NFTS pass through or are within 200 feet of plant sites and suitable habitat areas.

Lomatium stebbinsii (Stebbin's lomatium) grows on lava caps between the Mokelumne and Tuolumne Rivers at elevation ranges from 3,000 to 7,000 feet. Approximately 328 known sites of *Lomatium stebbinsii* are on the STF. Stebbin's lomatium grows in openings of chaparral and lower and upper montane coniferous forests on gravelly lahar (volcanic mud flow soils, often referred to as "lava caps"). Elevations range from 4,500 to 6,000 feet. This plant species is endemic to Tuolumne and Calaveras counties. Known populations of this lomatium range from the Mokelumne River to the Clavey River. The most extensive occurrences are found in the watersheds of the South Fork Stanislaus and North Fork Tuolumne Rivers. Many of the additions to the NFTS pass through or are within 200 feet of plant sites/occurrences and suitable habitat areas.

Lupinus gracilentus (slender lupine) grows in openings of subalpine coniferous forests and on seasonally moist slopes of lodgepole pine forest at elevations ranging from 7,500 to 11,000 feet. It is known to occur primarily at high elevations in Yosemite National Park, Mariposa, Tuolumne and Inyo Counties. Numerous suitable habitat areas for this species were identified through GIS analysis and may be affected by use on motorized routes. No known occurrences exist within 200 feet of the additions to the NFTS.

Moist Habitats – Meadows, Bogs and Riparian Areas

Fen and Meadow surveys were conducted seasonally within the last 10 years by Forest Service Botany/Range Survey Crews (Project record). Fens provide unique habitats for rare plant species. As compared to other habitats, a disproportionately large number of rare species are of vascular and nonvascular plants associated with peatlands in the Sierra Nevada. This fact underscores the importance of these habitats contributing to the biological diversity of the region. Unauthorized Off-highway vehicle (OHV) use can negatively impact fens by exposing soil and bare peat, creating channels in fens, which acts as a water diversion, and compacting soil. Water diversions, ditches, and roads can have a substantial impact on the hydrological function and biotic integrity of fens, (Cooper 1996).

Fens are areas where at least 40 cm of organic soils exist in the upper 80 cm of the soil profile (Stanislaus Fen and Meadow survey report). This organic soil is commonly referred to as peat. The vegetation of fens varies widely and appears to be controlled by the hydrologic regime (water depth, water flow rates). The integrity of peatland systems is inherently tied to hydrologic conditions. For example, roads placed above fens may divert runoff away from the fen and the result is a de-watering of the fen. Once the water table is lowered, peat oxidization and subsequent decomposition occurs quickly thereby reducing the peat depth, altering hydrologic patterns, and resulting in a change in plant species composition (Cooper 1996). In addition, roads can act as sources of sediment input into fens. As areas dry out, plant species often change to non peat-forming species such as forbs. Since this system is reliant on groundwater, any disturbances that impact water quality or quantity are a threat.

Invasion by exotic species (non-native plant species) is apparent in some peatlands in the Sierra Nevada. Such species include timothy (*Phleum pratense*) as well as exotic species common to other wetland types such as Canada thistle (*Cirsium arvense*) and dandelion (*Taraxacum officionale*). Native increasers (plants that increase after disturbance) such as *Phalacroseris bolanderi*, *Mimulus primuloides*, and *Hypericum anagalloides* often invade a fen that has been overgrazed or artificially drained. Although these species are native and commonly found in low abundance in undisturbed fens, they can be indicative of disturbance if they dominate areas previously occupied by sedges (Rocchio 2006. Rocky Mountain Alpine-Montane Wet Meadow Ecological System)

Sensitive Plant Species Known or suspected to occur in Moist Habitat

Seventeen taxa are listed as sensitive within the STF in moist habitats such as meadows, fens, seeps, springs, and streamside zones (Tables 3.02-1 and 3.02-2). Only seven of these seventeen species are known to occur on the STF, including one moss: *Bruchia bolanderi*, one lichen: *Hydrothyria venosa*, and 5 plants: *Epilobium howellii*, *Erythronium tuolumnense*, *Erythronium taylori*, *Mimulus filicaulis*, and *Mimulus pulchellus*.

Hydrothryria venosa is a rare lichen which is a combination of two different types of organisms (fungi and algae) growing together in a symbiotic relationship. It is known to occur on the STF system lands. Lichens occur in all types of habitats and frequently show specific substrate preferences. They are important in soil formation. As information regarding lichen distributions in the Sierra Nevada and on the STF is incomplete, a great need exists for further study of lichen ecology and distribution. Motor vehicle use affects lichens and the habitat through damage to organisms themselves. Other impacts include introduction of sediment and possible petroleum products into the lichen habitat component of clear water.

Bryophytes are mosses, liverworts, and hornworts (non-vascular green plants) and they play a crucial role in the hydrologic cycle and in the ecology of meadows and riparian areas. *Bruchia bolanderi* is the only moss to occur on the STF. It is possible that the mosses occur in fens and meadows on some unsurveyed areas on the STF. Motor vehicle uses impact moss species in two ways. When mosses are crushed by vehicles, they do not have an underground root system to help them recover as do vascular plants. In addition, water temperature is important to the photosynthetic ability of mosses. As described in SNFPA, mosses can photosynthesize effectively at temperatures as low as 33 degrees (F), compared to a lower limit of about 50 degrees for vascular plants (USDA 2004c). Mosses stop photosynthesizing effectively at an upper limit of about 77 degrees, in contrast to vascular plants which some can photosynthesize at temperatures of up to 100 degrees. When moss layers are disturbed by vehicle use, it is possible that water temperatures can go up due to hydrologic disruption (USDA 2004c).

Ten species are thought to occur within suitable habitat areas, but have not been located. They include the five species of the moonwort complex that are widely distributed in North America. In California, they occur infrequently in a variety of moist habitats throughout the Sierra Nevada and other portions of the state. Moonwort species are difficult to distinguish from each other and all have similar habitat preferences (wet or moist soils such as in meadows and fens or along the edges of lakes and streams). The moonworts include *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium lunaria*, *Botrychium minganense*, and *Botrychium montanum*. The remaining five taxa that have not been located on the STF include *Fissidens aphelotaxipholius*, *Helodium blandowii*, *Meesia triquetra*, *Meesia ulignosa*, and *Mielichhoferia elongata*.

Moist Habitat Descriptions for Sensitive Species

Botrychium ascendens (upswept moonwort) is found in lower montane coniferous forest, meadows and seeps from approximately 4,900 to over 7,500 feet in elevation. Upswept moonwort has not been identified on the STF.

Botrychium crenulatum (scalloped moonwort) is found in fens, lower montane coniferous forest, meadows, seeps, and freshwater marches from approximately 4,900 to over 10,500 feet in elevation. Scalloped moonwort has not been identified on the STF. Numerous suitable habitat areas for this species were identified through GIS analysis and may be affected by use on motorized routes. No known occurrences exist within 200 feet of the additions to the NFTS.

Botrychium lunaria (common moonwort) is found in meadows, seeps, and in subalpine and upper montane coniferous forest from approximately 7,450 to over 11,000 feet in elevation. Common moonwort has not been found on the STF. Numerous suitable habitat areas for this species were identified through GIS analysis and may be affected by use on motorized routes. No known occurrences exist within 200 feet of the additions to the NFTS.

Botrychium minganense (Mingan moonwort) is found in fens and in lower and upper montane coniferous forest from approximately 4,900 to over 6,750 feet in elevation. Mingan moonwort has not been identified within the STF. Numerous suitable habitat areas for this species were identified through GIS analysis and may be affected by use on motorized routes. No known occurrences exist within 200 feet of the additions to the NFTS.

Botrychium montanum (mountain moonwort) is found in lower and upper montane coniferous forest, meadows, and seeps from approximately 4,900 to 7,000 feet. No occurrences exist on the STF. Numerous suitable habitat areas for this species were identified through GIS analysis and may be affected by use on motorized routes. No known occurrences exist within 200 feet of the additions to the NFTS.

Bruchia bolanderi (Bolander's bruchia) is a moss known from 21 occurrences documented in California since 1980 with the majority in the Sierra Nevada Mountains. *Bruchia bolanderi* previously thought to be endemic to California and Oregon was recently found in Nevada and Utah. California populations are known from Fresno, Tulare, Madera, Mariposa, Modoc, Nevada, Tuolumne, Tehama and Plumas counties. This moss has been documented within the Plumas, Stanislaus, Sierra, and Eldorado National Forests. Habitat for Bolander's bruchia includes meadows, fens, springs, seeps, and damp soil in montane and subalpine coniferous forests from about 5,500 to 9,250 feet. It grows in ephemeral habitats such as erosion ditches or small streamlets through wet meadows and at the edges of fens, and seems capable of reestablishing itself in recently disturbed soils. One known occurrence and numerous suitable habitat areas exist on STF. Existing routes pass through or are within 200 feet of suitable habitat and one plant occurrence of this plant species may be affected by motor vehicle use.

Epilobium howellii (subalpine fireweed) occurs in wet meadows, streamside and mossy seeps in upper montane and subalpine coniferous forest, consistent with silty sites under part or near-full shade, with little competition. The meadows and seeps where this species occurs can easily be entered with late seasonal OHV use. Known occurrences exist on the STF, however, none are within 200 feet of additions to the NFTS and existing NFTS.

Erythronium taylori (Pilot Ridge fawn lily) is known from only one occurrence discovered on unique cliff formations in the Groveland Ranger District. The occurrence is restricted to isolated cliff-like rock outcrops in a north-facing, cool, damp, shaded microclimate, within the mixed conifer forest at approximately 4,200 feet. Numerous suitable habitat areas for this species were identified through GIS analysis and may be affected by use on motorized routes. No known occurrences exist within 200 feet of the additions to the NFTS.

Erythronium tuolumnense (Tuolumne fawn lily) grows on a variety of substrates and under a variety of canopies. It is found primarily on north facing slopes with rocky soils. It also grows in ephemeral drainages on very steep slopes and it is associated with intermittent or perennial streams on less steep slopes. It is found at elevations ranging from about 1,600 to 4,880 feet. Currently it is known from Deer Creek, the North Fork Tuolumne River and the South Fork Stanislaus River on the STF. Three occurrences are known on private lands. Approximately 42 known occurrences exist on the STF ranging in size from several individuals to more than 10,000 individuals. Many of the additions to the NFTS pass through or are within 200 feet of plant sites/occurrences and suitable habitat areas.

Fissidens aphelotaxipholius (brook pocket moss) is known to occur in wet soil, humus and rocks along narrow streams in the vicinity of small waterfalls; damp or wet crevices or cliffs; upper montane coniferous forest from about 6,000 to 7,200 feet. Although numerous suitable habitat areas for this species may be affected by the location of motorized routes, no known occurrences exist within 200 feet of additions to the NFTS.

Helodium blandowii (Blandow's bog moss) is known to occur near the forest boundaries of Kennedy Meadows, fens and seeps in subalpine conifer forest and alpine lakes at 6,000 to 9,000 feet. Numerous suitable habitat areas for this species were identified through GIS analysis and may be affected by use on motorized routes. No known occurrences exist within 200 feet of the additions to the NFTS.

Hydrothyria venosa (veined water lichen) is known to occur on the western slope of the Sierra Nevada, the north coast range, northwestern California, Oregon, Washington, and British Columbia and in several eastern states. In the Sierra Nevada, it is known from the Stanislaus, Plumas, and Sequoia National Forests and Calaveras Big Trees State Park. Other California occurrences include Shasta-Trinity and Mendocino National Forests. Within the Sierra Nevada, Veined water lichen is found in cold, unpolluted streams in mixed conifer forests. The water is very clear and peak flows are not of the intensity that would lead to scouring. The streamlets have a rich aquatic bryophyte flora and rarely are more than 8 inches in depth. It occurs at elevations ranging from 3,000 to 9,000 feet. Known occurrences exist on the STF. Although numerous suitable habitat areas for this species may be affected by the location of motorized routes, 3 known occurrences are within 200 feet of the additions to the NFTS.

Meesia triquetra (three-ranked hump-moss) is usually associated with Sphagnum and cold springs or seeps, between 4,000 and 9,000 feet. No known occurrences exist on the STF. Numerous suitable habitat areas for this species were identified through GIS analysis and may be affected by use on motorized routes. No known occurrences exist within 200 feet of the additions to the NFTS.

Meesia ulignosa (broad-nerved hump-moss) occurs in meadows and fens on dead/decomposing wood, usually in the subalpine zone, between 4,000 and 9,500. No known occurrences of this moss exist on the STF. Numerous suitable habitat areas for this species were identified through GIS analysis and may be affected by use on motorized routes. No known occurrences exist within 200 feet of the additions to the NFTS.

Mielichoferia elongata (elongate copper-moss) occurs in all types of seasonally or perennially moist rock outcrops, often with high copper or heavy metal content, at lower elevations of foothill woodland, and occasionally coniferous forest. No known occurrences of this moss exist on the STF. Numerous suitable habitat areas for this species were identified through GIS analysis and may be affected by use on motorized routes. No known occurrences exist within 200 feet of the additions to the NFTS.

Mimulus filicaulis (Hetch-Hetchy monkeyflower) occurs in meadows, seeps, and seasonally wet road cuts between the elevations of 2,000 and 5,500 feet. Although a moist germinating species, it also occurs on sites that dry out substantially in the summer, often within mixed-conifer stands. It germinates in early spring and dies soon after blooming, setting seed in late spring. In very dry years, *Mimulus filicaulis* occurrences might not bloom at all. The known range for this species is the Main Fork Tuolumne River south to Mariposa District of the Sierra NF and east into Yosemite National Park. Approximately 204 known sites exist within the STF. All of the documented occurrences are on the Groveland Ranger District. Many of the additions to the NFTS pass through or are within 200 feet of plant sites/occurrences and suitable habitat areas.

Mimulus pulchellus (pansy monkeyflower) grows in vernally wet to moist sites, which are usually flat, or with a slight slope, often on volcanic lava caps and granitic substrates. The elevational range is 2,000 to 6,500 feet. The times for germination and identification are in early spring from late April through June, depending on elevation and weather conditions. It occurs in Calaveras, Mariposa and Tuolumne Counties in the Stanislaus National forest, Yosemite National Park and near the town of Mariposa. It occurs in the Chowchilla River watershed (near Mariposa) and the Merced, Stanislaus and Tuolumne River watersheds. Approximately 76 known sites of this species exist on the STF. It has been observed in roads and routes driven in early spring. Many of the additions to the NFTS pass through or are within 200 feet of plant occurrences and suitable habitat areas.

Lower Montane, Chaparral and Woodland Habitats

Six Sensitive Plant Species are known to occur in the lower montane chaparral, and woodland habitats (Table 3.02-1): *Balsamorhiza macrolepis var. macrolepis*, *Clarkia biloba ssp. australis*, *Clarkia lingulata*, *Eriophyllum congdonii*, *Horkelia parryi*, and Iris hartwegii ssp. columbiana. One additional species, *Arctostaphylos nissenana*, occurs in lower montane, chaparral and woodland habitats, but has no known occurrences within the analysis area.

Lower Montane, Chaparral, and Woodland Habitat Descriptions for Sensitive Species

Arctostaphylos nissenana (Nissenan manzanita) is found in the lower Sierra Nevada foothills of the knobcone pine and chaparral habitats. It is typically found in areas with slate or shale rock types and associated soils. It ranges in elevation from 1,450 to 3,650 feet. Although it is known from the Eldorado NF, it has not been found on the STF in suitable habitat areas. Numerous suitable habitat areas for this species were identified through GIS analysis and may be affected by use on motorized routes. No known occurrences exist within 200 feet of the additions to the NFTS.

Balsamorhiza macrolepis var. macrolepis (big-scale balsamroot) is found in the Sierra Nevada Foothills from Tehama County south to Mariposa County and the interior Coast Range from Tehama County (Mendocino National Forest) south to Santa Clara County. It inhabits a variety of soil and plant community habitats, including ponderosa pine forests, chaparral, vernally moist meadows and grasslands, and grasslands within oak woodland. Substrates are usually sandstone, serpentine, or basalt outcrop. The Bureau of Land Management (BLM) occurrence in Mariposa County occurs on rocky clays of metasedimentary origin. It is usually found in openings or under an open brush cover. The elevation range is listed as below 4,600 feet. One known occurrence of *Balsamorhiza macrolepis var. macrolepis* on the STF is located in the Middle Fork Fuel Reduction and Forest Health Project analysis area. No occurrences of this plant species are within 200 feet of the additions to the NFTS.

Clarkia australis (Small's southern clarkia) is typically found on slopes with a south, southwest, or southeast aspect. It grows in openings in ponderosa pine and mixed-conifer stands often in association with bear clover. *Clarkia australis* tends to prefer "disturbed" sites – e.g. sites with little or no competition from more aggressive weedy species. In the natural setting, fire is the typical disturbance agent. It grows in open areas (sun or lightly filtered sun) within manzanita stands. When not associated with bear clover, the species is usually observed growing in bare mineral soil or with a very light layer of leaf litter at elevations between 2,500 and 6,000 feet. All but three known occurrences of *Clarkia australis* occur on the Groveland Ranger District (Haas 2008). One occurrence is known from private property within the boundaries of the Forest. Two other occurrences are known in Yosemite National Park (YNP), near the boundary with the STF. Approximately 484 known sites of this species exist on the forest. Many of the additions to the NFTS pass through or are within 200 feet of plant occurrences and suitable habitat areas.

Clarkia biloba ssp. australis (Mariposa clarkia) is most often found on north, northeast or northwest-facing slopes, usually under light shade. It is occasionally found on southwest or southeast-facing slopes, sometimes in direct sunlight. Clarkia biloba ssp. australis tends to prefer "disturbed" sites, e.g. sites with little or no competition from more aggressive weedy species. In the natural settings, fire is the common disturbance agent. The elevational range is approximately 1,500 to 4,600 feet. Approximately 152 known sites of Clarkia biloba ssp. australis exist on the STF. Many of the additions to the NFTS pass through or are within 200 feet of plant occurrences and suitable habitat areas.

Clarkia lingulata (Merced clarkia) is known from only two populations, both found on the Merced River in Mariposa County at around 1,500 feet elevation on the south side of the Merced River. The two occurrences are approximately two miles apart in the Merced River Canyon near the confluence with South Fork Merced River. It grows in the mixed chaparral/woodland habitat in the Merced River drainage. It does not appear to be limited by soils, geology, or other biotic or abiotic habitat components. Numerous suitable habitat areas for this species were identified through GIS analysis and may be affected by use on motorized routes. No known occurrences exist within 200 feet of the additions to the NFTS.

Eriophyllum congdonii (Condon’s woolly sunflower) is found in chaparral, woodland, and lower montane coniferous forest on metamorphic rock ridges and outcrops. It is also found in valley and foothill grasslands, south of the Tuolumne River and east of Pilot ridge at 1,600 to 6,235 feet in elevation. 24 known sites of this plant species exist on the STF. Many of the additions to the NFTS pass through or are within 200 feet of suitable habitat areas.

Horkelia parryi (Parry’s horkelia) is known to inhabit Amador, Calaveras, El Dorado, and Mariposa counties. It grows on stony, disturbed, slightly acidic soils under open canopies in chaparral and cismontane woodland below 3,400 feet. It has been documented on the ENF to co-habitate with Nissenan manzanita. It is often found on Ione formation soils. It has been known to colonize disturbed sites such as abandoned roads where the canopy is open. The ENF has four known occurrences. Many of the additions to the NFTS pass through or are within 200 feet of plant occurrences and suitable habitat areas.

Iris hartwegii ssp. columbiana (Tuolumne iris) has three occurrences on STF, one occurrence on BLM lands, and two occurrences on private lands in Tuolumne and Calaveras Counties. Two of these occurrences are in the watershed of the South Fork of the Stanislaus River. It grows on dry, open or partially shaded slopes in foothill woodlands and yellow pine forests. It occurs at elevations ranging from, 350 to 5,000 feet. Additions to the NFTS pass through or are within 200 feet of suitable habitat areas. Two occurrences of the Tuolumne iris are within 200 feet of additions to the NFTS.

Roads in Wet Areas

Meadows on the forest are the principal wetlands that were affected by roads. Forest roads can bisect meadows, separating the meadow into an upper and lower section via a large fill and culvert. This culvert can trap sediment above the crossing, aggrading the channel in the upper meadow and minimizing sediment deposition in the lower meadow where degradation of the channel has occurred. The road has altered the flow and sediment regime in the meadow. Several sensitive species on the STF are found in these habitats that may be affected by sediment deposition.

The road system directly affects riparian communities where it impinges on riparian areas. Roads can indirectly affect riparian communities by intercepting surface and subsurface flows and routing these flows so that riparian areas dry up and the riparian vegetation is replaced with upland vegetation. Seventeen taxa are listed as sensitive within the STF in moist habitats such as meadows, fens, seeps, springs, and streamside zones. One known occurrence of a rare lichen *Hydrothryria venosa*, is known to occur within 30 feet of the road edge of the STF road system. Lichens occur in all types of habitats, and frequently show specific substrate preferences. They are important in soil formation. As information regarding lichen distributions in the Sierra Nevada and on the STF is incomplete, a great need exists for further study of lichen ecology and distribution. Motor vehicle use affects lichens and the habitat through damage to organisms themselves, and these threats include damage to the habitat component of clear water from introduction of sediment and possible petroleum products.

One moss, *Bruchia bolanderi*, is known to occur within 30 feet of the road edge of the STF road system. Mosses, liverworts, and hornworts (non-vascular green plants) play a crucial role in the hydrologic cycle and in the ecology of meadows and riparian areas. It is possible that unlocated mosses do occur in fens and meadows on the STF. Motor vehicles impact moss species in several ways. Sensitive plants can occur on cut and fill slopes and sometimes grow on the road surface on maintenance level 1 and 2 roads. Roads can affect the hydrology of an area, drying out some areas, concentrating runoff, and causing erosion in others. In addition, sedimentation from roads and soil compaction from road-related activities affects Sensitive plant habitat in some areas.

Existing road densities may contribute significantly to fragmentation and erosion damage of special habitats such as aspen, meadows, oak woodlands, lavacaps, and Sensitive plant occurrences. Based on preliminary analyses, unauthorized roads account for a disproportionate amount of adverse effects to Sensitive plants.

A portion of the roadside management zone has known Sensitive plant occurrences that may be intolerant to ground-disturbing activities. A review of sensitive plant occurrences suggests that for some species, up to 81% of all known occurrences intersect roads (USDA 2003c). The additions to the NFTS have direct impacts on approximately 9% of the sensitive plant species occurring in the analysis area. These plant species are analyzed in the effects section of each alternative.

Plant communities may continue to be negatively impacted by motorized routes not added to the NFTS for a period of time after the motorized use is stopped if erosion from the motorized trail is not reduced and/or eliminated. Continued use of unauthorized routes by nonmotorized uses such as hiking, mountain biking, and horseback riding traffic may prevent vegetative recovery. Native vegetative cover protects against erosion and maintains infiltration capacity of the soil (Switalski 2004). Surveys of unauthorized routes (and those NFTS roads and trails used to access them) showed some level of erosion. Therefore, it is important to estimate how long it might take unauthorized routes not added to the NFTS might need to recover once use has stopped. The rate of passive recovery of any unauthorized route will vary from site to site based on the soil type, amount and type of vegetative cover at the site, topography of the area disturbed, and intensity of the motor vehicle use.

Noxious and Invasive Weed Species

Invasive grasses, such as cheatgrass (*Bromus tectorum*), and forbs, such as knapweeds (Centaurea species), have invaded over 50 million hectares of the region (western U.S.), reducing biodiversity by displacing native plants and animals (Mack 1989; Billings 1990).

Noxious weeds are defined in as “those plant species designated as noxious weeds by the Secretary of Agriculture or by the responsible State official (FSM 2080.5). Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being nonnative or new to or not common to the United States or parts thereof."

The Stanislaus National Forest maintains a list of noxious weeds and non-native, invasive pest plants of concern (Table 3.02-5). Inventories for weeds are conducted using this list as a guide. The list was generated from several sources including the SNFPA (USDA 2001, p. 310-311), the list of State-rated noxious weeds (2007), new weed discoveries in the Forest, occurrence records (CalFlora 2008), published technical references (Bossard, et.al., 2000, Hickman, 1993, Whitson, et.al., 1996), and personal observations. The detailed Noxious Weed Risk Assessment can be found in the Project record.

Table 3.02-5 Noxious Weeds and Non-native Invasive Plants

Common Name	Botanical Name	Annual/Perennial	CA Weed Status[1]	CA Invasive Plant Council[2]
Russian knapweed	*Acroptilon repens*	Perennial	BW	Moderate
Jointed goatgrass	*Aegilops cylindrica*	Annual grass	BW	--
Barbed goatgrass	*Aegilops triuncialis*	Annual grass	BW	High
Tree-of-heaven	*Ailanthus altissima*	Deciduous tree	Non-native	Moderate
Giant reed	*Arundo donax*	Perennial grass	Non-native	High
Black mustard	*Brassica nigra*	Perennial	Non-native	Moderate
Cheatgrass	*Bromus tectorum*	Annual grass	Non-native	High
Hoary cress	*Cardaria draba*	Perennial	BW	Moderate
Whitetop	*Cardaria pubescens*	Perennial	BW	Limited
Italian thistle	*Carduus pycnocephalus*	Annual	CW	Moderate
Slenderflower thistle	*Carduus tenuiflorus*	Annual	CW	Limited
Smooth distaff thistle	*Carthamnus baeticus*	Annual	BW	--
Woolly distaff thistle	*Carthamnus lanatus*	Annual	BW	Moderate
Purple starthistle	*Centaurea calcitrapa*	Annual to Perennial	BW	Moderate
Diffuse knapweed	*Centaurea diffusa*	Annual to Perennial	AW	Moderate
Iberian starthistle	*Centaurea iberica*	Annual to Biennial	AW	--
Spotted knapweed	*Centaurea maculosa*	Perennial	AW	High
Tocalote/ Malta starthistle	*Centauria melitensis*	Annual	Non-native	Moderate
Yellow starthistle	*Centaurea solstitialis*	Annual	CW	High
Squarrose knapweed	*Centaurea virgata ssp. squarrosa*	Perennial	AW	Moderate
Rush skeletonweed	*Chondrilla juncea*	Perennial	AW	Moderate
Canada thistle	*Cirsium arvense*	Perennial	BW	Moderate
Bull thistle	*Cirsium vulgare*	Biennial	Non-native	Moderate
Field bindweed	*Convolvulus arvensis*	Perennial Vine	CW	--
Bermuda grass	*Cynodon dactylon*	Perennial	CW	Moderate
Scotch broom	*Cytisus scoparius*	Deciduous Shrub	Non-native	Moderate
Quackgrass	*Elytrigia repens*	Perennial Grass	BW	--
Leafy spurge	*Euphorbia esulus*	Perennial	AW	High
Oblong spurge	*Euphorbia oblongata*	Perennial	BW	High
Fennel	*Foeniculum vulgare*	Perennial	Non-native	High
French broom	*Genista monspessulana*	Deciduous Shrub	CW	High
Hydrilla	*Hydrilla verticillata*	Aquatic herb	AW	High
Klamath weed	*Hypericum perforatum*	Perennial	CW	Moderate
Dyers woad	*Isatis tinctoria*	Perennial	BW	Moderate
Tall whitetop/ perennial pepperweed	*Lepidium latifolium*	Perennial	BW	High
Oxeye daisy	*Leucanthemum vulgare*	Perennial	Non-native	Moderate
Dalmation toadflax	*Linaria genistifolia ssp. dalmatica*	Perennial	AW	Moderate
Purple loosestrife	*Lythrum salicaria*	Perennial	BW	High
Parrot feather watermilfoil	*Myriophyllum aquaticum*	Aquatic Herb	Non-native	High
Eurasian milfoil	*Myriophyllum spicatum*	Aquatic Herb	CW	High

Common Name	Botanical Name	Annual/Perennial	CA Weed Status[1]	CA Invasive Plant Council[2]
Black locust	*Robinia pseudoacacia*	Deciduous Tree	Non-native	
Himalaya blackberry	*Rubus discolor*	Perennial Vine	Non-native	High
Cut-leaved blackberry	*Rubus laciniatus*	Perennial Vine	Non-native	High
Bouncing bet	*Saponaria officionalis*	Perennial	Non-native	--
Russian thistle	*Salsola tragus*	Annual	Non-native	Limited
White horsenettle	*Solanum elaeagnifolium*	Perennial	BW	--
Johnson grass	*Sorghum halepense*	Perennial Grass	CW	--
Spanish broom	*Spartinum junceum*	Deciduous Shrub	Non-native	High
Milk thistle	*Silybum marianum*	Annual or Biennial	Non-native	--
Medusahead grass	*Taeniatherum caputmedusae*	Annual Grass	CW	High
Puncturevine	*Tribulus terrestris*	Annual Herb	Non-native	--
Gorse	*Ulex europaeus*	Thorny Shrub	BW	High
Woolly mullein	*Verbascum thapsus*	Perennial	Non-native	Limited

[1] Code Weed Status
AW A list (noxious weeds)
BW B list (noxious weeds)
CW C list (noxious weeds)
NAW Noxious aquatic weed
PN Public nuisance
Q Quarantine
QW Q list (temporary "A" list noxious weed, pending final determination).
[2] Calweeds Database, California Invasive Plant Council website- Accessed September 2008. California weed list status for noxious weeds, and a rating for the ecological impact of each species cal-1ps/ip/inventory/weedlist.

Noxious Weed Management

The Forest has inventoried and monitored noxious weed locations and planned or implemented a number of noxious weed treatment projects as reported in 2004 and 2005 accomplishment reports. Noxious weed infestations and invasive plant species occupy 2,622.96 acres and 29.52 miles of motorized routes. Until surveys are performed throughout the analysis area, these numbers are considered estimates.

Habitat Vulnerability and Vector Methods

Data regarding weed and non-native plant infested routes within the STF is limited. The data consists of approximately 650 routes with invasive weed infestations. This data includes data points and polygons mapped along roadsides, primarily recorded by ground-based methods. The information associated with each infested route, such as size of infestation or distance along a route, is often unknown. All data on known weed and non-native plant locations were collected by botanists during the last 10 years, documenting approximately 86 miles of weed infested NFTS roads. Although many of the existing roads within the analysis area were surveyed for weeds, not all of the additions to the NFTS were surveyed. The GIS query of the existing data includes routes within 200 feet of infested areas, and weed infestation on existing and additions to the NFTS within 200 feet of sensitive plant occurrences/suitable habitats. Table 3.02-6 shows acres of weed species infestations on the forest.

Weeds were introduced and spread primarily through transport on vehicles, in straw and hay, on earthmoving and mowing/weed-eating equipment, and in animal manure. Weed seeds also spread quickly down stream and upwind along lakes and reservoirs.

Yellow starthistle, Tocalote or Malta starthistle and Medusahead grass are by far the most common species found along existing NFTS routes and additions to the NFTS (STF weed database 2008). To a lesser extent, several other invasive weed species occur on the STF, primarily along roads. Yellow Starthistle (*Centaurea solstitialis)* was introduced in North America probably sometime after 1849 as a seed contaminant in Chilean-grown alfalfa seed, also known as Chilean clover. Historic records indicate that alfalfa was first introduced to Chile from Spain and from Spain to California before 1903. Yellow starthistle in California was mainly transported to other areas by the use of tractors and equipment. It began invading the foothill grasslands around the 1940's and has become a part of the grazing/weed system (UC Davis, Di Tomaso 2001) Human activities are the primary mechanism for long distance movement of yellow starthistle seed. It is transported in large amounts by road maintenance equipment and on the undercarriage of vehicles. It can reduce land value and reduce access to recreational areas (Di Tomaso 2008, Roche and Roche 1988). In addition, starthistle infestations can reduce wildlife habitat and forage, displace native plants, and decrease native plant and animal diversity (Sheley and Larson 1995). Dense infestations not only displace native plants and animals, but also threaten natural ecosystems and nature reserves by fragmenting sensitive plant and animal habitat (Scott and Pratini 1995).

Most weeds will persist in permanent natural openings such as in meadows, on lava caps, and along roads. With the possible exception of blackberries, most weeds tend to be shaded out in forested areas as trees grow. Weeds are of particular concern where they alter habitats; compete with sensitive plants and other rare species, or occur near vectors (streamside, areas of high human use, fire staging and action areas, birds, etc.) that could carry them quickly to other areas.

Motor vehicle use is known to contribute to weed introduction in a number of ways (Trombulak and Frissell 2000) including moving weed seed and plant parts from place-to-place in the mud/soil on tires, and/or on the vehicle body. Motor vehicle use disturbs native plant communities and makes the habitat more suitable for weed growth by reducing native plant cover. The disturbed areas within and adjacent to major highways, general forest roads, two-tracked non-maintained roads, and OHV trails provide habitat for any weed seed deposited. Weeds are known to be spread by motor vehicle use regardless of the season of use. Native vegetation is also known to be physically damaged by motor vehicle use regardless of the season of use. Season of use may or may not affect the rate of spread of weeds, and/or the creation of bare soil. When weeds become established in these edge areas, they provide the weed seed source for new occurrences of weed in the areas adjacent.

When native plants are replaced by weeds, the entire ecosystem can be altered. For example, when motor vehicle use introduces weeds into new areas and the weeds become established, the vegetative pattern is changed, providing more flammable fuels into the system. As the weeds spread and increase in volume, an increase in fuels occurs. Weeds such as Scotch and Spanish brooms, cheatgrass, and others, change the arrangement of vegetation, the amount of soil moisture at specific times of the year, the amount of fuel available to burn, and how fire behaves. Vehicle fires were known to start wildfires. If a wildfire occurs in a weed infested area, many weeds such as cheatgrass and French/Spanish broom have the competitive edge over native plants when the burned area begins to revegetate.

Edges are recognized as potential starting points for invasions of weeds into the less disturbed areas of the rest of the plant community such as forested areas (Pauchard and Alaback 2005). Less disturbed areas such as the interior of a forest are usually considered less susceptible to weed invasion because of a combination of factors such as competition from native species, fewer sites for seed germination, less solar radiation and less seed dispersal. However, weed establishment is not based on disturbance alone. When a weed seed source is sufficiently close to a plant community, that plant community/habitat is at increased risk of weed introduction and spread.

The rate that weeds are introduced to the creation of unauthorized routes is unknown. In one study, Rooney (2003) collected mud from the undercarriage of 14 motor vehicles. He found that seeds germinated from the mud collected from 4 of those vehicles. In the same study, he reported that each vehicle carried an average of 3.6 seeds. When he multiplied this number by the number of motor vehicles traveling each day, he estimated that about 6 million seeds were transported per vehicle per year in Wisconsin. Rooney predicted that over the long term, with motor vehicles as seed dispersers, the fraction of roads/trails colonized by weeds would increase until all motorized roads and trails reached a weed saturation level. This prediction was based on the lack of constant, extensive, effective monitoring of motor vehicle routes. He also reported that weeds are generally better adapted to vehicular dispersal than native plant species due to their small seed size, high seed production, and persistent seed banks. In this analysis, 200 feet was chosen to define the distance that weed seed would be dispersed and established from travel on tires.

Disturbance by motor vehicles can have long-term effects to soils and favor weed establishment. Motor vehicles compact soils reducing water infiltration and accelerating erosion. They also displace soils and sheer off vegetative roots. If these effects are severe, a loss of soil productivity may occur. Numerous passes by vehicles over vegetation causes the plants to die, exposing the soil organic layer. The loss of vegetative cover makes the soil organic layer more susceptible to erosion. Loss of vegetative cover and the soil organic layer reduces the ability of the soil to hold moisture. Many weed species are more capable of utilizing less productive soils with less soil moisture. Some weeds can also produce secondary chemical compounds that inhibit native plant germination and growth. These compounds also affect nutrient cycling rates by inhibiting soil microbial fauna activity.

Maintenance of roads and trails can also spread weeds. Grading disturbs soil and competing vegetation, and also transports soil, and weed seeds/parts to new locations. Cleaning ditches/developing waterbars moves soils and creates ideal seedbeds. Seeds from equipment can be deposited in stream crossings and washed downstream. Mower heads can also move weed seeds/parts to new locations. This movement of weed seed/parts can happen at any time of the year since the seeds and parts are present in the soil at infested sites at all times of the year. Stockpiles of crushed aggregate can also be infested with weeds. When that aggregate is moved to a new location, the weeds go with it.

Another aspect of motor vehicle use that helps to spread weeds is tied to the use of recreational areas and facilities, such as trailheads, campgrounds, staging areas, and dispersed camping areas. These areas are frequently the first site on NFS lands that the motor vehicle comes in contact with after leaving major highways. Therefore, they frequently receive weed seed and plant parts. These areas have constant soil disturbance that provide a good seedbed for any weed seed that is deposited. In addition, the visitors themselves can also disperse weed seeds on their clothing, footwear, and camping equipment. Since many campgrounds are located near riparian areas and riparian areas in campgrounds frequently have high levels of public activity, they have a higher risk of weed infestation. Many weeds are adapted to riparian areas and rapidly become established on sites where soils were disturbed, such as eroding stream banks, road and trail crossings, and undeveloped trails. In addition, streams can carry weed seeds and plant parts great distances, hastening weed spread. Aquatic weeds, such as purple loosestrife, can take over whole wetland ecosystems, impeding water flow and reducing the quality of wetland habitats. Surveys for this listed noxious weed are incomplete, and it has not been located with in the analysis area.

Sensitive plants and watchlist species occurrences located in and/or near motor vehicle roads and trails have a high risk of negative impacts from weed introduction and spread. Several of the known occurrences of weeds on the STF are known to directly and indirectly impact sensitive plant occurrences. Noxious weed infestations, such as yellow starthistle and Klamath weed, are present along the Bull Creek Road on the Groveland District, and several of the known occurrences and habitat of the sensitive species Clarkia australis are directly and indirectly impacted. These occurrences are in open habitat and cutbanks where off-trail use can easily occur, and noxious weed spread is a primary concern for high risk to habitat and plants. Table 3.02-7 displays the miles of routes infested with invasive weeds. Table 3.02-8 displays routes where sensitive/watchlist plants and/or plant communities were impacted with noxious weed infestations. These plants and communities are at increased risk of loss of individuals and habitat due to weed introduction and spread over the short and long term. The sensitive/watchlist species occurrences that have known weed occurrences located within 200 feet are at even greater risk of negative impacts from weed infestation. This mileage does not represent a total inventory of weeds; it does include the routes with the most extensive roadside infestations on routes.

While noxious weeds and other invasive plant species may cause direct or indirect effects to sensitive plants through competition, weeds have major effects on potentially sensitive habitats. Invasive weeds also reduce species diversity in natural habitats across the analysis area.

Table 3.02-6 Weed Species Infestations

Common Name	Botanical Name	Acronym	Acres
Jointed goatgrass	*Aegilops cylindrica*	AECY	0.05
Barbed goatgrass	*Aegilops triuncialis*	AETR	0.04
Tree-of-heaven	*Ailanthus altissima*	AIAL	0.09
Cheatgrass	*Bromus tectorum*	BRTE	46.46
Italian thistle	*Carduus pycnocephalus*	CAPY	8.26
Diffuse knapweed	*Centaurea diffusa*	CEDI	2.10
Tocalote/Malta starthistle	*Centauria melitensis*	CEME	150.10
Yellow starthistle	*Centaurea solstitialis*	CESO	2,177.51
Squarrose knapweed	*Centaurea virgata ssp. squarrosa*	CEVIS	0.51
Canada thistle	*Cirsium arvense*	CIAR	0.25
Bull thistle	*Cirsium vulgare*	CIVU	33.32
Field bindweed	*Convolvulus arvensis*	COAR	0.01
Scotch broom	*Cytisus scoparius*	CYSC	2.01
French broom	*Genista monspessulana*	GEMO	0.27
Klamath weed	*Hypericum perforatum*	HYPE	42.53
Dyers woad	*Isatis tinctoria*	ISTI	0.74
Oxeye daisy	*Leucanthemum vulgare*	LEVU	0.41
Himalaya blackberry	*Rubus discolor*	RUDI	4.40
Cut-leaved blackberry	*Rubus laciniatus*	RULA	5.06
Bouncing bet	*Saponaria officionalis*	SAOF	1.08
Milk thistle	*Silybum marianum*	SIMA	0.37
Spanish broom	*Spartinum junceum*	SPJU	0.02
Medusahead grass	*Taeniatherum caputmedusae*	TACA	138.80
Puncturevine	*Tribulus terrestris*	TRTE	0.11
Woolly mullein	*Verbascum thapsus*	VETH	2.28
		total	**2,622.96**

The Noxious Weed Risk Assessment has a complete description of invasive plant species (Project record)

Table 3.02-7 Motorized Routes Infested with Invasive Weeds by Road Maintenance Level

Road Maintenance Level	**Alternative** (miles)				
	1	**2**	**3**	**4**	**5**
ML2	16.37	24.36	24.36	21.34	16.06
ML2 + HLO	4.58	0.00	0.00	3.40	4.57
ML3 + HLO	4.91	5.16	5.16	4.94	5.16
Additions to the NFTS	0.80	0.00	0.00	4.00	0.00
total	26.66	29.52	29.52	33.68	25.79

ML2 indicates a level 2 road (normally open to all vehicles)
ML3 indicates a level 3 road (normally open to highway legal vehicles only)

Table 3.02-8 Additions to the NFTS with Weeds and Direct Impacts to Sensitive Plants

Route	Sensitive Plant	Invasive Plants
15EV43C	Tuolumne fawn lily	Yellow starthistle
15EV43C	Tuolumne fawn lily	Yellow starthistle
15EV43C	Tuolumne fawn lily	Yellow starthistle
15EV43C	Tuolumne fawn lily	Milk thistle
15EV43C	Tuolumne fawn lily	Milk thistle
15EV43G	Tuolumne fawn lily	Yellow starthistle
16EV108	Stebbin’s lomatium	Cheatgrass
16EV109	Stebbin’s lomatium	Cheatgrass
16EV236	Stebbin’s lomatium	Cheatgrass
17EV183	Parry’s horkelia	Yellow starthistle
17EV192	Hetch-Hetchy monkeyflower/ Parry’s horkelia	Yellow starthistle
17EV192A	Hetch-Hetchy monkeyflower/ Parry’s horkelia	Yellow starthistle
17EV231	Three bracted onion/ Stebbin’s lomatium	Tree of heaven
17EV78	Stebbin’s lomatium	Cheatgrass
17EV88	Three bracted onion/ Stebbin’s lomatium	Cheatgrass
18EV110	Kellogg’s lewisia/ Stebbin’s lomatium	Cheatgrass
FR98581	Mariposa clarkia	Yellow starthistle

Special Interest Areas

The management emphasis for Special Interest Areas (SIA) is to protect and manage unique geological, scenic, historical, archaeological, botanical and memorial features, and to preserve the integrity of the special interest feature for which the area was established. A wide range of resource activities is permitted, provided the unique features of each area are protected (see 3.05 Roadless and Special Areas). The two SIAs containing sensitive species and Botanical resources are addressed here:

Trumbull Peak Historic and Botanical Area: The entire area covers 150 acres and includes three occurrences of sensitive plants, including Yosemite onion (*Allium yosemitense*), Congdon’s woolly sunflower (*Eriophyllum congdonii*), and Congdon’s lewisia (*Lewisia congdonii*). The existing road access to the area is gated with permitted access only.

Pacific Madrone Botanic Area: This 15 acre area contains the two southernmost known groves of Pacific Madrone (*Arbutus menziesii*) growing 1/10 mile apart. The two groves contain 20 mature and sapling trees, and some seedlings surrounded by riparian vegetation. No known occurrences of sensitive plants and no additions to the NFTS in this area.

Research Natural Areas

Certain botanical resources are protected within four Research Natural Areas (see 3.05 Roadless and Special Areas).

Bell Meadow Research Natural Area (490 acres): designated for aspen research, the RNA is located in the east-central portion of the Forest. It contains 110 acres of aspen stands in Bell Meadow along with wet mountain meadow, riparian habitat and examples of the aspen-meadow complex on deep soils.

Critchfield (Bourland Meadow) Research Natural Area (1,003 acres): designated for bogs and meadow research the RNA is located in the east-central portion of the Forest adjacent to the Emigrant Wilderness. Vegetation consists of seven major associations: red fir, red fir-lodgepole pine, red fir-western white pine-lodgepole pine, red fir-white fir-Jeffrey pine, red fir-white fir, and red fir-aspen. Wet and dry meadows are present and the area is noted for aquatic bog values. Successional stages are present in several stands, including meadows.

Grizzly Mountain Research Natural Area (500 acres): designated for black oak research, the RNA is located in the southern portion of the Forests on the northern slopes of Little Grizzly and Big Grizzly Mountains. Black oak stands occupy most of the area, interspersed with brush and scattered ponderosa pine.

Clark Fork Candidate Research Natural Area (460 acres): designated for white fir research, the RNA is located in the northeast portion of the Forest near Clark Fork Campground. It includes various mixtures of white fir and other conifers at a range of elevations. Part of the area (250 acres) is within the Bald Peak proposed addition to the Carson-Iceberg Wilderness and the remainder is within the Clark Fork proposed Wild and Scenic River.

Environmental Consequences

People, vehicles and the roads they travel on tend to diminish and fragment suitable habitat for certain Sensitive species.

The Stanislaus National Forest has about 2,947 miles of system roads. Most areas have adequate road access. Small areas are still identified where minor amounts of new road construction are needed.

In addition to the system roads, a number of unauthorized routes exist. Unauthorized roads originate in different ways. Some are built as temporary roads, often for timber access. Some are user-created routes made by OHV use. The entire forest has not been completely surveyed for unauthorized routes. The Stanislaus is in a gradual process of inventorying the unauthorized roads, and approximately half of the forest has now been inventoried. (See Transportation, Chapter 3)

In some areas of the Forest, new routes continue to be developed by people driving their vehicles off existing roads. After one vehicle leaves a set of wheel tracks, other vehicles follow, creating an unauthorized route.

Alternative 1 (Proposed Action)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Cross-Country travel is prohibited in Alternative 1. Elimination of cross country travel reduces impacts to plant communities by reducing direct impacts of crushing, ground disturbance, sedimentation, and rutting. Fewer acres are disturbed, resulting in fewer weed infestations. Passive recovery would occur on routes not added to the system. Sensitive plant populations could be affected by other non-motorized uses on these routes.

2. Additions to the NFTS

Alternative 1 includes 157.39 miles of additions to the NFTS. These additions would likely increase the direct and indirect effects to sensitive plants and their habitats. Proliferation of unauthorized routes is assumed zero or minor. Use will be discontinued on 92 miles of unauthorized routes. Direct impacts to sensitive species from cross country use could be significant at least at the local, site specific level. The significance of direct and indirect impacts is dependent on many factors including the amount of disturbance, the sensitive species being impacted, and in some cases, the season when the disturbance takes place. The significance of impacts is also dependent on the number of sensitive species that occur in a specific location and how many of them are damaged. Three routes will be mitigated for direct and indirect effects to plants and habitat in Alternative 1 (Appendix F).

The routes will be allowed to passively recover. Passive recovery and re-vegetation is expected within a 10 year period. Disturbed areas on shallow soils, particularly above 8,000 feet elevation (cold temperature), will recover more slowly. These changes will have a positive effect on soil conditions as compared to Alternative 2 (see 3.08 Soil). With less disturbance from motor vehicles direct impacts would lessened. Competing vegetation as a result of passive recovery may have an indirect effect to sensitive plants and habitat.

3. Changes to the Existing NFTS

Vehicle Class

Vehicle class changes would occur on 623.28 miles of NFTS roads. It is assumed that changing vehicle class does not change impacts to sensitive species and watchlist plants/plant communities, and that effects from all types of motor vehicles are assumed equal. These roads already have hardened surfaces that lack vegetation. It is likely that direct impacts to sensitive species and watchlist plant communities occurred when the road was developed. Indirect impacts may still be occurring if the sensitive species and watchlist plants/plant communities have survived within 200 feet of the road. These indirect impacts would continue regardless of the type of vehicle using the road.

Season of Use

Alternative 1 provides for season of use on designated native NFTS motorized routes (see Chapter 2). Lower elevations are open all year, middle elevations are open April 1 through November 30, and upper elevations are open May 15 through November 30. Alternative 1 would have a longer closure time and more benefit with lesser impact on sensitive plant resources than Alternative 4 and more of an impact than Alternative 5.

Wheeled over snow use would be allowed on 111.01 miles of roads by ATVs when 12 inches or more of snow is present (see Table 2.02-2) with no anticipated impact to plant communities by allowing this use.

Indicator Measure 1 – Number of sensitive plant sites/ occurrences within 200 feet of wheeled motor vehicle routes

Under Alternative 1, potential exists for direct and indirect effects to 83 documented sensitive plant sites and suitable habitat areas. These 83 sensitive plant sites and suitable habitat areas are documented to be within 200 feet of 157.39 miles of additions to the NFTS under Alternative 1.

Based on the assumption that suitable habitat exist along routes in upland and mid slope habitats and lower montane, chaparral, and woodland habitats, fourteen sensitive plant species may be directly or indirectly affected by routes within 200 feet of suitable habitat. These include: Jepson’s onion, Yosemite onion, Nissenan manzanita, big-scale balsamroot, Pleasant Valley mariposa lily, Small’s southern clarkia, Merced clarkia, Tahoe draba, Congdon’s woolly sunflower, Parry’s horkelia, short-leaved hulsea, Tuolumne iris, Yosemite lewisia, and slender-stalked monkeyflower.

Indicator Measure 2 - Number of documented direct impacts to sensitive plant sites/occurrences on either side of route’s edge within 30 feet of motor vehicle routes

This alternative includes 59 documented sensitive plant sites along additions to the NFTS that may be directly impacted by motor vehicle use, including driving off-road, parking and/or camping off roads. The Biological Evaluation (BE) for Sensitive Plants and Other Botanical Resources shows routes with direct impacts to plants for this alternative (see project record).

Table 3.02-9 represents the number of potentially affected occurrences for each sensitive plant species along additions to the NFTS for Alternative 1.

Table 3.02-9 Species and Occurrences within 30 feet of Additions to the NFTS: Alternative 1

Species Name	Occurrences
Kellogss's lewisia	3
Mariposa clarkia;	2
Small's southern clarkia	7
Tuolumne fawn lily	3
Hetch-Hetchy (slender-stemmed) monkeyflower	9
three-bracted onion	4
Stebbins's lomatium	26
Parry's horkelia	5

Indicator Measure 3 - Miles of motorized routes passing through lava caps

This alternative includes 29.3 miles of additions to the NFTS within lava caps with sensitive plant sites and suitable habitat areas. Three known sensitive plant species may be directly or indirectly affected by additions to the NFTS in lava cap habitat areas. These sensitive plant sites are known to occur within 200 feet of additions to the NFTS within lava cap areas: Stebbin's lomatium, three bracted onion, and Kellogg's lewisia. The three bracted onion (*Allium tribracteatum*) is an endemic occurring on very thin soils in open habitat and is quite vulnerable to OHV activity. This species would be most vulnerable by opening the trails within this habitat in early April (M. Willits, personal communication, January 16, 2009).

Indicator Measure 4 - Miles of motorized routes passing through meadows

Approximately 1.8 miles of additions to the NFTS pass through meadows with the potential to affect several sensitive plant species and mosses. Based on the assumption that suitable habitat exist along routes in meadows and riparian areas, seventeen sensitive species, including six mosses, one lichen, five moonworts, Tuolumne fawn lily, Hetch-Hetchy monkeyflower, subalpine fireweed, pansy monkeyflower, and Pilot Ridge fawn lily may be directly/indirectly affected by routes open for public wheeled motor vehicle use through wet areas. Of the action alternatives, Alternatives 1 and 4 have the greatest number of additions affecting sensitive plants in moist habitats.

Indicator Measure 5 - Miles of motorized routes infested with invasive plant species within 200 feet of sensitive plant occurrences/ and habitat

This alternative includes 0.80 miles of additions to the NFTS infested with invasive plant species and the potential to indirectly affect sensitive plant sites and suitable habitat areas. Twenty nine known noxious weed and invasive plant infestations are within 200 feet of sensitive plant sites and suitable habitat areas. Under this alternative, 22 sensitive plant sites/suitable habitat areas are within 200 feet of weed infested additions to the NFTS, .The two sensitive plant species with the highest number of sites with potential indirect and direct effects from noxious and invasive weed infestations include the Tuolumne fawn lily and Stebbin's lomatium. Stebbin's lomatium has 7 sites within 200 feet of noxious weed infestations, and Tuolumne fawn lily has 6 sites within 200 feet of noxious and invasive weed infestations associated with additions to the NFTS. An additional 9 sensitive plant sites may be indirectly or directly affected by noxious and invasive weed infested routes under this alternative.

CUMULATIVE EFFECTS

Alternative 1 will potentially have the third highest impact to sensitive plant sites and suitable habitat areas after alternative 1 and 4. The Tuolumne fawn lily, an endemic to the Stanislaus National Forest, has documented impacts from numerous recreational and other forest uses. Existing impacts by OHV in suitable habitat areas for this plant species were extensively documented. The three sensitive plant sites of Tuolumne fawn lily that may be impacted by additions to the NFTS under Alternative 1 represent approximately 7 % of the total known sensitive plant sites for this species in the analysis area. Stebbin's lomatium, another endemic to the Stanislaus National Forest, has documented impacts from OHV and other recreational uses. The twenty-three plant sites of Stebbin's lomatium that may be impacted by Alternative 1 represent approximately 7 % of the total known sites for this species within the analysis area. Under this alternative, additions to the NFTS and increases in OHV use will likely increase the cumulative effects to both of these plant species over time. It is assumed that future OHV use will contribute to the adverse cumulative effects, but would not result in a second vulnerable species, Hetch-Hetchy monkeyflower, has approximately 204 known sites documented on the STF. This species has a fairly narrow range, distributed through the southern half of the Groveland Ranger District on the STF. Nine of the 204 sites have documented impacts from motor vehicles on the analysis area. The meadows and seeps where this species occurs are easily accessed by OHVs. Numerous types of projects impact this species and were documented including, OHV use, logging, Ackerson and Rogge wildfires, large fire salvage, and reforestation projects. The nine plant sites potentially impacted by Alternative 1 represent approximately 4 % of the total known sites for this species within the analysis area.

Parry's horkelia occurs in open habitat where users have created unauthorized cross country OHV trails and some of these trails pass through known sites. Documented sites exist near a fuel break in the Date Flat area. Noxious and invasive weeds spread by OHV use threaten this species. The five sites that may be impacted under Alternative 1 represent approximately 4% of the total known plant sites.

Other meadow-dwelling sensitive species include moonworts, hump-mosses, Bolander's bruchia, and Blandow's bog moss. Although these are known to be wide ranging species, none are known to be numerous in California, and some of these species are thought to be in decline throughout their historic ranges. It is assumed that forest projects have and will impacte the suitable habitat. Surveys for these meadow-dwelling sensitive species are incomplete within the analysis area. However, it is not likely that the cumulative effects of these projects (Appendix B) will result in reducing the viability of these species.

This alternative includes noxious and invasive weed infestations associated with 26.66 miles of additions.

Overall, adverse cumulative effects to sensitive plant species under Alternative 1 are not expected to be of the scale that would reduce species viability for any of the STF sensitive plant species. Implementation of Alternative 1 would not, over time, improve conditions for sensitive plants and their habitats as a result of continued public wheeled motor vehicle use and new routes added to the system. Impacts to sensitive plant sites and suitable habitat areas by motorized uses are taking place and are expected to increase in the foreseeable future due to the predicted increase in motor vehicle use on the STF. Monitoring of sensitive plant sites and erecting physical barriers needs to be implemented where impacts from off-road vehicles use is documented as directly affecting sensitive plant occurrence areas.

While direct effects to sensitive plant species from disturbances caused by these activities has minimally been mitigated by avoidance, indirect effects such as further invasion by noxious weeds has occurred. Given the magnitude of the disturbance involved in various activities during the past 150 years, it is likely that historic fire suppression, road and trail construction (designed and unauthorized routes), campground construction, other types of recreation activities including OHV use, timber management, salvage activities, reforestation practices, historic grazing and mining activities, and hydroelectric development have degraded suitable habitat. It is also likely that individual sensitive plants were destroyed by these activities and that entire occurrences may were eliminated.

For the purpose of this analysis, cumulative effects of past activities are represented within the existing conditions. Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the STF and private lands within the Forest boundary. Some, but not all, of these activities will contribute to effects on sensitive plant and habitat. Within the project area, hazardous fuels reduction and associated timber harvest have occurred on approximately 25,410 acres of NFS land since 2000 (Appendix B). These treatments are anticipated to be the primary activity that will alter forest vegetation and impact sensitive plants and habitat. These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Since 2000, approximately 85,000 acres of NFS lands burned in wildfires. Within the project area, prescribed burning has occurred on about 22,500 acres between 2000 and 2008. CDF lists a total of 2,365 acres of private land within the STF administrative boundary for which timber harvest plans were submitted. On private timberlands, harvest methods include selective thinning and regeneration (clearcut) and then are reforested using herbicides to suppress competing vegetation

Compliance and maintenance efforts may limit the extent of impacts to the more vulnerable sensitive plant habitat areas. Difficult access to suitable habitat areas and sensitive plant occurrence areas, as well as prohibiting cross country travel on unauthorized routes will alleviate impacts from motor vehicles in some areas of the forest. Under Alternative 1, cumulative impacts to sensitive plants on the STF are expected to remain below the threshold that reduces the overall viability for these rare plant species, or to cause listing under the Endangered Species Act.

Alternative 2 (No Action)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Cross-country travel would not be prohibited under this alternative and travel on all existing routes would be allowed to continue except where prohibited by existing Forest Orders. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS. The use of these routes and the continued proliferation of new routes would result in increasing amounts of disturbance to sensitive plants and their habitat. These effects would be similar to those discussed within Alternative 4 for the short-term, but would be exacerbated over the long-term by the continued

2. Additions to the NFTS

No effects because use would only occur on the existing NFTS.

3. Changes to the Existing NFTS

Vehicle Class

No changes are made to vehicle class.

Season of Use

No changes are made to existing restrictions (see Table 2.02-7). Wheeled over Snow activities would be allowed to continue.

Alternative 2 has potential direct and indirect effects to approximately 39 percent of all documented sensitive plant sensitive plant sites/ occurrences and suitable habitat areas within 200 feet of existing motorized routes for the analysis area. Alternative 2 has 11.16 miles of existing motorized routes within meadows, and 29.52 miles of weed infested native surface routes.

Wheeled over snow use would have potential direct and indirect impacts to sensitive plant habitat. The potential impacts of these routes to the sensitive plants and habitat are included in the analysis in Indicator Measure 1 of this alternative for the upland and midslope species and habitat. Indirect effects of wheeled over snow travel to plant species and habitat would most likely be a result secondary to rutting or change in hydrology.

Indicator Measure 1 - Number of sensitive plant sites/ occurrences within 200 feet of wheeled motor vehicle routes

Direct and indirect effects may occur to 612 sensitive plants sites/habitat areas located within 200 feet of 2,259.37 miles of motor vehicle routes. Based on the assumption that suitable habitat exist along routes in upland and mid slope habitats and lower montane, chaparral, and woodland habitats, fourteen sensitive plant species may be directly or indirectly affected by routes within 200 feet of suitable habitat. These include: Jepson's onion, Yosemite onion, Nissenan manzanita, big-scale balsamroot, Pleasant Valley mariposa lily, Small's southern clarkia, Merced clarkia, Tahoe draba, Congdon's woolly sunflower, Parry's horkelia, short-leaved hulsea, Tuolumne iris, Yosemite lewisia, and slender-stalked monkeyflower.

Indicator Measure 2 - Number of documented direct impacts to sensitive plant sites/occurrences on either side of route's edge within 30 feet of motor vehicle routes

Approximately 248 documented sensitive plant sites occur along routes with known direct impacts caused by motor vehicles use including driving off-road, parking or camping off-roads. These sensitive plant species are listed in Table 3.02-10.

Table 3.02-10 Species and Occurrences within 30 feet of Additions to the NFTS: Alternative 2

Species Name	Occurrences
Kellogg's lewisia	3
Mariposa clarkia;	25
Small's southern clarkia	45
Tuolumne fawn lily	28
pansy monkey flower	15
Hetch-Hetchy (slender-stemmed) monkeyflower	5
three-bracted onion	18
Stebbins's lomatium	68
mountain lady slipper	4
Bolander's bruchia	4
Tuolumne iris	2
veiny aquatic lichen	2
Yosemite wooly sunflower	3
Parry's horkelia	19

Indicator Measure 3 - Miles of motorized routes passing through lava caps

Approximately 65.97 miles of existing motorized routes within lava caps have sensitive plant sites and potential habitat for three sensitive species, including Stebbin's lomatium, three bracted onion, and Kellogg's lewisia. The three bracted onion (*Allium tribracteatum*) is an endemic occurring on very thin soils in open habitat and is quite vulnerable to OHV activity.

Indicator Measure 4 - Miles of motorized routes passing through meadows

Approximately 11.16 miles of routes pass through meadows under this alternative. Based on the assumption that suitable habitat exist along routes in meadows and riparian areas, seventeen sensitive species, including six mosses, one lichen, five moonworts, Tuolumne fawn lily, Hetch-Hetchy monkeyflower, subalpine fireweed, pansy monkeyflower, and Pilot Ridge fawn lily may be directly/indirectly affected by routes open for public wheeled motor vehicle use through wet areas.

Indicator Measure 5 - Miles of motorized routes infested with invasive plant species within 200 feet of sensitive plant occurrences/ and habitat

At present, 29.52 miles and 521 motorized routes are infested with noxious and invasive weed species and the potential to directly and/or indirectly affect sensitive plant sites and/or suitable habitat areas. Thirty two known noxious and invasive weed infestations are within 200 feet of sensitive plant occurrences and suitable habitat areas. Under this alternative, 41 sensitive plant sites and suitable habitat areas are directly or indirectly affected by routes with noxious and invasive weed infestations within 200 feet.

CUMULATIVE EFFECTS

Although adverse cumulative effects to sensitive plant species under Alternative 2 are not expected to be of the scale that would reduce species viability, nearly 40 percent of the total number of sensitive plant sites/ occurrences and suitable habitats throughout the STF are impacted by motor vehicle use. Current impacts by motor vehicle travel have not been extensively documented in all suitable habitat areas for sensitive plant species on the STF. Alternative 2 has potential effects to approximately 39 percent of all STF documented plant sites within the analysis area and potential effects to their habitats. Alternative 2 has the greatest number of miles within meadows and lava caps. Under Alternative 2, cumulative effects from implementing a variety of projects listed in Appendix B could impact sensitive plants and their habitat, especially in meadows and on lava caps.

Alternative 2 would not, over time, improve conditions for sensitive plants and their habitats as a result of continued public wheeled motor vehicle use on unauthorized routes. Impacts to sensitive plant occurrences and habitat are expected to increase in the foreseeable future due to the predicted increase in population and associated increases motor vehicle use on the STF. In Alternative 2, cumulative impacts to sensitive plants on the Stanislaus NF are expected to remain below the threshold required to reduce the overall viability or cause listing status for these rare plant species. The unknown effects to sensitive plants and their habitat is greater under this alternative as motor vehicle travel by the public would not be limited to NFTS routes and continued use of user created routes is more likely to occur. It is assumed present and future unmanaged OHV use will contribute to the adverse cumulative effects. The continued use of the existing routes and additions to the NFTS will negatively affect the viability of sensitive plant species and habitat. Direct impacts to sensitive species from cross country use could be significant at least at the local, site specific level. The significance of direct and indirect impacts is dependent on many factors including the amount of disturbance, the sensitive species being impacted, and in some cases, the season when the disturbance takes place. The significance of impacts is also dependent on the number of individuals of sensitive species that occur in a specific location and how many of them are damaged.

Alternative 2 reflects the greatest number of miles of invasive plant infestations within 200 feet of sensitive plant resources and the risk of weed vectoring by motor vehicles is greater than all of the other alternatives.

This alternative would has the greatest impacts to sensitive plant communities in comparison to all of the other alternatives, with direct and indirect effects to approximately 612 known sites/suitable habitat areas within 200 feet of the 2259.37 miles of routes open for public wheeled motor vehicle use. At this time it is unknown what the direct and indirect effects are to undocumented plant occurrences. The unknown effects to sensitive plants and their habitat is greater for this alternative as motor vehicle travel by the public would not be limited to NFTS routes and continued use of user created routes will occur. Because of the inability to predict where route proliferation would occur on the Forest, it is difficult to determine what effects route proliferation would have on suitable habitat. While direct effects to sensitive plant species from disturbances caused by these activities has minimally been mitigated by avoidance, indirect effects such as further invasion by noxious weeds has occurred. Given the magnitude of the disturbance involved in various activities during the past 150 years, it is likely that historic fire suppression, road and trail construction (designed and unauthorized routes), campground construction, other types of recreation activities including OHV use, timber management, salvage activities, reforestation practices, historic grazing and mining activities, and hydroelectric development have degraded suitable habitat. It is also likely that individual sensitive plants were destroyed by these activities and entire occurrences eliminated.

For the purpose of this analysis, cumulative effects of past activities are represented within the existing conditions. Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the STF and private lands within the Forest boundary. Some, but not all, of these activities will contribute to effects on sensitive plant and habitat. Within the project area, hazardous fuels reduction and associated timber harvest have occurred on approximately 25,410 acres of NFS land since 2000 (Appendix B). These treatments are anticipated to be the primary activity that will alter forest vegetation and impact sensitive plants and habitat. These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Since 2000, approximately 85,000 acres of NFS lands burned in wildfires. Within the project area, prescribed burning has occurred on about 22,500 acres between 2000 and 2008. CDF lists a total of 2,365 acres of private land within the STF administrative boundary for which timber harvest plans were submitted. On private timberlands, harvest methods include selective thinning and regeneration (clearcut) and then are reforested using herbicides to suppress competing vegetation.

Over time, this alternative may have the highest level of cumulative effects to sensitive plant resources caused by noxious and invasive plant infestations.

Alternative 3 (Cross Country Prohibited)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Motor vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. The routes will be allowed to passively recover. Passive recovery and re-vegetation is expected within a 10 year period. The time frame of 10 years allows for most of the routes to grow vegetation and stabilize to background erosion rates. Disturbed areas on shallow soils, particularly above 8,000 feet elevation (cold temperature), will recover more slowly. These changes will have a positive effect on soil conditions as compared to Alternative 2 (see 3.08 Soil). With less disturbance from motor vehicles direct impacts would lessened. Competing vegetation as a result of passive recovery may have an indirect effect to sensitive plants and habitat.

2. Additions to the NFTS

This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on NFTS routes.

3. Changes to the Existing NFTS

No changes are made to existing restrictions (see Table 2.02-7). No changes are made to the existing NFTS.

Indicator Measure 1 - Number of sensitive plant sites/ occurrences within 200 feet of wheeled motor vehicle routes

This alternative would have impacts to sensitive plant communities with direct and indirect effects to approximately 410 known sites /suitable habitats occurring within 200 feet of 2,259.37 miles of the NFTS. At this time it is unknown what the direct and indirect effects are to undocumented plant occurrences.

Based on the assumption that suitable habitat exist along routes in upland and midslope habits and lower montane, chaparral, and woodland habitats, fourteen sensitive plant species may be directly or indirectly affected by routes within 200 feet of suitable habitat. These include: Jepson’s onion, Yosemite onion, Nissenan manzanita, big-scale balsamroot, Pleasant Valley mariposa lily, Small’s southern clarkia, Merced clarkia, Tahoe draba, Congdon’s woolly sunflower, Parry’s horkelia, short-leaved hulsea, Tuolumne iris, Yosemite lewisia, and slender-stalked monkeyflower.

Indicator Measure 2 - Number of documented direct impacts to sensitive plant sites/occurrences on either side of route's edge within 30 feet of motor vehicle routes

Alternative 3 contains 155 documented sensitive plant sites along the existing NFTS routes with known impacts from motor vehicle use, including driving off-road, parking or camping off-roads. Table 3.02-11 shows the number of occurrences of sensitive plant species for Alternative 3.

Table 3.02-11 Species and Occurrences within 30 feet of Additions to the NFTS: Alternative 3

Species Name	Occurrences
Mariposa clarkia;	24
Small's southern clarkia	39
Tuolumne fawn lily	12
pansy monkey flower	10
Hetch-Hetchy (slender-stemmed) monkeyflower	14
three-bracted onion	5
Stebbins's lomatium	31
mountain lady slipper	4
Bolander's bruchia	1
Tuolumne iris	1
veiny aquatic lichen	1
Yosemite wooly sunflower	3
Parry's horkelia	10

Indicator Measure 3 - Miles of motorized routes passing through lava caps

Approximately 65.97 miles of existing NFTS routes on lava caps are within 200 feet of sensitive plant sites and/or potential habitat. Three sensitive plant species, including Stebbin's lomatium, three bracted onion, and Kellogg's lewisia grow in the lava cap habitat. The three bracted onion (*Allium tribracteatum*) is an endemic occurring on very thin soils in open habitat and is quite vulnerable to OHV activity.

Indicator Measure 4 - Miles of motorized routes passing through meadows

Approximately 11.16 miles of existing NFTS routes pass through meadows under this alternative. Based on the assumption that suitable habitat exist along routes in meadows and riparian areas, seventeen sensitive species, including six mosses, one lichen, five moonworts, Tuolumne fawn lily, Hetch-Hetchy monkeyflower, subalpine fireweed, pansy monkeyflower, and Pilot Ridge fawn lily may be directly/indirectly affected by routes open for public wheeled motor vehicle use through wet areas.

Indicator Measure 5 - Miles of motorized routes infested with invasive plant species within 200 feet of sensitive plant occurrences/ and habitat

Alternative 3 contains 29.52 miles and 440 motorized routes infested with invasive plant species and the potential to directly and/or indirectly affect sensitive plant sites and/or suitable habitat areas. Thirty two known noxious and invasive weed infestations are within 200 feet of sensitive plant occurrences and suitable habitat areas documented for the existing routes in Alternative 3. Under this alternative, 41 sensitive plant sites and suitable habitat areas may be directly or indirectly affected by routes with noxious and invasive weed infestations within 200 feet.

CUMULATIVE EFFECTS

Under Alternative 3, cumulative impacts to sensitive plants on the STF are expected to remain below the threshold in reducing the overall viability for these rare plant species.

Overall, adverse cumulative effects to sensitive plant species in Alternative 3 are not expected to be of the scale that would reduce species viability. Impacts by motor vehicle travel have not been extensively documented in all suitable habitat areas for sensitive plant species on the STF. Continued use on the NFTS will likely continue the level of effects to all of the sensitive plant species within

200 feet of these routes over time. At this time, it is assumed that the cumulative effects, present and foreseeable future management activities, including those from motor vehicle impacts, would not result in a trend toward federal listing for sensitive plants suspected or known to occur within the analysis area.

Alternative 3 has potential direct and indirect effects to approximately 26 percent of all STF documented plant sites and potential indirect effects to their habitats within the analysis area. Under Alternative 3, cumulative effects would continue to impact sensitive plants and their habitats, especially in meadows and on lava caps, with fewer impacts than the other alternatives. Over time, the potential indirect and direct effects caused by the infestations of weedy plant species will increase. While direct effects to sensitive plant species from disturbances caused by these activities has minimally been mitigated by avoidance, indirect effects such as further invasion by noxious weeds has occurred.

Given the magnitude of the disturbance involved in various activities during the past 150 years, it is likely that historic fire suppression, road and trail construction (designed and unauthorized routes), campground construction, other types of recreation activities including OHV use, timber management, salvage activities, reforestation practices, historic grazing and mining activities, and hydroelectric development have degraded suitable habitat. It is also likely that individual sensitive plants were destroyed by these activities and entire occurrences eliminated. While direct effects to sensitive plant species from disturbances caused by these activities has minimally been mitigated by avoidance, indirect effects such as further invasion by noxious weeds has occurred.

For the purpose of this analysis, cumulative effects of past activities are represented within the existing conditions. Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the STF and private lands within the Forest boundary. Some, but not all, of these activities will contribute to effects on sensitive plant and habitat. Within the project area, hazardous fuels reduction and associated timber harvest have occurred on approximately 25,410 acres of NFS land since 2000 (Appendix B). These treatments are anticipated to be the primary activity that will alter forest vegetation and impact sensitive plants and habitat. These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Since 2000, approximately 85,000 acres of NFS lands burned in wildfires. Within the project area, prescribed burning has occurred on about 22,500 acres between 2000 and 2008. CDF lists a total of 2,365 acres of private land within the STF administrative boundary for which timber harvest plans were submitted. On private timberlands, harvest methods include selective thinning and regeneration (clearcut) and then are reforested using herbicides to suppress competing vegetation.

Implementation of Alternative 3 would improve conditions for sensitive plants and their habitats in comparison to the other alternatives by eliminating cross country routes, and by not adding any new routes or facilities. Impacts to sensitive plant occurrences and habitats are taking place and are expected to increase in the foreseeable future due to the predicted increase in motor vehicle use on the STF. This alternative potentially would have the least amount of impacts and effects on sensitive plant occurrences and suitable habitat areas than all of the other alternatives.

Alternative 4 (Recreation)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Cross-Country travel is prohibited in Alternative 4. The routes will be allowed to passively recover. Passive recovery and re-vegetation is expected within a 10 year period. Disturbed areas on shallow soils, particularly above 8,000 feet elevation (cold temperature), will recover more slowly. These changes will have a positive effect on soil conditions as compared to the Alternative 2 (see 3.08 Soil).

With less disturbance from motor vehicles direct impacts would lessened. Competing vegetation as a result of passive recovery may have an indirect effect to sensitive plants and habitat.

Direct impacts to sensitive species from dispersed recreational use could be significant at least at the local, site specific level. The significance of direct and indirect impacts is dependent on many factors including the amount of disturbance, the sensitive species being impacted, and in some cases, the season when the disturbance takes place. The significance of impacts is also dependent on the number of sensitive plant individuals that occur in a specific location and how many of them are damaged.

2. *Additions to the NFTS*

This alternative adds 181.72 miles of unauthorized routes to the NFTS system, including 102 routes within 200 feet of known sensitive plant sites and/or suitable habitat areas. This alternative will have the greatest impact to sensitive plant communities of all of the action alternatives, with potential direct and indirect effects to approximately 123 known sensitive plant sites and suitable habitat areas within 200 feet of additions to the NFTS within the analysis area. Proliferation of unauthorized routes is assumed zero or minor. Use will be discontinued on 65 miles of unauthorized routes

3. *Changes to the Existing NFTS*

Vehicle Class

Vehicle class changes would occur on 371.32 miles of NFTS roads. It is assumed that changing the class of vehicle does not change impacts to sensitive species and watchlist plants/plant communities and that effects from all types of motor vehicles are assumed equal. These roads already have hardened surfaces that lack vegetation. It is likely that direct impacts to sensitive species and watchlist plant communities occurred when the road was developed. Indirect impacts may still be occurring if the sensitive species and watchlist plants/plant communities have survived within 200 feet of the road. These indirect impacts would continue regardless of the type of vehicle using the road.

Season of Use

Alternative 4 provides for season of use on designated NFTS motorized routes. Season of use varies by surface type and route location within 3 different zones. Lower elevations are open all year, middle elevations are open April 1 through December 31, and upper elevations are open April 1 through December 31. The length of time for season of use increases the potential for direct and indirect effects to sensitive plant and other botanical resources under this alternative, in comparison to Alternatives 1 and 5.

Wheeled over Snow use is the same as Alternative 1.

Indicator Measure 1 - Number of sensitive plant sites/ occurrences within 200 feet of wheeled motor vehicle routes

Alternative 4 proposes approximately 181.72 miles of additions to the NFTS, potentially directly or indirectly affecting sensitive plant sites and/or suitable habitat areas. At this time it is unknown what the direct and indirect effects are to undocumented plant occurrences. This alternative has potential to have the greatest impact on sensitive plant species and suitable habitat areas. 123 sensitive plant sites and habitat areas within 200 feet of routes may be affected under Alternative 4.

Based on the assumption that suitable habitat exist along routes in upland and mid slope habitats and lower montane, chaparral, and woodland habitats, fourteen sensitive plant species may be directly or indirectly affected by routes within 200 feet of suitable habitat. These include: Jepson’s onion, Yosemite onion, Nissenan manzanita, big-scale balsamroot, Pleasant Valley mariposa lily, Small’s southern clarkia, Merced clarkia, Tahoe draba, Congdon’s woolly sunflower, Parry’s horkelia, short-leaved hulsea, Tuolumne iris, Yosemite lewisia, and slender-stalked monkeyflower.

Indicator Measure 2 - Number of documented direct impacts to sensitive plant sites/occurrences on either side of route’s edge within 30 feet of motor vehicle routes

This alternative includes 72 documented plant sites along additions to the NFTS that may be directly affected by motor vehicles either driving off-road, parking or camping off-roads. The Biological Evaluation (BE) for Sensitive Plants and Other Botanical Resources shows routes with direct impacts to plants for this alternative (see project record).

The following table represents the number of occurrences for each sensitive plant species that may be directly affected by unauthorized routes added to the system under Alternative 4.

Table 3.02-12 Species and Occurrences within 30 feet of Additions to the NFTS: Alternative 4

Species Name	Occurrences
Kellogss’s lewisia	4
Mariposa clarkia;	2
Small’s southern clarkia	9
Tuolumne fawn lily	4
Hetch-Hetchy (slender-stemmed) monkeyflower	11
three-bracted onion	5
Stebbins’s lomatium	30
Parry’s horkelia	6

Indicator Measure 3 - Miles of motorized routes passing through lava caps

An additional 32.1 miles of motorized routes within lava caps habitat areas have documented sensitive plant sites and suitable habitat. Alternative 4 has the greatest number of routes (a total of approximately 128 routes in lava cap habitat areas, and the largest potential for affects to the three sensitive plant species found growing on lava caps, including Stebbin’s lomatium, Kellogg’s lewisia, and three bracted onion. The three bracted onion (*Allium tribracteatum*) is an endemic occurring on very thin soils in open habitat and is quite vulnerable to OHV activity. This species would be most vulnerable by opening the trails within this habitat in early April (M. Willits, personal communication, January 16, 2009).

Indicator Measure 4 - Miles of motorized routes passing through meadows

This alternative includes 2.1 miles of additions to the NFTS in meadows and riparian areas. Based on the assumption that suitable habitat exist along routes in meadows and riparian areas, seventeen sensitive species, including six mosses, one lichen, five moonworts, Tuolumne fawn lily, Hetch-Hetchy monkeyflower, subalpine fireweed, pansy monkeyflower, and Pilot Ridge fawn lily may be directly/indirectly affected by routes open for public wheeled motor vehicle use through wet areas.

Indicator Measure 5 - Miles of motorized routes infested with invasive plant species within 200 feet of sensitive plant occurrences/ and habitat

Under this alternative, 4 miles and 68 additions to the NFTS are infested with invasive plant species with the potential to affect sensitive plant sites and suitable habitat areas. Forty two known noxious weed infestations are within 200 feet of sensitive plant sites and suitable habitat areas documented for the additions to the NFTS under Alternative 4. Under this alternative, a total of 17 sensitive plant sites/suitable habitat areas are within 200 feet of noxious weed infestations on additions to the NFTS, and 32 sites on existing routes. The two sensitive plant species with the highest number of occurrences with potential direct and indirect effects from noxious weed infestations include the Tuolumne fawn lily and Stebbin’s lomatium. Stebbin’s lomatium has 6 sites within 200 feet of noxious weed infestations, and Tuolumne fawn lily has 5 sites within 200 feet of noxious weed infestations.

CUMULATIVE EFFECTS

Overall, adverse cumulative effects to sensitive plant species from Alternative 4 may or may not be of the scale that could reduce species viability for two of the most potentially affected species, including the Tuolumne fawn lily and Stebbin's lomatium. Stebbin's lomatium grows in lava cap habitat areas, which tend to have the highest number of routes affecting rare plant resources. At least 8 percent of the known sites in the analysis area of Stebbin's lomatium are likely to be adversely affected by motor vehicle use from the additions to the NFTS under this alternative. Approximately 10 percent of the known sites in the analysis area of Tuolumne fawn lily are likely to be adversely affected by motor vehicle use from the additions to the NFTS under this alternative. At this time, it is unlikely that the cumulative effects of present, and foreseeable future management activities, including those from motor vehicle impacts, would result in a trend toward federal listing for Tuolumne fawn lily(CNPS list 1B.2) and Stebbin's lomatium (CNPS 1B.1).

Kellogg's lewisia, has 10 sites documented in the analysis area. Three sites have documented direct impacts from motor vehicle uses on existing motorized routes. In addition, four sites of this plant species may be directly impacted by route additions to the NFTS under Alternative 4. A total of 70% of the known plant sites of this plant species may be directly affected by motorized travel under this alternative. Due to the extended range of this taxon within the Sierra Nevada and the fact that this taxon was only recently listed as sensitive surveys for it have not been extensive, it is determined that the cumulative effects in the analysis area from present and foreseeable future management activities would not likely result in a trend toward federal listing for Kellogg's lewisia (CNPS list 3).

Alternative 4 has the greatest number of additions to the NFTS in lava caps of all the action alternatives. Stebbin's lomatium and Kellogg's lewisia grow in lava cap habitat areas where the highest densities of motorized routes occur in the analysis area. Both of these rare plant species are anticipated to decline in the number of individual plants and plant sites under Alternative 4.

The other meadow-dwelling and riparian sensitive species include the moonworts, the hump-mosses, Bolander's bruchia, Blandow's bog moss and the water-veined lichen. While none of these species are known to be abundant in California, they are wide ranging species thought to be in decline throughout their historic ranges. Even though cumulative effects are likely to occur to these meadow-dwelling sensitive species from present and foreseeable future management activities listed in Appendix B, it is not likely to be a trend toward federal listing for these wide-ranging species.

Alternative 4 also has the highest mileage of weed infested routes, with 33.68 miles of infestations on native surface routes and 29.68 miles of motorized routes are infested with noxious and invasive weed species. Alternative 4 has the potential to affect 49 known sensitive plant sites and suitable habitat areas within 200 feet of weed infested motorized routes. Cumulatively, effects to sensitive plant resources caused by invasive species will be more than Alternative 1. Given the magnitude of the disturbance involved in various activities during the past 150 years, it is likely that historic fire suppression, road and trail construction (designed and unauthorized routes), campground construction, other types of recreation activities including OHV use, timber management, salvage activities, reforestation practices, historic grazing and mining activities, and hydroelectric development have degraded suitable habitat. It is also likely that individual sensitive plants were destroyed by these activities and entire occurrences eliminated. While direct effects to sensitive plant species from disturbances caused by these activities has minimally been mitigated by avoidance, indirect effects such as further invasion by noxious weeds has occurred.

For the purpose of this analysis, cumulative effects of past activities are represented within the existing conditions. Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the STF and private lands within the Forest boundary. Some, but not all, of these activities will contribute to effects on sensitive plant and habitat. Within the project area, hazardous fuels reduction and associated timber harvest have occurred on approximately 25,410 acres of NFS land since 2000 (Appendix B). These treatments are anticipated to be the primary activity that will alter forest vegetation and impact sensitive plants and habitat. These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Since 2000, approximately 85,000 acres of NFS lands burned in wildfires. Within the project area, prescribed burning has occurred on about 22,500 acres between 2000 and 2008. CDF lists a total of 2,365 acres of private land within the STF administrative boundary for which timber harvest plans were submitted. On private timberlands, harvest methods include selective thinning and regeneration (clearcut) and then are reforested using herbicides to suppress competing vegetation.

Implementation of Alternative 4 would improve conditions for those sensitive plant populations and their habitats associated with routes not added to the system. Impacts to sensitive plant occurrences and habitat are expected to increase in the foreseeable future due to the predicted increase in motor vehicle use. Four routes will be mitigated for effects to plants and their habitats in Alternative 4. Monitoring of plant sites, signing and barriers may be implemented where continued impacts from off-road vehicles use are apparent. Compliance efforts may assist in limiting the extent of impacts to the more vulnerable sensitive plant habitats.

Alternative 5 (Resources)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Cross-Country travel is prohibited in Alternative 5. Proliferation of unauthorized routes is assumed zero or minor. Current use will be discontinued on 220 miles of unauthorized routes. The routes will not be added to the NFTS and allowed to passively recover. Passive recovery and re-vegetation is expected within a 10 year period. Disturbed areas on shallow soils, particularly above 8,000 feet elevation (cold temperature), will recover more slowly. These changes will have a positive effect on soil conditions as compared to the Alternative 2 (see 3.08 Soil). With less disturbance from motor vehicles direct impacts would lessened. Competing vegetation as a result of passive recovery may have an indirect effect to sensitive plants and habitat.

Direct impacts to sensitive species from dispersed recreational use could be significant at least at the local, site specific level. The significance of direct and indirect impacts is dependent on many factors including the amount of disturbance, the sensitive species being impacted, and in some cases, the season when the disturbance takes place. The significance of impacts is also dependent on the number of sensitive plant individuals that occur in a specific location and how many of them are damaged.

2. Additions to the NFTS

This alternative includes 31.51 miles of additions to the NFTS, including 8 routes within 200 feet of known sensitive plant occurrences. This alternative will have less of an impact to sensitive plant communities than alternative 1, 2 and 4. Alternative 5 may potentially directly and/or indirectly affect 9 known sensitive plant sites and suitable habitat areas within 200 feet of additions to the NFTS within the analysis area.

Alternative 5 has the least number of additions to the NFTS into meadows and lava cap areas. Alternative 5 also has the least number of additional miles of weed infested routes, including 25.79 miles of weed infested routes being analyzed

3. Changes to the Existing NFTS

Vehicle Class

Vehicle class changes would occur on 531.39 miles of NFTS roads. It is assumed that changing the class of vehicle allowed to use a particular road does not change impacts to sensitive species and watchlist plants/plant communities and that effects from all types of motor vehicles are assumed equal. These roads already have hardened surfaces that lack vegetation. It is likely that direct impacts to sensitive species and watchlist plant communities occurred when the road was developed. Indirect impacts may still be occurring if the sensitive species and watchlist plants/plant communities have survived within 200 feet of the road. These indirect and cumulative impacts would continue regardless of the type of vehicle using the road.

Season of Use

Alternative 5 provides for season of use on designated native and non-native NFTS motorized routes. Lower elevations are open all year, middle elevations are open April 15 through November 15, and upper elevations are open May 15 through November 15. This alternative provides for the greatest protection for botanical resources, including sensitive plant resources, with the longest season of use period in comparison to all of the other alternatives.

Indicator Measure 1 - Number of sensitive plant sites/ occurrences within 200 feet of wheeled motor vehicle routes

Direct and indirect effects may occur to 9 sensitive plant sites and/or suitable habitat areas located within 200 feet of additions to the NFTS open for public wheeled motor vehicle use. Alternative 5 includes approximately 31 additional miles of unauthorized routes that may cause direct/indirect effects to sensitive plant sites and/or suitable habitat areas. The direct and indirect effects that may occur to undocumented plant occurrences and/or suitable habitats under this alternative are unknown.

Based on the assumption that suitable habitat exist along routes in upland and mid slope habitats and lower montane, chaparral, and woodland habitats, fourteen sensitive plant species may be directly or indirectly affected by routes within 200 feet of suitable habitat. These include: Jepson's onion, Yosemite onion, Nissenan manzanita, big-scale balsamroot, Pleasant Valley mariposa lily, Small's southern clarkia, Merced clarkia, Tahoe draba, Congdon's woolly sunflower, Parry's horkelia, short-leaved hulsea, Tuolumne iris, Yosemite lewisia, and slender-stalked monkeyflower.

Indicator Measure 2 - Number of documented direct impacts to sensitive plant sites/occurrences on either side of route's edge within 30 feet of motor vehicle routes

Eight known sensitive plant sites are along additions to the NFTS under Alternative 5 that may be impacted by motor vehicle routes either by driving off road, parking, or dispersed camping. The Biological Evaluation (BE) for Sensitive Plants and Other Botanical Resources shows routes with direct impacts to plants for this alternative (see Project record).

Table 3.02-13 shows the number of sites for each sensitive plant species represents the additions to the NFTS added to the system under Alternative 5.

Table 3.02-13 Species and Occurrences within 30 feet of Additions to the NFTS: Alternative 5

Species Name	Occurrences
Small's southern clarkia	1
three-bracted onion	1
Stebbins's lomatium	4
Parry's horkelia	2

Indicator Measure 3 - Miles of motorized routes passing through lava caps

This alternative includes 6.3 miles of native surface additions to the NFTS within lava cap areas with sensitive plant sites and suitable habitats. Alternative 5 has the least number of additions to the NFTS in lava cap areas of all of the alternatives. The three bracted onion (*Allium tribracteatum*) is an endemic occurring on very thin soils in open habitat and is quite vulnerable to OHV activity. This species would be most vulnerable by opening the trails within this habitat in early April (M. Willits, personal communication, January 16, 2009).

Indicator Measure 4 - Miles of motorized routes passing through meadows

This alternative includes 0.2 miles of additions to the NFTS through meadows (habitat for several sensitive plant species). Based on the assumption that suitable habitat exist along routes in meadows and riparian areas, seventeen sensitive species, including six mosses, one lichen, five moonworts, Tuolumne fawn lily, Hetch-Hetchy monkeyflower, subalpine fireweed, pansy monkeyflower, and Pilot Ridge fawn lily may be directly/indirectly affected by routes open for public wheeled motor vehicle use through wet areas. Alternative 5 provides the most protection of STF meadow and riparian botanical resources of all of the action alternatives.

Indicator Measure 5 - Miles of motorized routes infested with invasive plant species within 200 feet of sensitive plant occurrences/ and habitat

This alternative include 0.02 miles of additions to the NFTS, infested with invasive plant species and the potential to indirectly and directly affect sensitive plant sites and suitable habitat areas. Seven known noxious and invasive weed infestations are within 200 feet of sensitive plant sites and suitable habitat areas documented for the additions to the NFTS under Alternative 5. Five sensitive plant sites are within 200 feet of noxious weeds that may be indirectly or directly affected by infestations additions to the NFTS under this alternative.

CUMULATIVE EFFECTS

Alternative 5 will provide more protection of botanical resources and conservation of sensitive plant sites and suitable habitat areas than Alternatives 1, 2 and 4. Cumulative effects would continue to impact sensitive plants and their habitat, but in a manner that slows the damage incurred from motor vehicle travel. This is mainly due to a reduction in miles of routes open for public wheeled motor vehicle use within and adjacent to suitable habitat areas and plant occurrences, and the prohibition of cross-country travel. Meadow, riparian and other wetland habitats are provided with more protection under Alternative 5, since fewer roads would impact wet habitats, including areas with suitable habitats and sensitive plant occurrences. Lava cap habitat areas will also be provided with more protection, as Alternative 5 has the least number of additions to the NFTS in lava caps. One route includes mitigation measures for direct and indirect affects to plants. Monitoring and compliance efforts would still be necessary to mitigate damage to the most vulnerable sites.

This alternative includes 25.79 miles of motorized routes infested with noxious and invasive weed species. Alternative 5 has the potential to indirectly and directly affect 37 known sensitive plant sites and suitable habitat areas within 200 feet of additional and existing miles of weed infested motorized routes. Cumulatively, potential indirect and direct effects to sensitive plant and other botanical resources caused by invasive species will be less for Alternative 5 than for the Alternatives 1 and 4.

Given the magnitude of the disturbance involved in various activities during the past 150 years, it is likely that historic fire suppression, road and trail construction (designed and unauthorized routes), campground construction, other types of recreation activities including OHV use, timber management, salvage activities, reforestation practices, historic grazing and mining activities, and hydroelectric development have degraded suitable habitat. It is also likely that individual sensitive plants were destroyed by these activities and entire occurrences eliminated. While direct effects to sensitive plant species from disturbances caused by these activities has minimally been mitigated by avoidance, indirect effects such as further invasion by noxious weeds has occurred.

For the purpose of this analysis, cumulative effects of past activities are represented within the existing conditions. Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the STF and private lands within the Forest boundary. Some, but not all, of these activities will contribute to effects on sensitive plant and habitat. Within the project area, hazardous fuels reduction and associated timber harvest have occurred on approximately 25,410 acres of NFS land since 2000 (Appendix B). These treatments are anticipated to be the primary activity that will alter forest vegetation and impact sensitive plants and habitat. These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Since 2000, approximately 85,000 acres of NFS lands burned in wildfires. Within the project area, prescribed burning has occurred on about 22,500 acres between 2000 and 2008. CDF lists a total of 2,365 acres of private land within the STF administrative boundary for which timber harvest plans were submitted. On private timberlands, harvest methods include selective thinning and regeneration (clearcut) and then are reforested using herbicides to suppress competing vegetation.

Although the effects to sensitive plants vary by alternative and the selection of any alternative may contribute to adverse effects on multiple occurrences of sensitive plants, all alternatives, except Alternative 2, represent a diminished risk to sensitive plants than under existing conditions. The six sensitive plant taxa that were most impacted due to the habitat's proximity to routes, will continue to be most at risk in the future. These sensitive taxa include Stebbin's lomatium (Lomatium stebbinsii), Tuolumne fawn lily (Erythronium tuolumnense), three bracted onion (Allium tribracteatum), Kellogg's lewisia (Lewisia kelloggii), Small's southern clarkia (Clarkia australis), and Hetch-Hetchy monkeyflower (Mimulus filicaulis). These six taxa have sites and suitable habitat adjacent to routes included in all the alternatives with the exceptions of Alternative 3, which does not have routes with impacts to Kellogg's lewisia, and Alternative 5, which has routes adjacent to occurrences of four taxa.

Summary of Effects Analysis across All Alternatives

An increase of mileage and number of routes available for public motor vehicle use occurs under alternatives 1 and 4, and will increase the potential for direct and indirect effects to sensitive plants and suitable habitat. Alternatives 3 and 5 will reduce the mileage and number of routes available for use. The reduction in routes and mileage is likely to concentrate OHV use on the routes designated, thereby, increasing the potential for effects to roadside sensitive plant occurrences on those routes. Effects from noxious weeds will continue to occur regardless of which alternative is selected. Alternatives with fewer routes open for public wheeled motor vehicle use, especially those that exclude routes that are weed infested, provide a reduced risk for vectoring of seeds by motor vehicles, and may decrease the spread of weeds to non infested portions of these routes and other parts of the forest. When the motor vehicle use on unauthorized routes ceases, the recovery of native vegetation can be affected by the presence of weeds within and adjacent to that route. Vegetative recovery in areas infested with weeds may not occur if the weeds are not eliminated and desired native vegetation is encouraged (Bard 2004). The amount of time needed for the motorized road or trail to revegetate with native species is dependent on many factors including the type of weed at the site.

Sensitive plant species were adversely affected by roadside brushing, piling and burning, erosion seeding, grading, hazard tree removal, noxious weed introduction and road and culvert failure. Effects of roads on Sensitive plants may occur within the roadside hazard tree removal zone. This zone, which occupies about 14% of the Stanislaus roaded acres, is the area within which roadside hazard tree removal is likely to affect botanical resources.

Continued activities of annual road and trail maintenance such as grading and brushing could have direct effects to sensitive plant populations adjacent to these facilities with narrow road or trail prisms. These plant populations occupy about 2% of the Stanislaus roaded acres.

Stebbin's lomatium and Kellogg's lewisia grow in lava cap habitat areas where the highest densities of motorized routes occur in the analysis area. Both of these rare plant species are anticipated to decline in the number of individual plants and plant sites under all of the Alternatives

Table 3.02-14 gives the summary of effects of motorized routes to Sensitive Plants, Habitats and Noxious Weeds on the within the analysis area.

Table 3.02-14 Botanical Resources Indicator Measures

Indicator Measures	Alternative				
	1	2	3	4	5
Additions to the NFTS with sensitive plant sites within 200 ft	68	0	0	102	8
Additions to the NFTS within meadows (miles)	1.8	0	0	2.1	0.2
Additions to the NFTS through lava caps with known plant sites (miles)	29.3	0	0	32.1	6.3
Routes with sensitive plant sites within 30ft	493	612	410	533	419
Sensitive plant sites with noxious weed infestations within 200 ft	22	41	41	17	5
Weed infested additions to the NFTS (miles)	0.80	0	0	4.0	0.02
Weed infested motorized routes (miles)	26.66	29.52	29.52	33.68	25.79

Table 3.02-15 presents the direct and indirect effects to sensitive plants by alternative for each indicator measure developed. The effects were analyzed for Alternatives 1, 4 and 5 with miles of additions to the NFTS and with total miles of existing and additions to the NFTS for all alternatives.

Table 3.02-15 Direct and Indirect Effects to Sensitive Plants

Sensitive Plant Occurrence Effects	Indicator Measure	Alternative				
		1	2	3	4	5
Sites directly/indirectly affected (w/in 200 ft) by additions to the NFTS	1	83	0	0	123	9
Sites directly/indirectly (w/in 200 ft) affected by total number of routes	1	493	612	410	523	419
Sites directly affected by additions to the NFTS	2	59	0	0	69	8
Sites directly affected by total number of routes	2	111	101	55	123	64
Sites directly/indirectly affected on lava caps by additions to the NFTS	3	31	0	0	36	6
Sites directly/indirectly affected on lava caps by total number of routes	3	43	166	12	48	18
Sites directly/indirectly affected in moist habitats by additions to the NFTS	4	33	0	0	15	0
Sites directly/indirectly affected in moist habitats by total number of routes	4	51	66	18	33	18
Sites directly/indirectly affected by invasive plant infestations (w/in 200 ft) by additions to the NFTS	5	22	0	0	17	5
Sites directly/indirectly affected by invasive plant infestations (w/in 200 ft) by total number of routes	5	63	41	41	58	46

From the results presented in Table 3.02-15, Alternative 5 will have the least amount of impact to unique habitats such as lava caps and meadows, while Alternative 3 will have the least amount of overall indirect and direct impacts to sensitive plant sites. Alternative 2 poses the greatest indirect and direct effects to sensitive plants and suitable habitats along existing routes and to lava cap and moist habitat types. Alternative 4 has the potential for the highest direct impacts of the action alternatives to known sensitive plant sites, while Alternative 1 poses the greatest risk to sensitive plants indirectly and directly affected by routes within 200 feet of areas infested with noxious and invasive plants.

Table 3.02-16 presents the direct effects to sensitive plants and one moss by species as measured by using the numbers in Indicator Measure 3 and adding the proposed alternative numbers from 1, 4 and 5. The effects were analyzed for all of the alternatives including additions to the NFTS and existing routes for Alternative 2.

Table 3.02-16 Direct Effects to Sensitive Plants

Plant Species	**Alternative**				
	1	**2**	**3**	**4**	**5**
Lomatium stebbinsii	26	68	31	30	4
Allium tribracteatum	4	18	5	5	1
Clarkia australis	7	45	39	9	1
Clarkia biloba ssp. australis	2	25	24	2	0
Mimulus filicaulis	9	15	14	11	0
Horkelia parryi	5	19	10	6	2
Erythronium tuolumnense	3	28	12	4	0
Cypripedium montanum	0	4	4	0	0
Mimulus pulchellus	0	15	10	0	0
Lewisia kelloggii ssp. kelloggii	3	3	0	4	0
Eriophyllum nubigenum	0	3	0	0	0
Hydrothyria venosa	0	2	1	0	0
Iris hartwegii ssp.columbiana	0	1	1	0	0
Balsamoriza macrolepis var. macrolepis	0	0	0	0	0
Moss Species					
Bruchia bolanderi	0	2	1	0	0
Additions to the NFTS with Direct Effects to Plant Sites	55	0	0	69	8
total	**210**	**248**	**155**	**224**	**163**

Table 3.02-17 shows the potential for direct impacts to sensitive plants and unique habitat increases with additions to the NFTS under Alternatives 1 and 4, respectively.

Table 3.02-17 Summary of Effects for Botanical Resources

Indicators – Botanical Resources	**Rankings of Alternatives for Each Indicator**[1]				
	1	**2**	**3**	**4**	**5**
Unauthorized routes within or adjacent to sensitive plant sites or within or adjacent to suitable sensitive plant habitat.	3	1	5	2	4
Routes/areas open for public motor vehicle use within or adjacent to sensitive plant sites.	3	1	5	2	4
Routes/areas open for public motor vehicle use with documented disturbances from motor vehicles that resulted in damage to individual sensitive plants or to habitat.	3	1	5	2	4
Density of routes open for motor vehicle use within areas of suitable TES plant habitat where occurrences exist (e.g., lava caps)	1	3	5	2	4
Routes/areas open for motor vehicle use within moist habitats (miles)	1	3	5	2	4
Average for Botanical Resources	**2.2**	**1.8**	**5.0**	**2.0**	**4.0**

[1] A score of 5 indicates the alternative has the least impact on this resource; a score of 1 indicates the alternative has the most.

Compliance with the Forest Plan and Other Direction

All alternatives comply with the Forest Plan S&Gs for botanical resources.

Sensitive Plant Mitigations

Four routes require mitigation measures because of impacts to the sensitive plants and habitats. These routes are within the Deer Creek area with impacts to the Tuolumne fawn lily, and also the Stebbin's lomatium occurrences in one area.

- 15EV38 – rock barriers to be placed 50 feet at base of incline to deter vehicles from sensitive plants; Recommend accurately mapping and monitoring occurrence 16-9D of Tuolumne fawn lily (Alternatives 1, 4 and 5).
- 16EV108 – log barriers to be placed 50 feet at base of hill climb to prevent trail access and widening, and access to lava cap and lomatium occurrence. Tractor is not recommended and barrier type would require no digging (Alternatives 1 and 4).
- 16EV209 – rock barriers 740 feet along creek and occurrence; Recommend survey, mapping, and monitoring Tuolumne fawn lily occurrences (Alternative 4).
- 16EV265 - rock barriers 182 feet along occurrence of Tuolumne fawn lily to prevent further impacts from vehicles and weed disbursement (Alternatives 1 and 5).

3.03 Cultural Resources

The Congress in 1966 declared a 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 policy 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 cultural resources and avoiding unnecessary damage to them. Many cultural resources 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) (Cultural Resources). The 36 CFR 212 (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 lands (36 CFR 212.55(a), 212.55(b)(1)).

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

Direction relevant and specific to the proposed action as it affects cultural resources includes:

The Forest Service is directed to identify, evaluate, treat, protect, and manage cultural resources by several laws. However, the NHPA, as amended (16 U.S.C. 470 et seq.), 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 cultural resources in Federal land management decisions.

The NHPA 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 (ACHP) regulations (36 CFR 800) implements NHPA Section 106. NHPA Section 110 sets inventory, nomination, protection, and preservation responsibilities for Federally-owned cultural resources.

The Forest Service policy for compliance with Section 106 of the NHPA in travel management with respect to route designation for motor vehicle use was issued in 2005: *USDA Forest Service Policy for Section 106 of the NHPA Compliance in Travel Management*: Designated Routes for Motor Vehicle Use (project record). This policy was developed in consultation with the Advisory Council on Historic Preservation. It outlines minimal requirements for considering possible effects to cultural resources 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 cultural resources, 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. Region 5 has such an agreement: *Programmatic Agreement among the USDA Forest Service, Pacific Southwest Region, USDA Forest Service,* *Intermountain Region's Humboldt-Toiyabe National Forest, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Designating Motor Vehicle Routes and Managing Motorized Recreation on the National Forests in California* (Motorized Recreation PA) (project record). This agreement defines the Area of Potential Effects (APE) (36 CFR 800.4(a)(1)) and includes a strategy outlining the requirements for cultural resource inventory, evaluation of cultural resources, 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.

The Stanislaus National Forest cultural resource specific S&Gs are described below (see Appendix C).

- Complete a cultural resource inventory prior to any land disposal action or any Forest or Forest-permitted or assisted action, activity or program that has the potential of altering prehistoric or historic cultural values to identify all potentially eligible cultural properties which may be affected (36 CFR 219.24).
- Consult with members of the potentially affected local Native American community to identify specific locations and issues.
- Assess the scientific, historic and ethnic significance for each cultural property before determining further treatment (36 CFR 219.24).
- Use appropriate Programmatic Agreements and Treatment Plans whenever possible.
- Apply the National Register of Historic Places criteria in 36 CFR 60 and regulations in 36 CFR 63 to determine the eligibility of a cultural property to the National Register.
- Use FSM 2361, FSM 1680, and Advisory Council on Historic Preservation's "Treatment of Archaeological Properties: A Handbook", and the traditional values of local Miwok, Washoe and Paiute Indian communities as guidelines for evaluating significance.
- Evaluate the effect of Forest undertakings on the resource.
- Apply the Criteria of Effect in 36 CFR 800, and follow FSM 2361 for determining the effect of an undertaking.
- All identified cultural resources are to be protected until they are evaluated. The integrity and significant values of eligible properties and National Historic Landmarks are to be protected. When necessary, mitigative excavation or data recovery may be accomplished.
- Use the guidelines in FSM 2361 and FSM 1680 for developing and implementing protective measures.
- Comply with 36 CFR 800 regulations and follow the guidelines in 36 CFR 66, FSM 2361, and the 13 principles in the "Treatment of Archaeological Properties" Handbook (ACHP).
- Utilize law enforcement patrols to help prevent site vandalism and conduct law enforcement investigations when cultural resources are impacted using ARPA, 36 CFR 261.9, and other applicable laws and regulations.
- Plan interpretation, research and restoration projects for the benefit of the public and of cultural resources.
- Treatments of cultural properties, including maintenance of cultural resources, should be appropriate to their assessed values (as documented in the Statement of Significance in the Request for Determination of Eligibility and National Register nomination form), the state of knowledge and methods of cultural resource disciplines, and the public interest.

- The significant values of National Register and eligible historic structures shall be conserved by physical protection and maintenance or recording to professional standards if physical preservation is not possible.
- Work with Interpretive Services to develop high quality brochures, publications and/or audio-visual presentations. Work with cooperators to develop high quality interpretive, stabilization, and/or restoration projects.
- Encourage the Sierra Miwok, Washoe, and Mono Lake Paiute to contribute to the Forest's cultural resource management activities, to enhance public understanding of their traditional and contemporary cultures.

Effects Analysis Methodology

Assumptions Specific to Cultural Resources

1. Unauthorized, user-created routes and areas have already affected cultural resources within route/area prisms.
2. Historic railroad grades and roads being used as routes were built for the purposes of travel and continued use of them will cause no effect.
3. 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.
4. Given identical environmental variables, no measurable difference in potential impacts to cultural resources exists between that generated by different vehicle classes (i.e., full-size four-wheel drive vehicles, off-road vehicles and motorcycles).
5. According to the Motorized Recreation PA, all archaeological and historical sites identified within the APE for all alternatives adding facilities to the National Forest’s Transportation System (NFTS) are considered cultural resources for the purposes of this undertaking, unless they already have been determined not eligible in consultation with the SHPO or through other agreed on procedures (36 CFR 60.4; 36 CFR 800).
6. Changing vehicle class or season of use is not considered an undertaking subject to the NHPA. However, opening a road to public vehicle use when it was closed previously due to a resource conflict is considered an undertaking.
7. Changes to the existing NFTS, when combined with the past, present and foreseeable future actions are not expected to cumulatively lead to increased impacts to cultural resources.
8. Wheeled over snow use has no measurable potential impact to cultural resources.

Data Sources

1. Site-specific cultural resource inventories. The Forest conducted cultural resources field surveys for this undertaking throughout 2004–08. The primary objectives of these surveys were to identify cultural resources in the APE that may be affected by the undertaking and collect information on their current condition.
2. Existing information from cultural resource records, historic archives, maps, and GIS spatial layers was also used.

Cultural Resources Indicators

1. Degree to which the integrity of historic property values are diminished.
2. Number of cultural resources within unauthorized routes at risk from ongoing use.
3. Average number of cultural resources per acre at risk if new routes or areas are created.

Cultural Resources Methodology by Action

1. Direct and indirect effects of the prohibition of cross country motorized vehicle travel

Short-term timeframe: 1 year

Long-term timeframe: 20 years.

Spatial boundary: Forest scale where motor vehicle use is not already prohibited by law (e.g., wilderness).

Indicator(s): Number of cultural resources within unauthorized routes at risk from ongoing use.

Methodology: GIS analysis to identify: (1) the number of cultural resources at risk within existing unauthorized routes (estimate of on-going direct and indirect effects curtailed); and (2) the average number of cultural resources 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.

2. Direct and indirect effects of adding facilities to the NFTS including identifying seasons of use and vehicle class

Short-term timeframe: 1 year

Long-term time frame: 20 years

Spatial boundary: Location of historic property.

Indicator(s): Degree to which the integrity of historic property values are diminished, related to: location, design, setting, materials, workmanship, feeling, or association.

Methodology: Use existing data from cultural resource site atlas, historic archives, maps, site record files, and GIS spatial layers, and information obtained from archaeological inventories of unauthorized routes, to identify cultural resources in the APE that may have direct or indirect effects.

Rationale: Motorized Recreation PA.

3. Direct and indirect effects of changes to the existing NFTS including identifying seasons of use and vehicle class

Changing vehicle class and/or season of use are not considered an undertaking subject to NHPA Section 106 compliance (USDA Forest Service Policy for Section 106 of the NHPA Compliance in Travel Management: Designated Routes for Motor Vehicle Use (2005)). Motorized vehicles can already use NFTS roads. Allowing or prohibiting non-highway vehicle use will have no direct, indirect, or cumulative effect on cultural resources. However, opening a road that was previously closed due to conflicts with cultural resources is considered an undertaking.

Short-term timeframe: 1 year

Long-term time frame: 20 years

Spatial boundary: Location of historic property.

Indicator(s): Degree to which the integrity of historic property values are diminished, related to: location, design, setting, materials, workmanship, feeling, or association.

Methodology: Use existing data from cultural resource site atlas, historic archives, maps, site record files, and GIS spatial layers, and information obtained from archaeological inventories of unauthorized routes, to identify cultural resources in the APE that may have direct or indirect effects.

Rationale: Motorized Recreation PA.

4. Cumulative Effects

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

Long-term timeframe: 20 years

Spatial boundary: Forest 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 cumulative effects.

Rationale: Motorized Recreation PA.

Affected Environment

Cultural resources are archaeological, cultural, and historical legacies from our past that are more than 50 years old. Cultural resource information, combined with environmental data, can illuminate past relationships between people and the land. Cultural-ecological relationships, the result of both natural processes and approximately 10,000 years of human interaction in the central Sierra Nevada, are key topics in this region’s anthropological, archaeological, and historical research.

The Forest currently contains 4,538 recorded prehistoric and historic archaeological sites (cultural resources). The vast majority of these (2,708) represent prehistoric Native Americans and ethnographic Miwok and Washoe land use. These include seasonal villages, temporary camps, toolstone quarries, and bedrock mortar milling locations. Today, the Miwok still actively use the Forest for gathering traditional food and medicine plants, hunting, and conducting ceremonies.

There are 1,501 recorded sites representing historic land use of the Forest. These include emigrant trails, historic cabins, roads, bridges, lumber or mining complexes and camps, ditches, homesteads, grazing camps, arbor glyphs (tree carvings), railroad grades, trestles, mining shafts and adits, and Forest Service administrative buildings and compounds. All of the historic sites found in the Forest, date from ca. 1846 to the present. Historic sites provide many opportunities for interpretation and public appreciation.

Since people today favor many of the areas preferred by Native people, there are 329 sites that have both a prehistoric and historic component.

Existing Conditions

This project constitutes one of the Forest’s largest Section 106 compliance projects ever undertaken. The scale of this undertaking required that extensive field surveys be conducted to identify cultural resources in the APE that may be affected by the undertaking and collect information on their current condition. Cultural resources specialists conducted field surveys throughout the summers of 2004–08. They also reviewed existing archaeological, historic, and ethnographic literature in the Forest’s Heritage Program files. The results of the cultural resource surveys and information from the Heritage files were used in the following analysis.

A cultural resources report on file with the Forest includes all of the data collected for this project (USDA 2008a). The report includes a site-specific analysis of the cultural resources associated with all routes or areas being considered for addition to the NFTS. No previously unidentified cultural resource sites were located during field surveys. In addition, sites were monitored and their current condition documented. The report provides background information, outlines the methodologies employed, describes the condition of cultural resource sites, describes results, and includes cultural resource site records. Route specific survey coverage was entered into the forest's digital Geographic Information Software (GIS) files.

The primary objectives of this project from its inception in 2004 have been to identify cultural resources in the APE that may be affected by the undertaking and collect information on their current condition. Surveys consisted of pedestrian transects conducted according to methods and standards mandated in the Motorized Recreation PA. The data reported in this section are reported at the forest-wide scale. As compiled and reported here, the data basically describe current conditions as reflected by the No Action Alternative.

The Motorized Recreation PA includes an identification strategy outlining cultural resource inventory requirements for most routes and areas considered for addition to the NFTS (project record). The current status of the cultural resources field survey is tabulated in Table 3.03-1. The Forest has calculated that 181.72 miles of unauthorized routes are being analyzed as potential additions to the NFTS. A total of 169.91 miles of routes had been surveyed prior to August 2008 at various periods in the past for both unrelated Forest undertakings and for associated OHV projects). The remaining 11.81 miles were surveyed in September and October 2008.

Table 3.03-1 Status of Cultural Resources Survey within APE

Item	Miles
Routes Previously Surveyed	169.91
Routes Surveyed for this project	11.81
Routes Unsurveyed	0
total	**181.72**

The existing condition of cultural resources in the APE provides baseline information in assessing the potential effect of adding routes to the NFTS. The first-order indicator of existing conditions is the total number of cultural resources located within the project APE—regardless of effects. Seventy-seven cultural resources have been identified within the APE forest-wide (Table 3.03-2). The sum includes all properties where any segment of an unauthorized route bisects the boundary of a historic property, regardless of scale or impact.

All cultural resources sites that have not been determined eligible for the NRHP are being considered eligible for the purposes of this undertaking unless they have previously been determined not eligible (project record). The process of completing evaluations of significance for the NRHP is often a time consuming and expensive undertaking. For that reason very few cultural sites have formally been evaluated. The current NRHP status of all sites located within the APE are reported in Table 3.03-2.

In addition to the procedures in the Motorized Recreation PA addressing potential effects, the integrity measures listed in the adverse effect criteria at 36 CFR 800.5(a) were also used to characterize the severity of any identified effects:

> ***Criteria of adverse effect****: an adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's* ***location, design, setting, materials, workmanship, feeling, or association****.[emphasis added] Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative. (36 CFR §800.5(a))*

Different disturbance agents can combine in a variety of ways to create a potential threat to cultural resources. The results of field survey and the literature search demonstrated a number of potential adverse effects to cultural resources should certain routes be added to the NFTS. The analysis documented both direct effects of designating specific routes (caused by the action and occur at the same time and place) as well as indirect (caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable). The more common threats identified are summarized in Table 3.03-3. The list is not exhaustive. Other disturbances have been noted, but those threats specified in Table 3.03-3 constitute the most common disturbances documented.

The undertaking's effect on the integrity of each of the 77 cultural resource sites currently identified in the APE was determined. Available data were reviewed for each cultural resource site in order to determine whether or not the proposed addition of any route to the NFTS would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Table 3.03-2 Cultural Resources within APE

Site ID	Site Type	NRHP Status	Site ID	Site Type	NRHP Status
05165100023	prehistoric	unevaluated	05165100896	historic	unevaluated
05165100024	multi-component	unevaluated	05165100934	historic	unevaluated
05165100067	multi-component	unevaluated	05165100941	historic	unevaluated
05165100097	multi-component	unevaluated	05165100974	historic	unevaluated
05165100101	prehistoric	unevaluated	05165100976	prehistoric	unevaluated
05165100114	historic	unevaluated	05165101040	historic	unevaluated
05165100118	multi-component	unevaluated	05165101117	historic	unevaluated
05165100120	multi-component	unevaluated	05165101233	historic	eligible
05165100122	multi-component	unevaluated	05165200216	historic	unevaluated
05165100144	multi-component	unevaluated	05165200427	prehistoric	unevaluated
05165100156	multi-component	unevaluated	05165200826	prehistoric	unevaluated
05165100171	multi-component	unevaluated	05165400019	multi-component	contributing
05165100173	prehistoric	unevaluated	05165400031	historic	unevaluated
05165100228	multi-component	unevaluated	05165400034	prehistoric	unevaluated
05165100244	multi-component	unevaluated	05165400039	prehistoric	unevaluated
05165100257	prehistoric	unevaluated	05165400102	prehistoric	contributing
05165100263	historic	unevaluated	05165400120	multi-component	unevaluated
05165100270	multi-component	unevaluated	05165400193	multi-component	unevaluated
05165100282	historic	unevaluated	05165400232	prehistoric	unevaluated
05165100287	prehistoric	unevaluated	05165400285	prehistoric	unevaluated
05165100288	historic	unevaluated	05165400288	prehistoric	unevaluated
05165100302	prehistoric	unevaluated	05165400297	prehistoric	eligible
05165100303	historic	unevaluated	05165400351	prehistoric	unevaluated
05165100304	prehistoric	unevaluated	05165400404	historic	unevaluated
05165100388	prehistoric	unevaluated	05165400418	historic	unevaluated
05165100389	prehistoric	unevaluated	05165400433	prehistoric	unevaluated
05165100394	multi-component	unevaluated	05165400486	multi-component	unevaluated
05165100444	historic	eligible	05165400504	historic	unevaluated
05165100598	historic	unevaluated	05165400527	historic	contributing
05165100599	historic	unevaluated	05165400638	prehistoric	unevaluated
05165100612	prehistoric	unevaluated	05165401007	prehistoric	unevaluated
05165100625	historic	eligible	05165401009	historic	unevaluated
05165100638	historic	unevaluated	05165401283	prehistoric	unevaluated
05165100639	historic	unevaluated	05165401320	prehistoric	unevaluated
05165100646	historic	unevaluated	05165401359	prehistoric	unevaluated
05165100647	historic	unevaluated	05165401660	prehistoric district	eligible
05165100680	historic	unevaluated	05165401661	historic district	eligible
05165100690	prehistoric	unevaluated	05165401663	historic	unevaluated
05165100737	historic	unevaluated			

Table 3.03-3 Examples of Site Disturbances Documented within Project APE

Indirect Effects	Direct Effects
- Driving off-established routes onto cultural sites - Motorized vehicle camping-related activities (e.g., digging fire pits) within boundaries of cultural sites that contain significant cultural features. - Motorized vehicle camping on site where the occupants conducted illicit digging activities within prehistoric and historic site boundaries.	- Routes bisect a primary locus in a prehistoric cultural resource site. - Routes promote direct vehicle contact with architectural features. - Routes promote direct vehicle contact with resource-procurement features

The magnitude of any effect to a cultural resource site's integrity determines the severity of any direct, indirect, or cumulative effects. The following effect analysis identifies the scale and severity of potential adverse effects. Accordingly, effects are categorized based on a professional assessment of the data available to date: no/negligible, minor, moderate, and major. These categories represent a progressive scale that provides a qualitative assessment of the severity of any direct, indirect, or cumulative effects to the integrity of a cultural resource site.

No distinction is made between "no" disturbance and "negligible" disturbance. All sites determined to be within the APE have been bisected in varying degrees by some route or area. Therefore it is more appropriate to describe the most innocuous effects as "negligible" as opposed to "none." In either case, the threat to cultural resources is minimal and no mitigation measures are required.

Working definitions for the four severity categories are provided in Table 3.03-4. A severity rating of "minor" indicates that some relatively minor disturbance has been noted within the boundaries of cultural resource site. A "minor" value indicates that, if present patterns of use are indicative of future trends, direct and indirect effects can most likely be avoided by employing the simplest of protection measures. In most cases this will consist of installing signage in strategic locations informing the public of the presence of sensitive forest resources. In some locations, it may be necessary to prohibit motorized vehicle camping or use to eliminate the threat.

If a cultural resource site is "moderately" susceptible to direct, indirect or cumulative effects, evidence of more extensive site disturbance has been noted. In this case, mitigation measures to avoid or minimize identified effects are required. Prescribed mitigation measures for moderate severity effects will most often take the form of physical barriers that prohibit off-route travel that could adversely affect cultural resources. Materials used may consist of timber, boulders, vegetation or other materials, or a combination thereof. A number of alternative mitigation measures could be employed, many of which are expressly described in the Motorized Recreation PA (project record). In the event that the mitigation measures listed in the Motorized Recreation PA are inadequate or untenable, the PA will no longer apply and compliance with 36 CFR §800 regulations will be necessary.

An effect severity rating of "major" indicates that the integrity of cultural resource site values would be affected in a significant way unless appropriate mitigation measures are implemented. A "major" value is reserved for those cases where a cultural resource site exhibits evidence of an adverse effect associated with past activities either directly or indirectly associated with the motorized use of an unauthorized route and these adverse effects will continue or increase if the route or area is added to the NFTS. Mitigation measures associated with direct or indirect effects of "major" severity require a substantial investment of time and resources to implement.

Table 3.03-4 Severity of Effects

Severity of Effects	Working Definition	Explanatory Notes
Negligible	Cultural resources are adjacent to routes but are not bisected or route bisects some portion of the site, but the effect on NRHP values is insignificant	If the effect on integrity measures is determined to be “negligible,” there is essentially no measurable effect on the cultural resource; therefore no mitigation measures are prescribed. No distinction is made between “no” disturbance and “negligible” disturbance. All sites determined to be within the APE have been bisected in varying degrees by some length of an unauthorized route. Therefore it is more appropriate to describe the most innocuous effects as “negligible” as opposed to “none.” In either case, no mitigation measures are necessary, so the outcome is identical.
Minor	Effects on cultural resources are relatively minor, but not insignificant. Integrity of the NRHP values may diminish if measures are not taken to alleviate the potential effect.	If the severity of effect is determined to be “minor,” some type of mitigation measure may be required. In most cases the preferred method of protection will be the erection of signs with wording to the effect that there are critical resource concerns in the area and certain activities (for example, camping) may be prohibited in localized areas. Most minor problems consist of indirect effects. In some cases, monitoring is prescribed to ensure that the minor degree of disturbance (or potential for disturbance) initially noted does not increase in severity over time. It is assumed for minor effects that an adaptive management strategy will be employed—a prescription specifically outlined in the Motorized Recreation PA. Signs, for example, may be erected as a first measure. If signs do not curtail potential adverse actions, more aggressive measures will be taken. Barriers (such as low impact barriers) are sometimes prescribed for minor threats when it appears as though the action responsible for the disturbance is well entrenched and not likely to be curtailed by the simple installation of a sign. The threshold between a “minor” and “moderate” threat is therefore more subjective than others.
Moderate	Effects on cultural resources are either localized or noted in multiple areas. Materials associated with NRHP values exhibit some degree of damage or alteration, but NRHP integrity can be retained or improved if the detrimental activity is curtailed	If the integrity measure is determined to be “moderate,” some types of mitigation measures are required. In most cases the preferred method will be to erect a barrier large enough to prohibit vehicle traffic off the designated route, thereby eliminating the potential for an adverse effect to cultural resources. Padding of the cultural material in order to eliminate potential effect is also an option.
Major	Effects on cultural resources are severe. If that particular route is added to the system without mitigation measures, the action would result in adverse effects to the NRHP values.	If the effect is determined to be “major,” more complex and potentially costly mitigation measures are required to prevent direct adverse effects to the resource. In some cases, potential mitigation measures can not be determined without additional consultation under 36 CFR §800 and evaluation against the NRHP criteria. Due to costs, the only viable option may be to not add the route to the system or re-route the activity around the resource.

Table 3.03-5 provides a summary of the effects to cultural resources based on an analysis of effects to site integrity. The data categorize current forest-wide severity of effects if no action is taken to avoid adverse effects. Several sites have multiple routes within their boundaries that have a range of effects. For purposes of this table, only the most serve effect is counted for each site.

Table 3.03-5 Cultural Resource Effect Severity

Negligible	Minor	Moderate	Major	Total
44	2	12	19	77

The mitigation measures initially prescribed may qualify as the minimal actions necessary to alleviate potential adverse effects. The Motorized Recreation PA mandates that all “at-risk” properties within the APE be monitored over a two-year period after designation (project record). If monitoring demonstrates that mitigation measures initially prescribed prove ineffective, other protection measures in the PA will be used as appropriate or the SHPO will be consulted to identify other resource protection or management needs. This type of adaptive management policy is listed as an option in the Motorized Recreation PA (project record).

Environmental Consequences

Alternative 1 (Proposed Action)

Direct and Indirect Effects

Under this alternative, cross country travel is prohibited and a total of 157.39 miles of unauthorized routes (458 routes in total) would be added to the system. Of these, 71 cultural resource sites fall within the APE of 69 proposed routes. If these routes are added to the system, 35 routes would have would have a negligible/minor effect on 42 sites. Fourteen routes would have a moderate effect on 13 sites. Twenty-two routes would have a major effect on 17 sites.

Of the 13 sites with moderate effects, the use of low impact barriers or padding will reduce or eliminate the effects.

Of the 17 sites with major effects, the direct and indirect causes can not be reasonably mitigated without additional NHPA Section 106 consultation with SHPO (see Table 3.03-6). The routes range in length of between 0.02-0.84 miles. Estimated costs for mitigation (NRHP evaluation, archaeological data recovery, and then additional mitigations based on those findings [e.g., barriers, fencing, monitoring]) could range between $10,000 for smaller sites to $25,000 for larger complex sites. Consultation with SHPO is needed to refine mitigation requirements and respective costs, and this information will be included in the FEIS/ROD.

The locations of mitigations prescribed by other disciplines (soils, botany, etc.) were examined and none will cause any negative effect to cultural resources.

Changes to Existing NFTS: This alternative proposes to convert 69.11 miles of ML1 roads (113 routes in total) for use as trails open to all vehicles. Two sites are within the APE of two routes. One site is being moderately affected but can be mitigated through the use of barriers. One site has a major effect and will require further consultation with SHPO before the route could be opened (see Table 3.03-9).

Table 3.03-6 Summary of Effects to Cultural Resources: Alternative 1

Route ID	Site Number	Type	Nature of Effect	Severity	Protection/Mitigation
11808B	05165400418	direct/indirect	looting and camping	major	additional consultation with SHPO required
15EV43G	05165100444	none	none	negligible	n/a
15EV47A	05165100282	direct	bisected	negligible	n/a
16E182	05165100118	direct	bisected	negligible	n/a
16E182A	05165100118	direct	bisected	negligible	n/a
16EV154	05165100896	direct	none	negligible	n/a
16EV160	05165100114	none	none	negligible	n/a
16EV176	05165100156	none	none	negligible	n/a
16EV230	05165100302	none	none	negligible	n/a
16EV230	05165100304	none	none	negligible	n/a
16EV243	05165100690	direct	bisected and damaged	moderate	use padding (52 x 3 feet) to protect site
16EV259A	05165100257	direct	bisected and damaged	moderate	use padding (300 x 4 feet) to protect site
16EV266	05165100244	direct	bisected and damaged	moderate	use padding (300 x 4 feet) to protect site
16EV269	05165100287	direct	bisected	negligible	n/a
16EV272	05165100974	none	none	negligible	n/a
16EV272	05165101040	none	none	negligible	n/a
16EV303	05165100976	direct	bisected	negligible	n/a
16EV79	05165100288	direct	bisected	negligible	n/a
16EV79	05165100303	direct	bisected	negligible	n/a

Route ID	Site Number	Type	Nature of Effect	Severity	Protection/Mitigation
16EV79	05165100263	direct	bisected	negligible	n/a
16EV81	05165100270	indirect	off route travel	moderate	use low impact barriers (100 feet on each side of route) to keep users out of Feature One
17EV130	05165200826	indirect	off route travel	moderate	use low impact barriers (300 feet on north side of route) to keep users on route
17EV14	05165100612	direct/indirect	bisected and damaged	moderate	use low impact barriers (246 feet on each side of route) to keep users on route
17EV15B	05165100171	indirect	camping	moderate	use low impact barriers (50 feet on each side of route) to keep users on route and prevent parking
17EV192	05165400120	direct	off route travel	moderate	use low impact barriers (100 feet on each side of route) to keep users on the route
17EV192A	05165400120	direct	off route travel, rutting, damage, and camping	major	additional consultation with SHPO required
17EV241	05165100941	none	none	negligible	n/a
17EV249	05165100638	direct/indirect	rutting, damage, and camping	major	additional consultation with SHPO required
17EV249A	05165100638	direct/indirect	rutting, damage, and camping	major	additional consultation with SHPO required
17EV267	05165100144	direct/indirect	rutting, damage, and camping	major	additional consultation with SHPO required
17EV268	05165100144	direct/indirect	rutting, damage, and camping	major	additional consultation with SHPO required
17EV51	05165100599	none	none	negligible	n/a
17EV58	05165100173	direct	none	negligible	n/a
17EV901	05165400120	direct	bisected and damage	moderate	use low impact barriers (100 feet on each side of route) to keep users on the route
18EV105	05165100023	indirect	damage	minor	signage (No Motor Vehicles or camping)
18EV258	05165100024	direct/indirect	looting, rutting, damage, and camping	major	additional consultation with SHPO required
18EV281	05165100388	direct/indirect	rutting, damage, and camping	major	additional consultation with SHPO required
18EV283	05165100394	none	none	negligible	n/a
18EV308	05165100737	direct/indirect	rutting, off route travel, vandalism, damage, and camping	major	additional consultation with SHPO required
18EV67	05165100097	direct/indirect	bisected, damage, and camping	moderate	use low impact barriers (50 feet on each side of route) to define route and block camping area, signage (No Motor Vehicles or camping)
18EV67	05165100101	none	none	negligible	n/a
1S1727	05165400486	direct	off route travel	moderate	use low impact barriers (100 feet on north side of route) to keep users on route
1S1736	05165400285	direct	off route travel	moderate	use low impact barriers (1300 feet on each side of route) to keep users on route
1S1933	05165400193	indirect	looting	moderate	use low impact barriers (500 feet on each side of route) to keep users on route, signage (No Motor Vehicles or camping)
EV681	05165100389	direct	bisected	negligible	n/a
FR10178	05165400527	none	none	negligible	n/a
FR10178	05165401661	none	none	negligible	n/a
FR14721	05165401663	none	none	negligible	n/a
FR8165	05165401359	direct	damaged	major	additional consultation with SHPO required
FR8601	05165400404	direct	off route travel	moderate	use low impact barriers (200 feet on each side of route) to keep users on route
FR9501	05165200427	direct	bisected	negligible	n/a

Route ID	Site Number	Type	Nature of Effect	Severity	Protection/Mitigation
FR98477	05165401007	direct	bisected	negligible	n/a
FR98477	05165401009	direct	bisected	negligible	n/a
FR98481	05165400102	direct/indirect	looting, damaged, and camping	major	additional consultation with SHPO required
FR98482	05165400039	direct	damaged	major	additional consultation with SHPO required
FR98493	05165400232	direct	damaged	major	additional consultation with SHPO required
FR98504	05165400031	direct	bisected	negligible	n/a
FR98507	05165400034	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98507	05165400351	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98508	05165400288	direct	bisected	negligible	n/a
FR98523	05165400433	direct	bisected	negligible	n/a
FR98541	05165400297	direct/indirect	rutting, damage, and camping	major	additional consultation with SHPO required
FR98544	05165401320	direct	bisected	negligible	n/a
FR98547	05165401283	direct	bisected	negligible	n/a
FR98552	05165400034	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98552	05165400351	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98554	05165400019	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98554	05165401660	none	none	negligible	n/a
FR98566	05165400504	none	none	negligible	n/a
FR98592	05165400638	direct	bisected	negligible	n/a
FR98603	05165100067	indirect	off route travel and camping	minor	signage (No Motor Vehicles or camping)
FR98612	05165100122	direct/indirect	damaged	major	additional consultation with SHPO required
FR98616	05165100646	indirect	none	negligible	n/a
FR98616	05165100680	none	none	negligible	n/a
FR98616	05165101233	none	none	negligible	n/a
FR98663	05165200216	none	none	negligible	n/a
FR98671	05165400486	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98686	05165100228	indirect	camping	negligible	n/a
FR98690	05165100144	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98691	05165100144	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98704	05165100120	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required

Note: although there are no direct and indirect effects currently known, the following sites are near routes and should be monitored for effect: 05165100411, 05165400093, 05165400094, 05165400106, 05165400108, and 05165401240.

Cumulative Effects

Prior to the 1974 Forest and Rangeland Renewable Resources Planning Act (RPA), effects to heritage resources were not considered during project planning or implementation. Consequently, cumulative impacts of varying degrees occurred within the project area from various land management activities including mining, logging, road construction, recreation development, dam construction, and hydroelectric development to name a few. Stochastic effects, such as natural environmental processes and unrestricted land uses, have also contributed to effects to heritage resources within the project area. These include dispersed recreation, looting and vandalism by the public, unregulated OHV use, illegal mountain bike trail construction, mining, previous road and trail construction and existing road and trail conditions, wildfires, erosion, and exposure to the elements.

Subsequent to the 1974 RPA, the vast majority of cultural resources were protected using “flag and avoid” measures. Unfortunately, this management practice, which is essentially deferred management, has resulted in a high number of recorded archaeological sites that have not been evaluated for inclusion into the NRHP resulting in the Forest managing hundreds of sites that may be not eligible for inclusion.

All projects listed in the Reasonably Foreseeable Future Actions Considered in Cumulative Effects Analysis (Appendix B) have been or will be subject to NHPA Section 106 compliance and potential effects to cultural resources would be identified at that time following stipulations in the *Programmatic Agreement Among the USDA Forest Service, Pacific Southwest Region, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Identification, Evaluation and Treatment of Historic Properties Managed by the National Forests of the Sierra Nevada, California* (Sierra PA; USDA 1996).

This alternative, when combined with the past, present and foreseeable future actions and events are not expected to cumulatively lead to increased impacts to cultural resources.

Alternative 1 will reduce potential effects to cultural resources through prohibition of cross country travel and the reduction in the number of motorized routes on the Forest. Unregulated cross country travel has the greatest potential for creating adverse impacts to cultural resources making the route designation process an important part of preventing long-term impacts to resources.

Alternative 2 (No Action)

Direct and Indirect Effects

Under this alternative, cross country travel would not be prohibited. There would be no management of any known unauthorized motorized routes. An untold number of additional routes not being proposed in this project would continue to be used. Using Alternative 4 as a guide, there are 77 cultural resource sites located within the APE of the 181.72 miles proposed for addition; thirty-one of which are having moderate/major effects. Since cross country travel could occur anywhere on the forest, an unknown number of cultural resources, greater than 31, could be affected. This alternative does not propose any mitigation for these potential affects. Since Alternative 2 would have unmitigated adverse effect on an unknown number of cultural resources, it would not meet the requirements of Section 106 of the NHPA.

Cumulative Effects

This alternative, when combined with the past, present and foreseeable future actions are expected to cumulatively lead to increased impacts to cultural resources. Alternative 2 will increase the potential effects to cultural resources by allowing cross country travel. Over the next 20 years, it is estimated that an additional 2.25 miles of new routes will be created annually on the Forest, for a total of 45 new miles of unauthorized motorized routes (project record). An additional 50 cultural resource sites could be subject to moderate/major effects based on these projections.

Alternative 3 (Cross Country Prohibited)

Direct and Indirect Effects

Under this alternative, cross country travel is prohibited; no unauthorized motorized routes would be added to the system and no changes made to the existing NFTS. No cultural resource sites would be affected.

Cumulative Effects

As noted in more detail under Alternative 1, this alternative, when combined with the past, present and foreseeable future actions are not expected to cumulatively lead to increased impacts to cultural resources. Alternative 3 will reduce potential effects to cultural resources through prohibition of cross country travel and adding no new motorized routes on the Forest. Unregulated cross country travel has the greatest potential for creating adverse impacts to cultural resources making the route designation process an important part of preventing long-term impacts to resources.

Alternative 4 (Recreation)

Direct and Indirect Effects

Under this alternative, cross country travel is prohibited and a total of 181.72 miles of unauthorized motorized routes (509 routes in total) would be added to the system. Of these, 77 cultural resource sites fall within the APE of 77 proposed routes. If these routes are added to the system, 38 routes would have would have a negligible/minor effect on 47 sites. Seventeen routes would have a moderate effect on 14 sites. Twenty-four routes would have a major effect on 19 sites.

Of the 14 sites with moderate effect, the use of low impact barriers or padding will reduce or eliminate the effects.

Of the 19 sites with major effects, the direct and indirect causes can not be reasonably mitigated without additional NHPA Section 106 consultation with SHPO (see Table 3.03-6). The routes range in length of between 0.02-0.84 of a mile. Estimated costs for mitigation (NRHP evaluation, archaeological data recovery, and then additional mitigations based on those findings [e.g., barriers, fencing, monitoring]) could range between $10,000 for smaller sites to $25,000 for larger complex sites. Consultation with SHPO is needed to refine mitigation requirements and respective costs, and this information will be included in the FEIS/ROD.

The locations of mitigations prescribed by other disciplines (soils, botany, etc.) were examined and none will cause any negative effect to cultural resources.

Changes to Existing NFTS: This alternative proposes to convert 104.80 miles of ML1 roads (151 routes in total) for use as trails open to all vehicles. Fourteen cultural resource sites are within the APE of six routes. Of these 14 sites, three are being moderately affected but can be mitigated through the use of barriers. For the remaining 11 sites with major effects, further consultation with SHPO is necessary before the routes can be opened (see Table 3.03-9).

Table 3.03-7 Summary of Effects to Cultural Resources: Alternative 4

Route ID	Site Number	Type	Nature of Effect	Severity	Protection/Mitigation
11808B	05165400418	direct/indirect	looting and camping	major	additional consultation with SHPO required
15EV43G	05165100444	none	none	negligible	n/a
15EV47A	05165100282	direct	bisected	negligible	n/a
16E182	05165100118	direct	bisected	negligible	n/a
16E182A	05165100118	direct	bisected	negligible	n/a
16EV154	05165100896	direct	none	negligible	n/a
16EV160	05165100114	none	none	negligible	n/a
16EV176	05165100156	none	none	negligible	n/a
16EV230	05165100302	none	none	negligible	n/a
16EV230	05165100304	none	none	negligible	n/a
16EV243	05165100690	direct	bisected and damaged	moderate	use padding (52 x 3 feet) to protect site
16EV259A	05165100257	direct	bisected and damaged	moderate	use padding (300 x 4 feet) to protect site
16EV266	05165100244	direct	bisected and damaged	moderate	use padding (300 x 4 feet) to protect site
16EV269	05165100287	direct	bisected	negligible	n/a
16EV272	05165100974	none	none	negligible	n/a
16EV272	05165101040	none	none	negligible	n/a
16EV273	05165100270	indirect	off route travel	moderate	use low impact barriers (100 feet on each side of route) to keep users out of Feature One
16EV303	05165100976	direct	bisected	negligible	n/a
16EV79	05165100288	direct	bisected	negligible	n/a
16EV79	05165100303	direct	bisected	negligible	n/a
16EV79	05165100263	direct	bisected	negligible	n/a
16EV81	05165100270	indirect	off route travel	moderate	use low impact barriers (100 feet on each side of route) to keep users out of Feature One
17EV130	05165200826	indirect	off route travel	moderate	use low impact barriers (300 feet on north side of route) to keep users on route

Route ID	Site Number	Type	Nature of Effect	Severity	Protection/Mitigation
17EV14	05165100612	direct/indirect	bisected and damaged	moderate	use low impact barriers (246 feet on each side of route) to keep users on route
17EV15B	05165100171	indirect	camping	moderate	use low impact barriers (50 feet on each side of route) to keep users on route and prevent parking
17EV192	05165400120	direct	off route travel	moderate	use low impact barriers (100 feet on each side of route) to keep users on the route
17EV192A	05165400120	direct	off route travel, rutting, damage, and camping	major	additional consultation with SHPO required
17EV212	05165100639	direct	none	negligible	n/a
17EV241	05165100941	none	none	negligible	n/a
17EV249	05165100638	direct/indirect	rutting, damage, and camping	major	additional consultation with SHPO required
17EV249A	05165100638	direct/indirect	rutting, damage, and camping	major	additional consultation with SHPO required
17EV267	05165100144	direct/indirect	rutting, damage, and camping	major	additional consultation with SHPO required
17EV268	05165100144	direct/indirect	rutting, damage, and camping	major	additional consultation with SHPO required
17EV51	05165100599	none	none	negligible	n/a
17EV51	05165100598	direct/indirect	looting, rutting, and camping	major	last .125 mile not recommended for inclusion
17EV51	05165100647	none	none	negligible	n/a
17EV58	05165100173	direct	none	negligible	n/a
17EV901	05165400120	direct	bisected and damage	moderate	use low impact barriers (100 feet on each side of route) to keep users on the route
18EV105	05165100023	indirect	damage	minor	signage (No Motor Vehicles or camping)
18EV258	05165100024	direct/indirect	looting, rutting, damaged, and camping	major	additional consultation with SHPO required
18EV281	05165100388	direct/indirect	rutting, damage, and camping	major	additional consultation with SHPO required
18EV283	05165100394	none	none	negligible	n/a
18EV308	05165100737	direct/indirect	rutting, off route travel, vandalism, damage, and camping	major	additional consultation with SHPO required
18EV51	05165100625	direct	off route travel	moderate	use low impact barriers (100 feet on each side of route) to keep users on route
18EV67	05165100097	direct/indirect	bisected, damage, and camping	moderate	use low impact barriers (50 feet on each side of route) to define route and block camping area, signage (No Motor Vehicles or camping)
18EV67	05165100101	none	none	negligible	n/a
1S1727	05165400486	direct	off route travel	moderate	use low impact barriers (100 feet on north side of route) to keep users on route
1S1736	05165400285	direct	off route travel	moderate	use low impact barriers (1300 feet on each side of route) to keep users on route
1S1907A	05165400297	direct/indirect	rutting, off route travel, damage, deterioration, and camping	major	additional consultation with SHPO required
1S1933	05165400193	indirect	looting	moderate	use low impact barriers (500 feet on each side of route) to keep users on route, signage (No Motor Vehicles or camping)
21711G	05165101117	direct	bisected	negligible	n/a
EV681	05165100389	direct	bisected	negligible	n/a
FR10178	05165400527	none	none	negligible	n/a
FR10178	05165401661	none	none	negligible	n/a
FR14721	05165401663	none	none	negligible	n/a
FR15091	05165100934	none	none	negligible	n/a
FR15091	05165100171	indirect	camping	moderate	use low impact barriers (50 feet on each side of route) to keep users on route and prevent parking
FR15091	05165100934	none	none	negligible	n/a
FR8165	05165401359	direct	damaged	major	additional consultation with SHPO required
FR8601	05165400404	direct	off route travel	moderate	use low impact barriers (200 feet on each side of route) to keep users on route

Route ID	Site Number	Type	Nature of Effect	Severity	Protection/Mitigation
FR9501	05165200427	direct	bisected	negligible	n/a
FR98477	05165401007	direct	bisected	negligible	n/a
FR98477	05165401009	direct	bisected	negligible	n/a
FR98481	05165400102	direct/indirect	looting, damaged, and camping	major	additional consultation with SHPO required
FR98482	05165400039	direct	damaged	major	additional consultation with SHPO required
FR98493	05165400232	direct	damaged	major	additional consultation with SHPO required
FR98504	05165400031	direct	bisected	negligible	n/a
FR98507	05165400034	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98507	05165400351	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98508	05165400288	direct	bisected	negligible	n/a
FR98523	05165400433	direct	bisected	negligible	n/a
FR98541	05165400297	direct/indirect	rutting, damage, and camping	major	additional consultation with SHPO required
FR98544	05165401320	direct	bisected	negligible	n/a
FR98547	05165401283	direct	bisected	negligible	n/a
FR98552	05165400034	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98552	05165400351	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98554	05165400019	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98554	05165401660	none	none	negligible	n/a
FR98566	05165400504	none	none	negligible	n/a
FR98592	05165400638	direct	bisected	negligible	n/a
FR98603	05165100067	indirect	off route travel and camping	minor	signage (No Motor Vehicles or camping)
FR98612	05165100122	direct/indirect	damaged	major	additional consultation with SHPO required
FR98616	05165100646	indirect	none	negligible	n/a
FR98616	05165100680	none	none	negligible	n/a
FR98616	05165101233	none	none	negligible	n/a
FR98663	05165200216	none	none	negligible	n/a
FR98671	05165400486	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98686	05165100228	indirect	camping	negligible	n/a
FR98690	05165100144	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98691	05165100144	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required
FR98704	05165100120	direct/indirect	rutting, off route travel, damage, and camping	major	additional consultation with SHPO required

Note: although there are no direct and indirect effects currently known, the following sites are near routes and should be monitored for effect: 05165100158, 05165100242, 05165100411, 05165400093, 05165400094, 05165400106, 05165400108, and 05165401240.

Cumulative Effects

As noted in more detail under Alternative 1, this alternative is not expected to cumulatively lead to increased impacts to cultural resources. Alternative 4 will reduce potential effects to cultural resources through prohibition of cross country travel and the reduction in the number of motorized routes on the Forest. Unregulated cross country travel has the greatest potential for creating adverse impacts to cultural resources making the route designation process an important part of preventing long-term impacts to resources.

Alternative 5 (Resources)

Direct and Indirect Effects

Under this alternative, cross country travel is prohibited and a total of 31.51 miles of unauthorized motorized routes (90 routes in total) would be added to the system. Of these, four cultural sites fall within the APE of four proposed routes. None of the routes are causing any effect (see Table 3.03-8).

The locations of mitigations prescribed by other disciplines (soils, botany, etc.) were examined and none will cause any effect to cultural resources.

Changes to Existing NFTS: This alternative proposes to convert 11.66 miles of ML1 roads (9 routes in total) for use as trails open to all vehicles. No cultural resource sites are located within the APE of these routes.

Table 3.03-8 Summary of Effects to Cultural Resources: Alternative 5

Route ID	Site Number	Type	Nature of Effect	Severity	Protection/Mitigation
16EV176	05165100156	none	none	negligible	n/a
17EV51	05165100599	none	none	negligible	n/a
17EV241	05165100941	none	none	negligible	n/a
16EV303	05165100976	direct	bisected	negligible	n/a

Cumulative Effects

As noted in more detail under Alternative 1, this alternative, when combined with the past, present and foreseeable future actions and events are not expected to cumulatively lead to increased impacts to cultural resources. Alternative 5 will reduce potential effects to cultural resources through prohibition of cross country travel and the reduction in the number of motorized routes currently being used on the Forest. Unregulated cross country travel has the greatest potential for creating adverse impacts to cultural resources making the route designation process an important part of preventing long-term impacts to resources.

Summary of Effects Analysis across All Alternatives

Table 3.03-9 Effects to Cultural Resources: Changes to Existing NFTS

Route	Site Number	ALT	Site	Eligibility	Type	Nature of Effect	Severity	Protection/Mitigation
02S59A	05165400528	4	multi	unevaluated	direct	bisected/damaged	major	use low impact barriers (500 feet both sides of road) to keep users on route
02S20C	05165400657	1,4	historic	unevaluated	direct	bisected/damaged	major	additional consultation with SHPO required
01S38Y	05165400550	1,4	historic	unevaluated	direct	bisected/damaged	moderate	use low impact barriers (500 feet both sides of road) to keep users on route
02S05C	05165400455	4	prehistoric	unevaluated	direct	bisected/damaged	moderate	use low impact barriers (688 feet both sides of road) to keep users on route
02S22	05165400241	4	prehistoric	contributing	direct	bisected/damaged	major	additional consultation with SHPO required
02S22	05165401025	4	prehistoric	contributing	direct	bisected/damaged	major	additional consultation with SHPO required
02S22	05165401660	4	prehistoric	eligible	direct	bisected/damaged	major	additional consultation with SHPO required
02S26	05165400113	4	prehistoric	contributing	direct	bisected/damaged	major	additional consultation with SHPO required
02S26	05165400245	4	prehistoric	contributing	direct	bisected/damaged	major	additional consultation with SHPO required
02S26	05165400247	4	prehistoric	contributing	direct	bisected/damaged	major	additional consultation with SHPO required
02S26	05165400757	4	prehistoric	unevaluated	direct	bisected/damaged	major	additional consultation with SHPO required
02S26	05165400758	4	prehistoric	contributing	direct	bisected/damaged	major	additional consultation with SHPO required
02S26	051654001494	4	prehistoric	contributing	direct	bisected/damaged	major	additional consultation with SHPO required
02S26	05165401660	4	prehistoric	eligible	direct	bisected/damaged	major	additional consultation with SHPO required

Table 3.03-10 Summary of Effects to Cultural Resources

Indicators – Cultural Resources	Rankings of Alternatives for Each Indicator[1]				
	1	2	3	4	5
Degree to which the integrity of cultural resource values are diminished	3	1	5	2	4
Number of cultural resources within unauthorized routes at risk from ongoing use	3	1	5	2	4
Average number of cultural resources per acre protected from creation of new routes	3	1	5	2	4
Average for Cultural Resources	3	1	5	2	4

[1] A score of 5 indicates the alternative is the least impact for this resource; a score of 1 indicates the alternative is the most impact.

Compliance with the Forest Plan and Other Direction

Alternatives 1, 3, 4 and 5 comply with all Forest Plan S&Gs as well as with all federal laws identified in the Analysis Framework Section. Alternative 2 does not comply with Forest Plan S&Gs or with the federal laws identified in the Analysis Framework Section.

3.04 RECREATION RESOURCES

This section examines the extent to which alternatives respond to recreation management direction established in the Forest Plan and the TM Rule. The Forest Plan recreation direction was established under the implementing regulations of NFMA which requires the provision of a broad spectrum of forest and rangeland-related outdoor recreation opportunities that respond to current and anticipated user demands. The Forest Plan satisfies this requirement through its use of the Recreation Opportunity Spectrum (ROS) classification system of “zoning” recreation opportunities. In addition, specifically for off-road vehicle use, NFMA requires that these motor vehicle opportunities be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the NFS lands. The TM Rule requires an examination of: the compatibility of motor vehicle use with existing conditions in populated areas; the conflict between motor vehicle use and existing or proposed recreational uses of NFS lands or neighboring federal lands; and, the provision of recreational opportunities and access needs.

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

Direction relevant 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 Stanislaus National Forest Land and Resource Management Plan includes standards and guidelines for recreation management including use of Off-Highway Vehicles (OHV).

Sierra Nevada Forest Plan Amendment (SNFPA) - The SNFPA established the direction to prohibit motorized vehicle travel off designated routes, trails, and limited 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.

Travel Management (TM) Rule - The TM Rule requires that in designating NFS roads, trails, and areas, Responsible Officials consider the provision of recreational opportunities; public access needs; conflicts among uses of NFS lands, including other recreational uses; and the compatibility of motor vehicle use with existing conditions in populated areas.

Forest Plan - The Forest Plan provides goals for the recreation resource and requires a broad range of developed and dispersed recreation opportunities in balance with existing and future demand. The Recreation Opportunity Spectrum (ROS) is the basic inventory that was used to create recreation-opportunity “zoning” in these plans. For the purposes of the proposed action, the term “off-road vehicles” applies to public motor vehicle use (highway legal and non-highway legal. The ROS inventory provides for a spectrum of classes from “Urban” to “Primitive.” Motorized and non-motorized spectrum classes (or ‘zones’) are distinct. Motorized use falls in the motorized ROS classes: Urban, Rural, Roaded Natural, and Semi-primitive-Motorized. Non-motorized classes include Semi-Primitive Non-Motorized and Primitive.

In summary, Forest Plan direction specific to recreation emphasizes providing a variety of quality recreation opportunities while protecting the natural setting and natural resource values. Specific elements address motorized activities to optimize recreation opportunities while minimizing conflict with non motorized activities, encouraging public participation, managing conditions on the ground, and assuring effective and sustainable management. See Appendix C, Forest Plan Direction for specific recreation and OHV direction.

Effects Analysis Methodology

Assumptions Specific to Recreation Resources Analysis

1. The prohibition of motorized cross-country travel does not change ROS (e.g., semi-primitive motorized); it is simply a prohibition within that ROS 'zone' to travel off designated routes. The ability to add or remove routes in the future is still guided by NEPA, and is not affected by the action of prohibiting motorized cross-country travel and limiting travel to designated routes forest wide.
2. Proposed additions to the NFTS can have a beneficial effect on the motor-vehicle experience by sustaining a variety of riding experiences (variety of easy-to-difficult riding experiences) and contributing to the continuity of the motor-touring experience, including access to dispersed recreation activities and trail loop opportunities (both motorized and non-motorized). Reductions in OHV riding opportunities can affect the viability of route systems, the overall capacity, and the quality of recreation opportunities.
3. The Forest NVUM report accurately expresses the most popular recreation activities for analysis.
4. The Sierra Nevada Forest Plan Amendment accurately defines the Forest Wildland Urban Interface (WUI) defense zone, as mapped on the Stanislaus National Forest.
5. The number of NFTS miles in the WUI defense zone, per alternative, is a metric to help us better understand the cumulative effects of motorized use to neighboring populated areas.
6. OHV use is considered to be the use of four wheel drive (4WD) vehicles, all terrain vehicles (ATVs) and motorcycles on rough roads and trails that require some skill and challenge to operate. Four wheel drive vehicles operating on paved or smoothly graded roads will be considered part of general passenger vehicle use and are not included in the following discussions.
7. The Forest Plan states that recreation demand will not be met at some point in the future (USDA 1991-d). With the exception of alternative 2, all alternatives reduce supply and hasten the time when demand will not be met for OHV activities on the Forest. The OHV supply and demand section of the Recreation Report (see project record) discusses supply and demand.
8. Some trailheads and staging areas may need to be developed near designated trail systems in the future to maximize use of the NFTS system. These projects, if needed, will be analyzed in a future NEPA analysis.
9. Wheeled Over Snow (WOS) use does not affect other recreation resources since the use is on existing NFTS routes that are open to public motorized use during the normal summer driving season.

Data Sources

1. Forest Plan
2. GIS
3. NVUM reports

Recreation Resources Indicators

1. The extent of non-motorized recreation activities, as expressed primarily by Semi-primitive Non-motorized (SPNM) ROS class, displaced by proposed motor vehicle use. This includes consideration for quiet recreation opportunities, forest-wide.
2. The number of proposed NFTS miles within proximity to populated areas or neighboring public lands.
3. The number of miles devoted to each vehicle class, and the number of miles providing a variety of riding experiences, including loop opportunities.
4. The number of routes and total miles accessing dispersed recreation activities.

Recreation Resources Methodology by Action

1. Direct and indirect effects of the prohibition of cross country motorized vehicle travel

Short-term time frame: 1 year.

Long-term time frame: 20 years.

Spatial boundary: The forest boundary is the unit of spatial analysis when considering effects associated with changes in the NFTS or season of use.

Indicators: (1) the extent of non-motorized recreation activities displaced by proposed motor vehicle use; (2) the number of proposed NFTS miles in proximity to populated areas or neighboring public lands; (3) the number of miles devoted to each vehicle class; and (4) the number of miles devoted to each vehicle class for access to dispersed activities.

Methodology: GIS analysis of added routes in relation to ROS classes, WUI zones, most popular non-motorized recreation activities, and vehicle classes.

Rationale: The indicators address how alternatives respond to the Forest Plan and the TM Rule: the motorized recreation opportunity conflicts with other recreation opportunities, specifically non-motorized opportunities; the proximity of motor vehicle use to populated areas or neighboring public lands; the quality of the motorized recreation experience; and the quality and quantity of motorized access to dispersed recreation areas.

2. Direct and indirect effects of adding facilities to the NFTS including identifying seasons of use and vehicle class

Short-term time frame: 1 year.

Long-term time frame: 20 years.

Spatial boundary: The forest boundary is the unit of spatial analysis when considering effects associated with changes in the NFTS or season of use.

Indicators: (1) the extent of non-motorized recreation activities displaced by proposed motor vehicle use; (2) the number of proposed NFTS miles in proximity to populated areas or neighboring public lands; (3) the number of miles devoted to each vehicle class; and (4) the number of miles devoted to each vehicle class for access to dispersed activities.

Methodology: GIS analysis of added routes in relation to ROS classes, WUI zones, most popular non-motorized recreation activities, and vehicle classes.

Rationale: The indicators address how alternatives respond to the Forest Plan and the TM Rule: the motorized recreation opportunity conflicts with other recreation opportunities, specifically non-motorized opportunities; the proximity of motor vehicle use to populated areas or neighboring public lands; the quality of the motorized recreation experience; and the quality of motorized access to dispersed areas.

3. Direct and indirect effects of changes to the existing NFTS including identifying seasons of use and vehicle class

Short-term time frame: 1 year.

Long-term time frame: 20 years.

Spatial boundary: The forest boundary is the unit of spatial analysis when considering effects associated with changes in the NFTS or season of use.

Indicators: (1) the extent of non-motorized recreation activities displaced by proposed motor vehicle use; (2) the number of proposed NFTS miles in proximity to populated areas or neighboring public lands; (3) the number of miles devoted to each vehicle class; and (4) the number of miles devoted to each vehicle class for access to dispersed activities.

Methodology: GIS analysis of added routes in relation to ROS classes, WUI zones, most popular non-motorized recreation activities, and vehicle classes.

Rationale: The indicators address how alternatives respond to the Forest Plan and the TM Rule: the motorized recreation opportunity conflicts with other recreation opportunities, specifically non-motorized opportunities; the proximity of motor vehicle use to populated areas or neighboring public lands; the quality of the motorized recreation experience; and the quality of motorized access to dispersed areas.

4. Cumulative Effects

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

Long-term time frame: 20 years

Spatial boundary: The forest boundary is the unit of spatial analysis for determining cumulative effects.

Indicator(s): Net SPNM ROS class acres and number of NFTS miles in proximity to populated areas or neighboring public lands (within WUI zone).

Methodology: The total NFTS miles within WUI defense zones and SPNM areas, as shown by GIS analysis.

Rationale: The number of NFTS miles in the WUI defense zone will illustrate the cumulative effects of the proximity of the proposed NFTS, per alternative, to populated areas.

Affected Environment

The STF offers a variety of high quality recreation opportunities in a range of settings, year round. Located between Lake Tahoe and Yosemite National Park on the western slope of the Sierra, it is within a 3 hour drive of the San Francisco Bay Area. The Recreation Facility Analysis (RFA) during 2006 projected an increase in overall recreation use of 43% during the next 20 years. This is dramatically more than the average forest nationally, but typical of adjacent Forests in the central Sierra. The expected increase in visitor use will create challenges as demand approaches capacity in the future.

The STF provides a wide range of facilities located in attractive settings primarily located along reservoirs or rivers. The developed facilities include: 47 family campgrounds, 5 group campgrounds, 12 picnic grounds, 47 trailheads (this includes OHV trailheads), 8 boating sites, 745 recreation residences, 8 organization camps, and 4 resorts. These developed facilities often support recreation activities that occur outside of the developed sites as described in the following sections. California State Highways 4, 108, and 120 pass through the Forest, provide easy access to most of the recreation opportunities. Of the 3 corridors, highway 108 serves the most recreation use on the Forest. Highway 4 is a National Scenic Byway and Highway 120 is the most direct route between the San Francisco Bay Area and Yosemite National Park. The lakes and rivers offer excellent fishing, boating, and swimming opportunities. The elevation ranges from 1,500’ to 12,000’, providing a variety of settings for year-round recreational use.

From a recreation management point of view, a key goal of recreation is to provide for a wide range of recreation opportunities. For OHV recreation opportunities this means the Forest should 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 terms of length, range of difficulty from easy to difficult, and a range of recreation opportunities including; access to dispersed camping, access to fishing, hunting, viewing wildlife, access to scenic vistas, and other opportunities to explore the back country of the Forest. Trails should be designed for user enjoyment in terms of vegetation type, layout of the trails with views, loop opportunities, or trail systems that connect so users can explore a variety of trails and areas. These factors facilitate a quality recreation experience. A large system of trails results in opportunities for solitude and remoteness. A small system compresses the increasing use into a limited area, resulting in crowding, dust, noise, and user conflicts (between other motorized users as well as non-motorized users), and resource degradation.

Non-Motorized Recreation Opportunities

The Forest contains portions of three designated Wildernesses; the Tuolumne Wild and Scenic River; and the Merced Wild and Scenic River. These areas contribute to the 238,763 acres of Primitive ROS and 128,816 acres of SPNM ROS on the Forest. Most of the managed non-motorized trail system is associated with these areas, which are free of conflict with motorized activities. More than 1,000 miles of non-motorized trails exists outside of these areas, offering a range of opportunities. They vary from heavily used/ paved bicycle trails and interpretive trails to lightly used or overgrown historic routes in a range of settings. Even in the most highly developed areas of the Forest, such as Pinecrest, many non-motorized opportunities exist in a quiet setting, especially during low use periods. OHV activities currently occur on Semi-Primitive Motorized and Roaded Natural areas throughout the Forest. This allows for a choice and mix of motorized and non-motorized activities. This mix is preferred by many visitors, but has the potential to negatively impact quiet recreation activities when near OHV activity.

Recreation Visitor Use

Visitor use estimates for the Forest were generated based on the NVUM survey that was conducted from October 1, 2002 through September 30, 2003. Recreation use on the Stanislaus National Forest for this period was estimated at 1,759,756 National Forest visits and 2,324,863 site visits. The survey was designed to assess existing recreation demand on the forest by asking visitors what they did during their visit. This assessment resulted in two categories of visitor use: all activities in which they participated in and the main activity. It highlighted the fact that the two uses may or may not be related. For example, 52 percent of forest visitors reported participating in the viewing of natural features, but only 5 percent reported this as their main activity. The top five recreation activities visitors participated in were general relaxation, viewing scenery, hiking/walking, viewing wildlife, and fishing. Each visitor also picked one of these activities as his or her primary activity for the current recreation visit to the forest. The top main activities were downhill skiing, relaxing, fishing and developed camping (Table 3.04-1).

Most visitors to the Forest participate in a variety of activities. Many activities, such as “viewing natural features” can be either motorized or non-motorized. The overwhelming majority of visitors arrive to the Forest in a motorized vehicle, the exception being adjacent residents. This means that motorized and non-motorized activities are often combined as part of the total recreation experience. The presence of motorized activities can be either a positive or negative factor, depending on the circumstances. Table 3.04-1 identifies all classified activities in the NVUM report and highlights those that are primarily either motorized or non-motorized. Activities that are primarily non-motorized appear to have more use than motorized activities in both categories.

Off Highway Vehicle Recreation Opportunities

California is experiencing the highest level of OHV use of any state in the nation with 786,914 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. Four-wheel drive vehicle sales were extremely high. They increased 1500% to 3,046,866 from 1989 to 2002. According to field personnel, overall use has more than doubled at many Forest locations during the last 10 years. These observations are supported by several studies, including the latest NVUM results from 2007 surveys (Kordell 2005).

Despite OHV use ranking 12th in the participation category and 6th as a main activity in Table 3.04-1, it is an important program on the Forest. The data indicates the Stanislaus ranks 8th of 18 National Forests in Region 5 (California) for overall recreation use, but it ranks 3rd in OHV use, having the 2nd highest percentage of OHV use as a main activity participation. Of 122 Forests nationally, the Stanislaus ranks 45th for overall recreation use but 18th for OHV use[3]. Reductions in riding opportunities (capacity) would likely have a greater effect than at forests with a lower percentage of OHV use.

Table 3.04-1 NVUM Classified Activities

Activity	% Participating	Rank	% as Main Activity	Rank
Developed Camping	21.12	8	8.97	4
Primitive Camping	9.69	13	3.70	9
Backpacking	5.49	20	2.38	12
Resort Use	8.35	14	1.92	14
Picnicking	24.67	6	3.15	10
Viewing Natural Features	51.62	2	4.59	8
Visiting Historic Sites	6.60	18	0.06	26
Nature Center Activities	6.24	19	0.11	25
Nature Study	3.84	21	0.41	23
Relaxing	60.56	1	19.35	2
Fishing	30.95	5	13.51	3
Hunting	1.79	24	1.26	18
OHV Use	10.34	12	6.19	6
Driving for Pleasure	18.97	10	2.36	13
Snowmobiling	1.70	25	1.44	16
Motorized Water Activities	7.09	17	0.52	21
Other Motorized Activity	0.57	26	0.54	20
Hiking / Walking	45.25	4	7.80	5
Horseback Riding	1.91	23	0.38	24
Bicycling	7.10	16	1.23	19
Non-motorized Water	10.40	11	2.48	11
Downhill Skiing	21.37	9	20.42	1
Cross-country Skiing	2.51	22	1.35	17
Other Non-motorized	21.64	7	4.97	7
Gathering Forest Products	7.35	15	0.52	22
Viewing Wildlife	47.28	3	1.76	15
Total motorized	40.46		12.31	
Total non-motorized	88.81		18.31	

Environmental Consequences

Direct and Indirect Effects for all Alternatives

Indicator Measure 1 - The extent of non-motorized recreation activities, as expressed primarily by SPNM ROS class, displaced by proposed motor vehicle use. This includes consideration for quiet recreation opportunities forest-wide.

Primitive (P) ROS opportunities exist on 238,763 acres within designated Wilderness on the Forest, which remains the same for alternatives. Outside of Wilderness, an additional 128,816 acres of SPNM class are identified on the Forest as stated in the Forest Plan. These two classes identify areas available for quiet recreation (non-motorized) on the forest.

[3] OHV Use on National Forests: Volume and characteristics of visitors. 2004

Table 3.04-2 displays the number of proposed NFTS miles within Semi-Primitive Non-Motorized (SPNM) ROS class for each alternative. Alternatives 3 and 5 add no miles to the NFTS (within SPNM) and prohibit cross country travel, therefore having the least impact on the SPNM setting. Alternative 2 will not prohibit cross country travel, and therefore is most likely to result in vehicle intrusion into SPNM areas, but no miles of NFTS are added. Alternative one will add 1.7 miles, and alternative 4 would add 5.20 miles, the most of all alternatives.

Table 3.04-2 NFTS: SPNM and Cross Country Travel

Item	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
SPNM (miles)	1.70	0	0	5.20	0
Cross country prohibition	yes	no	yes	yes	yes

In the following discussions of effects, motorized and non-motorized activities interact. It is often desirable for the two to exist together at the same location, but not necessarily at the same time. Mountain bikers may enjoy riding motorcycle trails, for instance. Many pristine non-motorized experiences are possible in Semi-Primitive and Roaded Natural settings and will remain available in all alternatives to a varying extent. During low visitation periods, the forest can be remarkably quiet in all settings. Most of the changes to recreation settings occur within the Roaded Natural ROS setting. These changes are site specific and vary by alternative. Refer to maps in the and summaries of specific areas in the Recreation Report (see project record).

Alternative 2 represents the current situation. Motorized use is concentrated in a few locations but is generally dispersed throughout the Forest (where not restricted). All of the other alternatives would limit OHV travel to NFTS routes, resulting is more concentrated use at those locations. Fewer riding opportunities would result in more noise and dust at those locations. Quiet recreation activities would be negatively impacted within the immediate area (¼.mile), but opportunities for quiet recreation will be expanded as areas are closed to motorized use. Table 3.04-3 shows additions to the NFTS by alternative.

Indicator Measure 2 - The number of proposed NFTS miles within proximity to populated areas or neighboring public lands.

Other federal lands adjacent to the Stanislaus National Forest are the Eldorado National Forest (north), the Sierra National Forest (south), Humboldt-Toiyabe National Forest (northeast), Yosemite National Park (southeast), and the Bureau of Land Management (BLM) (west). The ROS classes for each of the bordering National Forests vary, but are compatible with the ROS classes on the STF. ROS classes adjacent to the BLM and Yosemite National Park are not entirely compatible. Proposed changes would require coordination with them. Calaveras Big Trees State Park is located within the Forest boundary and would also require coordination for any changes.

The private lands surrounding the Stanislaus National Forest vary between very rural/sparsely populated to residential subdivisions. Potential impacts to populated areas may differ among the alternatives. The alternatives with fewer routes would possibly have a lower impact of noise, dust and physical presence near populated areas. Many adjacent residents enjoy riding directly onto Forest land from their property and would prefer to continue. Others may strongly disagree. These issues have surfaced at several locations on the Forest and are difficult to resolve.

The Wildland/Urban Interface (WUI), as defined in the Sierra Nevada Forest Plan Amendment, was used to comparatively display the relative effects of motorized activities near populated areas. The defense zone of the WUI in the Forest GIS database was used for the following table. It closely conforms to the ¼ mile distance established for noise and dust nuisance (USDA 2003b, Appendix C). Table 3.04-3 displays the number of proposed NFTS miles of road added within the WUI defense zone for each alternative. For a complete listing of routes within this zone, see the project record. Alternative 2 poses the greatest impact to populated areas, since all use, including non NFTS open riding will continue and some new unauthorized routes will develop. Existing ML2 roads will remain open for use by all OHVs. Existing routes through private land will continue to be used without limitations unless action is taken by the owner. Alternatives 3, 4, 1 and 5 pose progressively less impact.

Table 3.04-3 Proximity of Non-Highway Legal Vehicles to Private Land

Vehicle Class	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
ALL within ¼ mile of private	63.18	185.22	156.85	129.58	52.93
MC and ATV within ¼ mile of private	4.06	1.86	1.86	6.99	2.51
Total non-highway legal within ¼ mile of private	**67.24**	**187.07**	**158.70**	**136.56**	**55.43**

Indicator Measure 3 - The number of miles devoted to each vehicle class and the number of miles providing a variety of riding experiences, including loop opportunities.

The quality and diversity of riding experiences vary considerably by alternative. Routes range from high standard, surfaced roads already designated for public highway-licensed motor vehicle use, to roughly graded native surface roads and trails. A variety of riding experiences on loop systems are desirable, whether touring on roads or riding trails.

Mileages for “degree of difficulty” by trail category are presented for each riding area in Table 3.04-4. Alternatives 1 and 4 display a balance of riding opportunities. Alternative 2 would not designate additions to the NFTS but would have more miles in each category available for use.

Table 3.04-4 Additions to the NFTS: Degree of Difficulty

Degree of Difficulty	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
Difficult	23.10	0	0	29.11	2.27
Moderate	58.64	0	0	65.63	12.06
Easy	76.05	0	0	87.38	19.63
Total	**157.79**	**0**	**0**	**182.12**	**33.96**

Table 3.04-5 illustrates the total motorized recreation opportunities including existing and proposed NFTS routes and existing unauthorized routes. This illustrates the net effect of all actions. Alternative 4 has the most total miles, followed by Alternative 2, 1, 3 and 5. In addition to total miles and difficulty, the geographical distribution and interconnectedness are factors that would vary by alternative. Refer to the alternative maps for specifics.

Table 3.04-5 Total Motorized Opportunities

Motorized Opportunity	Alternative				
	1	2	3	4	5
All Vehicles (ALL) Road	1387.43	1734.91	1734.91	1682.16	1226.15
Highway Licensed Only (HLO) Road	735.58	429.17	429.17	473.23	869.05
All Vehicles (ALL) Trail	136.76	61.35	61.35	198.11	83.25
All Terrain Vehicle (ATV) Trail	60.05	21.00	21.00	71.95	28.48
Motorcycle (MC) Trail	71.22	12.94	12.94	74.46	26.52
Permit Only (PER) Trail	1.38	0.00	0.00	1.38	0.54
Highway Licensed Only (HLO) Trail	46.02	0.00	0.00	30.97	9.45
Total	**2438.44**	**2259.37**	**2259.37**	**2532.26**	**2243.45**
Combined Use Roads (CU)	16.51	0.00	0.00	18.44	0.00
Mixed Use Roads (MU)	70.56	0.00	0.00	74.79	0.00
Total	**87.06**	**0.00**	**0.00**	**93.23**	**0.00**
Additions to the NFTS	157.79	0.00	0.00	181.72	31.51
NFTS roads changed from closed to open	67.96	0.00	0.00	101.83	11.66
NFTS roads changed from open to closed	51.40	0.00	0.00	13.13	64.45
Net miles of change in existing NFTS routes	21.98	0	0	91.17	-47.37

Table 3.04-6 displays the total trail mileage available for each vehicle class by alternative, and those miles proposed for seasonal closure. Seasonal closures apply to alternatives 1, 4 and 5. Alternatives 2 and 3 have no additions to the NFTS.

Table 3.04-6 Additions to the NFTS: Trail Categories

Trail Category by Alternative	Season of Use	Miles
Alternative 1		
Trails open to highway legal vehicles only (HLO) (Zone 1)	Open All Year	0.99
Trails open to highway legal vehicles only (HLO) (Zone 2)	Apr 1- Nov 30	8.87
Trails open to highway legal vehicles only (HLO) (Zone 3)	May 15- Nov 30	4.45
Trails open to all vehicles (Zone 1)	Open All Year	7.72
Trails open to all vehicles (Zone 2)	Apr 1- Nov 30	14.29
Trails open to all vehicles (Zone 3)	May 15- Nov 30	28.35
Trails open to ATVs and motorcycles (<50") (Zone 1)	Open All Year	0.00
Trails open to ATVs and motorcycles (<50") (Zone 2)	Apr 1- Nov 30	12.69
Trails open to ATVs and motorcycles (<50") (Zone 3)	May 15- Nov 30	24.32
Trails open to motorcycles (Zone 1)	Open All Year	0.60
Trails open to motorcycles (Zone 2)	Apr 1- Nov 30	39.09
Trails open to motorcycles (Zone 3)	May 15- Nov 30	15.04
Trails open to highway legal vehicles only (HLO) – Total all zones		13.13
Trails open to all vehicles – Total all zones		61.64
Trails open to ATVs and motorcycles (<50")		47.71
Trails open to motorcycles – Total all zones		58.26
Trails open under SUP – Total all zones		1.38
Total		**157.79**
Alternative 4		
Trails open to highway legal vehicles only (HLO) (Zone 1)	Open All Year	0.99
Trails open to highway legal vehicles only (HLO) (Zone 2)	Apr 1- Dec 31	7.90
Trails open to highway legal vehicles only (HLO) (Zone 3)	Apr 1- Dec 31	4.25
Trails open to all vehicles (Zone 1)	Open All Year	8.09
Trails open to all vehicles (Zone 2)	Apr 1- Dec 31	20.75
Trails open to all vehicles (Zone 3)	Apr 1- Dec 31	32.80
Trails open to ATVs and motorcycles (<50") (Zone 1)	Open All Year	0.00
Trails open to ATVs and motorcycles (<50") (Zone 2)	Apr 1- Dec 31	13.89
Trails open to ATVs and motorcycles (<50") (Zone 3)	Apr 1- Dec 31	33.82
Trails open to motorcycles (Zone 1)	Open All Year	0.60
Trails open to motorcycles (Zone 2)	Apr 1- Dec 31	42.02
Trails open to motorcycles (Zone 3)	Apr 1- Dec 31	15.64
Trails open to highway legal vehicles only (HLO) – Total all zones		13.13
Trails open to all vehicles – Total all zones		61.64
Trails open to ATVs and motorcycles (<50")		47.71
Trails open to motorcycles – Total all zones		58.26
Trails open under SUP – Total all zones		1.38
Total		**182.12**
Alternative 5		
Trails open to highway legal vehicles only (HLO) (Zone 1)	Open All Year	0.00
Trails open to highway legal vehicles only (HLO) (Zone 2)	Apr 15- Nov 15	0.25
Trails open to highway legal vehicles only (HLO) (Zone 3)	May 15- Nov 15	2.56
Trails open to all vehicles (Zone 1)	Open All Year	2.98
Trails open to all vehicles (Zone 2)	Apr 15- Nov 15	4.96
Trails open to all vehicles (Zone 3)	May 15- Nov 15	3.32
Trails open to ATVs and motorcycles (<50") (Zone 1)	Open All Year	0.00
Trails open to ATVs and motorcycles (<50") (Zone 2)	Apr 15- Nov 15	2.31
Trails open to ATVs and motorcycles (<50") (Zone 3)	May 15- Nov 15	5.15
Trails open to motorcycles (Zone 1)	Open All Year	0.00
Trails open to motorcycles (Zone 2)	Apr 15- Nov 15	11.74
Trails open to motorcycles (Zone 3)	May 15- Nov 15	0.15
Trails open to highway legal vehicles only (HLO) – Total all zones		2.81
Trails open to all vehicles – Total all zones		11.26
Trails open to ATVs and motorcycles (<50")		7.46
Trails open to motorcycles – Total all zones		11.89
Trails open under SUP – Total all zones		0.54
Total		**33.96**

Indicator Measure 4 - Number of routes or miles accessing dispersed recreation sites.

Dispersed recreation sites may be campsites or parking areas for other activities (motorized and non-motorized). Some visitors prefer the characteristics of dispersed areas, which include the lack of development, fees, regimentation, and management controls. Greater solitude and privacy are often possible at these remote locations. Visitors may prefer the freedom to engage in activities not appropriate in developed locations, such as OHV use, discharge of 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. Sites that have a long history of repeated use are often special places that visitors return to over time, creating 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 to the vehicle such as RV, trailer, or camper use are displaced as vehicle access is prohibited. These sites would then be available for non-motorized use with the parking relocated to the NFTS road. Existing sites in close proximity to system roads will be affected less than those at great distances. Of the estimated 1000+ routes on the forest, 256 were inventoried and included in this analysis. The average inventoried dispersed access route length is 690 feet adding up to 32 miles total. It is estimated that this is about ½ the total mileage on the Forest, since routes not analyzed are shorter in length, estimated to be an average of 200 feet. It is assumed that the majority not analyzed will be closed to motorized uses.

Table 3.04-7 Additions to the NFTS: Dispersed Access Routes

Dispersed Access Routes by Alternative	Season of Use	Miles
Alternative 1		
Dispersed Access routes open to highway legal vehicles only (HLO) (Zone 1)	Open All Year	0.99
Dispersed Access routes open to highway legal vehicles only (HLO) (Zone 2)	Apr 1- Nov 30	8.80
Dispersed Access routes open to highway legal vehicles only (HLO) (Zone 3)	May 15- Nov 30	4.45
Dispersed Access routes open to all vehicles (Zone 1)	Open All Year	0.41
Dispersed Access routes open to all vehicles (Zone 2)	Apr 1- Nov 30	6.03
Dispersed Access routes open to all vehicles (Zone 3)	May 15- Nov 30	7.15
Total		**27.83**
Alternatives 2 and 3		
No proposed additions to NFTS	No change	0
Alternative 4		
Dispersed Access routes open to highway legal vehicles only (HLO) (Zone 1)	Open All Year	0.99
Dispersed Access routes open to highway legal vehicles only (HLO) (Zone 2)	Apr 1- Dec 31	7.90
Dispersed Access routes open to highway legal vehicles only (HLO) (Zone 3)	Apr 1- Dec 31	3.72
Dispersed Access routes open to all vehicles (Zone 1)	Open All Year	0.41
Dispersed Access routes open to all vehicles (Zone 2)	Apr 1- Dec 31	10.23
Dispersed Access routes open to all vehicles (Zone 3)	Apr 1- Dec 31	8.61
Total		**31.96**
Alternative 5		
Dispersed Access routes open to highway legal vehicles only (HLO) (Zone 1)	Open All Year	0.00
Dispersed Access routes open to highway legal vehicles only (HLO) (Zone 2)	Apr 15- Nov 15	0.25
Dispersed Access routes open to highway legal vehicles only (HLO) (Zone 3)	May 15- Nov 15	2.56
Dispersed Access routes open to all vehicles (Zone 1)	Open All Year	0.00
Dispersed Access routes open to all vehicles (Zone 2)	Apr 15- Nov 15	1.77
Dispersed Access routes open to all vehicles (Zone 3)	May 15- Nov 15	0.74
Total		**5.32**

Alternative 1 (Proposed Action)

DIRECT AND INDIRECT EFFECTS

Motorized recreation: Of the 5 alternatives, Alternative 1 would provide the 3rd-highest motorized mileage available to all OHV use, behind alternative 2 and 4. NFTS routes would meet existing demand. Consideration has been given to accommodate a range of difficulties for motorcycles, ATVs, and four-wheel-drive vehicles and they are distributed to many different riding areas. Of the 252 miles of unauthorized route, 158 miles will be added to the NFTS. Road management will change to allow an additional 22 miles of use by OHVs, primarily to complete loop opportunities. Access to staging or trailheads is easy over good roads. Since the Forest would be closed to cross-country travel, all use is on designated routes. Season of use is more restrictive than Alternative 4, but less than 5. Although a reduction in miles occurs, this system would be more manageable and sustainable than alternatives 2 or 4 with 2,438 miles of potential opportunity in the NFTS (see project record).

The existing and proposed NFTS trails in popular OHV riding areas will see increasing use that will approach capacity within a decade. At these popular areas and heavily used NFTS routes, more noise, and dust would occur, negatively affecting quiet recreation activities for some recreationists. As demand increases for motorized activity, these effects will be felt more. At some point, controls on the amount of use may be needed. The Recreation Report (see project record) discusses supply and demand.

Adjacent ownership: Routes have been selected to avoid conflict with adjacent landowners, and be compatible with adjacent public lands. This alternative includes much more HLO (ML2) compared to Alternative 2, reducing trespass.

Recreation settings and non-motorized recreation: Cross-country travel would be prohibited resulting in a smaller footprint for motorized activity and better management of the NFTS. Routes have been selected to reduce potential impact with non-motorized activities. More use would occur on the NFTS creating more noise and dust impacts near them, but other areas would become free of motorized activities. This will increase opportunities for quiet recreation away from the NFTS. 1.7 miles of motorized use are proposed within SPNM, though a Forest Plan Amendment. This will allow existing use to occur on 4N80Y (Candy Rock Rd.) and at 5N02R (Pine Needle Flat Trail)

Dispersed recreation access: 27.83 miles of existing routes are provided for motorized access, serving hundreds of campsites and other activities. Parking one vehicle length off the NFTS system would be allowed. Although the majority of the motorized routes accessing dispersed recreation sites were not analyzed in this project, they will remain available for walk-in access only.

Many recreation activities stage from a vehicle, camper, or trailer. Closure of routes will displace this activity to the parking area at the edge of the road. Fire rings, clearing of the Forest floor for tents, tables, etc. will result in new user-made campsites at many locations. Over time, proliferation of new campsites adjacent to NFTS roads would replace many of those closed to motorized access. Some existing campsites would continue to be used, especially those close to the parking area. Other campsites away from the road would be welcomed by those who prefer quiet recreation, solitude, and separation from motorized use, especially near water and other attractions. Many routes and campsites would not be used and will naturally recover (disappear) over time.

CUMULATIVE EFFECTS

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 will occur, primarily to complete loop opportunities (5 miles minimum). An analysis of unauthorized routes providing motorized access to dispersed recreation sites could make other additions to the NFTS not analyzed in this analysis. Timber harvest and fuel projects may make changes to the NFTS system on a case by case basis. The combined effects of past, present and reasonably foreseeable actions are not expected to be significant.

Alternative 2 (No Action)

DIRECT AND INDIRECT EFFECTS

Motorized recreation: Of the 5 alternatives, Alternative 2 would provide the most motorized opportunities with few limitations. Of the 252 miles of existing unauthorized trails, all would remain available for use. Added to the existing NFTS road and trail miles (2,259), this alternative has a total of 2,511 miles of routes plus the cross country riding opportunity. This results in more total miles of motorized opportunity than any other alternative, including alternative 4. Season of use does not change. Existing closures would remain in effect. Weather permitting, year-round opportunities exist. Allowable uses on roads will not change. Without a prohibition on cross country riding, opportunities to pioneer new routes will exist, resulting in an estimated addition of 45 miles of user made routes over the next 20 years. Due to terrain and vegetation limitations, true motorized cross country travel opportunities are limited. Significant management challenges would occur since the extensive and growing network of routes will be difficult to monitor, maintain, and enforce. Increasing resource degradation and user conflicts would reduce the quality of the experience and could lead to closure at some locations. This alternative would be the least sustainable over time. To meet standards, it would be the most expensive and most demanding.

Adjacent ownership: This alternative would have the greatest conflict with adjacent land owners and the most incompatibility with adjacent public lands. Recreation settings and non-motorized recreation: Cross-country travel would continue unabated, potentially entering SPNM areas, creating additional resource issues in the future. This alternative has the greatest potential to negatively alter recreation settings and cause resource damage. Recreation settings in popular areas will become more dominated by OHVs and their impacts as use increases in the future. Dust, noise, and vehicle traffic, resulting from motorized use, would increase and expand to new areas on the Forest. Although use would grow and expand, it will be dispersed over much of the Forest, and be less concentrated than other alternatives. This would provide more expansive riding opportunities compared to the other alternatives. This may negatively affect the experience of recreationists engaged in non-motorized activities at unpredictable locations. This alternative would have the highest potential impact on non-motorized or quiet recreation activities.

Dispersed recreation access: Alternative 2 is the only alternative that would continue to provide motorized access to all of the existing dispersed recreation sites on the forest. An estimated 1000 of these types of routes are currently in use.

CUMULATIVE EFFECTS

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 will occur, primarily to complete loop opportunities (5 miles minimum). An analysis of unauthorized routes providing motorized access to dispersed recreation sites could make other additions to the NFTS not analyzed in this analysis. Timber harvest and fuel projects may make changes to the NFTS system on a case by case basis. The combined effects of past, present and reasonably foreseeable actions are not expected to be significant.

Without a cross country prohibition, existing motorized use would continue to expand, creating approximately 2.25 miles of new unauthorized 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. The Recreation Report (see project record) discusses supply and demand.

Alternative 3 (Cross Country Prohibited)

DIRECT AND INDIRECT EFFECTS

Motorized recreation: Alternative 3 adds no additional routes, and cross-country travel would be prohibited, eliminating use on 272 miles of unauthorized routes. No conversion of NFTS routes to non-motorized use is proposed. 2,259 miles of existing roads and trails will remain available. Existing closures would remain in effect. Motorized use will be prohibited on many of the most challenging motor cycle and ATV trails. This use would continue only at existing NFTS system locations. The quality of the recreation experience for experienced riders will be most affected. Isolated segments of existing roads do not provide a quality opportunity. These segmented sections are therefore not desirable and will receive little use by motorized riders. Existing use will be concentrated in a few desirable areas. Crowded conditions would result, negatively changing the experience and setting. This alternative is the least desirable for motorized recreation. Little thought of the recreation experience has been incorporated. Use would be limited to existing level 2 roads, which do not necessarily provide continuity or loop experience.

The few existing NFTS OHV riding areas would receive substantially greater use than in Alternatives 1 or 4. The concentration of use at these locations will change the riding experience (more congestion, dust, etc). Quiet recreation will be increasingly impacted nearby, and resource impacts concentrated. Increasingly intensive management will be required as use increases beyond a desirable level in the near future. The OHV supply and demand section of the Recreation Report (see project record) discusses supply and demand.

Adjacent ownership: This alternative would have the least conflict with adjacent land owners and the most compatibility with adjacent public lands since no unauthorized routes would remain open.

Recreation settings and non-motorized recreation: Alternative 3 does not provide any additional motorized routes and prohibits cross-country travel. The recreation setting would change from a predominately motorized setting to a predominately non-motorized setting on lands currently popular for riding. This alternative would also provide the lowest potential to negatively alter recreation settings and cause resource damage. The indirect effect of displacing use to other areas is the primary impact. Outside of those few locations, dust and noise from motorized vehicles would be minimized. This alternative would result in the lowest impact to non-motorized recreation users.

Dispersed recreation: This alternative provides motorized access to the fewest number of dispersed recreation opportunities contrasting with Alternative 2 which continues all existing motorized access to dispersed campsites on the forest. All of the estimated 1000 routes will be closed to motorized travel. Parking will be limited to the shoulder of the existing roads. New campsites will be pioneered along these roads by those displaced. Campsites and special places would still be accessible to those who wish to hike or bike on the route. Dispersed campers would seek new sites in lieu of access to traditional sites which would be unavailable for motorized use. Proliferation of new campsites adjacent to parking locations along NFTS roads would occur at many locations. Demand will not be met for more difficult trail riding. Increasing demand will be focused on a limited number of riding opportunities. The quality motorized opportunities remaining on the Forest will receive a high level of use. Intensive management (permits, etc.) would be needed, since demand will soon exceed the capacity.

CUMULATIVE EFFECTS

Same as Alternative 1.

Alternative 4 (Recreation)

DIRECT AND INDIRECT EFFECTS

Motorized recreation: Of the 5 alternatives, Alternative 4 would provide the 2nd-highest motorized mileage available to all OHV use, behind alternative 2. Existing demand would be met with less concentration of use. Consideration has been given to accommodate a range of difficulties for motorcycles, ATVs, and four-wheel-drive vehicles and they are distributed to many different riding areas on the Forest. Of the 252 miles of existing trails, 182 miles will be added to the NFTS. Road management will change to allow an additional 91 miles of use by OHVs, primarily to complete loop opportunities. Access to existing staging or trailheads is convenient to most areas on good roads. Since the Forest would be closed to cross-country travel, all use is on designated routes. Unlike alternative 1, some of these routes will not be a part of a loop system. Season of use is less restrictive than either alternative 1 or 5, providing more winter opportunities. Although a reduction from the existing use, this system would be more manageable and sustainable than alternatives 2, but less than 1. Some future new trail construction will occur, primarily to complete loop opportunities (5 miles minimum). Combined with the road system, 2,532 miles of potential opportunity exist, more than the other four alternatives (see project record, specialist report Appendix A).

The more extensive riding opportunities (compared to alternatives 1,3, and 5 would disperse use and likely attract more volunteers and potential funding from the OHV community. Use would concentrate at the most popular areas, but less than alternatives 1, 3, and 5. At these popular areas, and heavily used NFTS routes, more noise and dust would occur, negatively affecting quiet recreation activities for some recreationists. As demand increases for motorized activity, these effects will be felt more. At some point, controls on the amount of use may be needed as demand exceeds available supply. The OHV supply and demand section of the Recreation Report (see project record) discusses supply and demand.

Adjacent ownership: Some conflicts with adjacent private land may occur with the routes selected for addition. Proposed routes are compatible with adjacent public lands. Fewer miles of HLO (ML2) than alternatives 1 or 4, increases the possibility of trespass.

Recreation settings and non-motorized recreation: Cross-country travel would be prohibited resulting in a smaller footprint for motorized activity and better management of the designated routes. Routes have been selected to maximize motorized opportunities on routes with legal access. This alternative has the 2nd greatest potential to impact non-motorized activities. Use would increase moderately on the designated routes creating more noise and dust impacts near them, but other areas would become free of motorized activities. This would increase opportunities for quiet recreation away from the proposed routes, but less than Alternatives 3, 5, or 1. A Forest Plan Amendment proposes 5.2 miles of motorized use are within SPNM. This will allow existing use to occur on 4N80Y (Candy Rock Rd.) and at 5N02R (Pine Needle Flat Trail), and 1N09 (Jawbone Flat).

Dispersed recreation access: This alternative would convert the majority of the motorized routes accessing dispersed recreation sites to non-motorized status. 31.86 miles of routes will continue to serve hundreds of campsites and other activities, slightly more than alternative 1. Many recreation activities stage from a vehicle, camper, or trailer. Closure of routes will displace this activity to the parking area at the edge of the road. Fire rings, clearing of the Forest floor for tents, tables, etc. will result in new user-made campsites at many locations. Over time, proliferation of new campsites adjacent to NFTS roads would replace many of those closed to motorized access. Some existing campsites would continue to be used, especially those close to the parking area (within a vehicle length of the NFTS route. Other campsites away from the road would be welcomed by those who prefer quiet recreation, solitude, and separation from motorized use, especially near water and other attractions. Many routes and campsites would not be used and will naturally recover (disappear) over time.

CUMULATIVE EFFECTS

Same as Alternative 1.

Alternative 5 (Resources)

DIRECT AND INDIRECT EFFECTS

Motorized recreation: Of the 5 alternatives, Alternative 5 would provide the lowest motorized mileage available to all OHV use. Due to the 34 miles of addition to the NFTS, more quality riding opportunities than alternative 3 would exist. Demand in the single track and ATV trail categories would not be met. This alternative includes less than ½ the mileage of alternatives 1 and 4. Little consideration was given to accommodate a range of difficulty for OHVs on trails, and they are not well distributed to different riding areas on the Forest. Of the 252 miles of existing non-system trails, 34 miles will be added to the NFTS. Changes in use on roads reduce OHV opportunities an additional 47 miles. Few loops provide very limited riding opportunities. The quality of the recreation experience for experienced riders will be most affected. Isolated segments of existing roads do not provide a quality opportunity. Existing use will be concentrated in a few desirable areas. Crowded conditions would result, negatively changing the experience and setting. Access to staging or trailheads is convenient, but loop and system riding opportunities from them are minimal. Since the Forest would be closed to cross-country travel, all use is on designated routes. Unlike alternative 1or 4, most of the routes will not be a part of a loop system. Season of use is more restrictive than either alternative 1 or 5, providing fewer winter opportunities. Being a substantial reduction from the existing use, this system would be more manageable and sustainable, but less likely to attract volunteers and partnerships. Some future new trail construction will occur, primarily to complete loop opportunities (5 miles minimum). Combined with the road system, 2,243 miles of potential opportunity in the NFTS is less than the other four alternatives, most of it on existing ML 2 roads (project record). The few remaining riding areas would receive substantially greater use than in Alternatives 1 or 4. The concentration of use at these locations will change the riding experience (more congestion, dust, etc). Quiet recreation will be increasingly impacted nearby, and resource impacts concentrated. Increasingly intensive management will be required as use increases beyond a desirable level in the near future. As demand exceeds supply, controls on amount of use will be required. The Recreation Report (see project record) discusses supply and demand.

Adjacent ownership: The low mileage of new routes reduces the possibility of conflict with adjacent landowners. No known conflicts with adjacent public lands exist.

Recreation settings and non-motorized recreation: Cross-country travel would be prohibited resulting in a smaller footprint for motorized activity and better management of the NFTS. This alternative has the least potential to impact non-motorized activities. Use would increase substantially on the NFTS, but other areas would become free of motorized activities. This would increase opportunities for quiet recreation away from the NFTS, similar to alternative 3. No motorized uses are proposed within SPNM areas.

Dispersed recreation access: Motorized access would be prohibited on the majority of existing routes. A total of 5.32 miles of routes will continue to provide motorized access to less than 100 campsites forestwide. Proliferation of new campsites adjacent to NFTS roads would occur. Demand will not be met for more difficult trail riding. Increasing demand will be focused on a limited number of riding opportunities. The quality motorized opportunities remaining on the Forest will receive a high level of use. Intensive management (permits, etc.) would be needed to protect the quality of the experience and resource since demand will soon exceed the capacity.

CUMULATIVE EFFECTS

Same as Alternative 1.

Summary of Effects Analysis across all Alternatives

1. ***Direct and indirect effects of the prohibition of cross country motorized vehicle travel in Alternatives 1, 3, 4 and 5.***

   Direct Effects: As a result of prohibiting cross-country travel, motorized recreation riding opportunities would be reduced. In addition, access to dispersed campsites by all vehicles would be reduced. This would directly impact recreationists that rely on motorized access to their "special places", reducing capacity for those types of use. Opportunities for some non-motorized recreation activities would be affected by the loss of access also. Some non-motorized opportunities would benefit by the action, which will improve opportunities for quiet recreation.

   Indirect Effects: The recreation setting in areas that receive significant cross-country use would change from a predominately motorized environment to a predominately non-motorized environment. By default, routes not inventoried or included in this analysis will be unavailable for motorized use. Vehicles would be required to park alongside the NFTS road, often in new locations. Dispersed recreation would occur at many of these locations.

2. ***Direct and indirect effects of adding facilities to the NFTS including identifying seasons of use and vehicle class in Alternatives 1, 4 and 5.***

   Direct Effects: Adding facilities would continue existing riding opportunities for OHV vehicle classes, but at a reduced scale, varying by alternative. Riding opportunities decrease during seasonal closures affecting early and late-season use. Changes of vehicle class from "highway legal only (HLO) to "all vehicles" would expand recreational opportunities on the specific routes affected.

   Indirect Effects: By adding these routes to the NFTS, it will be clear to all users where the motorized uses are allowed. This would facilitate enforcement. Maps and information about these routes would be valuable to new riders and make enforcement easier. Recreationists would know where to expect motorized activity in order to avoid it if they desire a quiet setting.

3. ***Direct and indirect effects of changes to the existing NFTS including identifying seasons of use and vehicle class in Alternatives 1, 4 and 5.***

   Direct Effects: Motorized recreation would benefit if the changes contribute to the continuity of the motor-touring experience, including access to dispersed recreation and loop trails. Motorized recreation would also benefit with the addition of routes designated for mixed use. A reduced season of use would limit early and late season access.

   Indirect Effects: Changes to the volume and mixes of vehicles would occur.

Table 3.04-8 shows a summary of the effects on recreation resources across all alternatives.

Table 3.04-8 Summary of Effects for Recreation Resources

Indicator – Recreation Resources	Rankings of Alternatives for Each Indicator[1]				
	1	2	3	4	5
Proximity: Non-motorized recreation compatibility (extent of non-motorized recreation activities displaced by motor vehicle routes)	3	2	4	2	4
Proximity: non-motorized recreation compatibility (extent of non-motorized recreation activities displaced by cross-country travel)	5	1	5	5	5
Proximity: the proximity of motor vehicle use to populated areas or neighboring public lands (proposed NFTS miles in proximity to populated areas or neighboring federal lands, within the WUI)	4	1	4	3	4
Average for non motorized/quiet recreation.	**4**	**1.3**	**4.3**	**3.3**	**4.3**
Opportunity: the quality and diversity of motorized recreation experience (number of miles devoted to each vehicle class)	3	5	1	4	1
Opportunity: the quality of motorized access to dispersed recreation opportunities (number of miles devoted to each vehicle class for access to dispersed activities)	2	5	1	3	2
Average for motorized opportunities/access	**2.5**	**5**	**1**	**3.5**	**1**

[1] A score of 5 indicates the alternative is the least impact for this resource; a score of 1 indicates the most impact.

Compliance with the Forest Plan and Other Direction

Alternatives 1, 4 and 5 include non-significant Forest Plan amendments making them consistent with the Forest Plan. Alternative 3 meets Forest Plan S&Gs. Alternative 2 does not comply with the Forest Plan because it allows wheeled vehicle travel off designated routes.

3.05 ROADLESS AND SPECIAL AREAS

This section describes the affected environment and the environmental consequences for Roadless and Special Areas. Roadless Areas are Inventoried Roadless Areas identified in the second Roadless Area Review and Evaluation (RARE II). Special Areas are Forest Plan management area land allocations that include Research Natural Areas (RNA); Special Interest Areas (SIA); Wild and Scenic Rivers and Proposed Wild and Scenic Rivers; and, Wilderness and Proposed Wilderness (USDA 2005a).

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

The Forest Service conducted RARE II from 1977 to 1979 studying 13 roadless areas (236,100 acres) on the Stanislaus for their Wilderness values. The California Wilderness Act of 1984 designated 100,000 of those acres as Wilderness, released about 100,000 acres for non-wilderness uses and identified three “further planning areas” for more study and future consideration as Wilderness: Tryon Peak (3,400 acres), Bald Peak (20,500 acres) and Pacific Valley (10,300 acres). The Forest addressed the “further planning areas” through the land management planning process in 1991 by recommending Wilderness designation for Tryon Peak and Bald Peak (USDA 1991a).

Both RARE II and the California Wilderness Act of 1984 made several roadless area boundary splits based on issues and resource values, resulting in the now 17 specific named IRAs listed in Table 3.05-1 along with the Forest Plan management area allocations. The Forest Plan allocates Wilderness, Wild Rivers, Near Natural and RNA to non-motorized uses while all other allocations allow motorized use. (USDA 2005a, p. 63-164).

Table 3.05-1 Forest Plan Management Area Allocations: Roadless Areas

Roadless Area	Management Area										acres
	Wilderness	Wild and Scenic		Near Natural	Wildlife	SIA	RNA	Scenic Corridor	General Forest	Winter Sports	
		Wild	Other								
Arnot Creek			100								100
Bald Peak	20,500	(1500)					(360)				20,500
Bell Meadow				5,700	1,500		500	250	250		8,200
Carson-Iceberg		1,700		8,900	2,700			1,200	400		14,900
Cherry Lake					1,000						1,000
Dome			950	4,500	3,500	50		2,200	200		11,400
Eagle				14,300	700			700	300		16,000
Mt. Reba				2,900	900					300	4,100
Night			1000	2,100							3,100
North Mountain		1,600		5,600					900		8,100
Pacific Valley			1000	9,300							10,300
Raymond Peak		500		2,100	600						3,200
Trumbull Peak			600	5,250		50			400		6,300
Tryon Peak	3,400	(900)									3,400
Tuolumne River		3,600		13,000				700			17,300
Waterhouse				4,200						200	4,400
Wheats Meadow				3,000	800						3,800
total	**23,900**	**7,400**	**3,650**	**80,850**	**11,700**	**100**	**500**	**5,050**	**2,450**	**500**	**136,100**

RNAs are managed to maintain select vegetative, aquatic, and/or geologic elements in natural conditions. Forest Service Manual (FSM) 4063.3 provides protection against any activities that directly or indirectly modify ecological processes (USDA 2005b). RNAs, established for research and study purposes, are a discrete land area large enough to represent a specific natural ecosystem. RNAs are important because they provide benchmarks for comparison of present and future management of the National Forests and will prove to be an invaluable asset in the future. The Forest Plan includes direction to manage RNAs with allocations to Semi-Primitive Non-Motorized ROS and Closed Motor Vehicle Travel Management (USDA 2005a, p. 134).

Forest Plan direction for SIAs is to protect values, make educational opportunities available and preserve the integrity of the special interest feature for which the areas were established (USDA 2005a, p. 117). The Forest Plan allocates the Emigrant Road and the Big Trees-Carson Valley Road SIA to Primitive ROS and Closed Motor Vehicle Travel Management because it is within Wilderness; and, all other SIAs to Semi-Primitive Motorized or Roaded Natural ROS and Restricted Motor Vehicle Travel Management (USDA 2005a, p. 119-120).

Management of Proposed Wild and Scenic Rivers within Wilderness complies with Wilderness designations and the Wilderness Act of 1964. The following river segments (46 miles) within Wilderness are not affected by the proposed action or any alternatives and motorized activity is prohibited under all the alternatives per the Wilderness Act of 1964.

- North Fork Mokelumne River: entire Segment 2, from the Mokelumne Wilderness boundary to Salt Springs Reservoir (18 miles)
- Middle Fork Stanislaus River: entire Segment 2, Kennedy Creek (8 miles)
- Middle Fork Stanislaus River: entire Segment 3, Summit Creek headwaters to Relief Reservoir (7 miles)
- Clark Fork: entire Segment 1, headwaters to Carson-Iceberg Wilderness boundary (8 miles)
- Clavey River: portion of Segment 1, Bell Creek (1 mile)
- Clavey River: portion of Segment 2, Lily Creek (4 miles)

Forest Plan direction for Proposed Wild and Scenic Rivers is to protect and enhance Wild and Scenic River characteristics and manage the same as designated Wild and Scenic Rivers (USDA 2005a, p. 108). The Forest Plan allocates Wild classification segments to Primitive or Semi-Primitive Non-Motorized ROS and Closed Motor Vehicle Travel Management; Scenic and Recreational classification segments to Roaded Natural ROS and Restricted Motor Vehicle Travel Management (USDA 2005a, p. 105-106).

The Stanislaus National Forest manages all or portions of the Carson-Iceberg, Emigrant and Mokelumne Wildernesses. Actions proposed comply with Wilderness designations and the Wilderness Act of 1964. Designated Wilderness is not affected by the proposed action or any alternative and motorized activity is prohibited in those areas under all alternatives.

Forest Plan direction for Proposed Wilderness is to protect and enhance Wilderness characteristics and manage them the same as designated Wilderness with allocations to Primitive ROS and Closed Motor Vehicle Travel Management (USDA 2005a, p. 66-67).

Effects Analysis Methodology

Assumptions Specific to Roadless and Special Areas

1. All of the unauthorized routes considered for motorized use are currently available for motorized use because nothing prohibits such use. The effect of this motorized use is part of the existing situation.
2. Actions proposed within Wilderness comply with Wilderness designations and the Wilderness Act of 1964. Designated Wilderness is not affected by the proposed action or any alternative and motorized activity is prohibited in those areas under all alternatives.
3. Outside of designated Wilderness, no Forest Order prohibiting motorized use or cross country travel is in effect within Roadless and Special Areas.

4. Wheeled Over Snow (WOS) use does not affect Roadless and Special Areas because the proposed WOS routes are all on existing NFTS routes that are open to public motorized use during the normal summer driving season.
5. No NFTS or unauthorized motorized routes exist within RNAs.
6. Bald Peak Proposed Wilderness currently contains one NFTS road segment of 07N76A (0.02 miles) that is not available for public motorized use. No other authorized or unauthorized motorized routes exist within any Proposed Wilderness.
7. No unauthorized routes in designated Wild and Scenic Rivers are added to the NFTS in any alternative and
8. No vehicle class changes are proposed in designated Wild and Scenic Rivers in any alternative.

Data Sources

1. Forest Plan
2. GIS
3. RNA Establishment Records
4. Wild and Scenic River Study

Roadless and Special Areas Indicators

The environmental consequences described for the alternatives below identify only the individual roadless and special areas affected by that alternative using the following indicators.

- **Roadless Area Characteristics**: the following values or features often characterize inventoried roadless areas (66 Federal Register 9, January 12, 2001; p. 3245):

  High quality or undisturbed soil, water, and air: these three key resources are the foundation upon which other resource values and outputs depend. Healthy watersheds catch, store, and safely release water over time, protecting downstream communities from flooding; providing clean water for domestic, agricultural, and industrial uses; helping maintain abundant and healthy fish and wildlife populations; and are the basis for many forms of outdoor recreation.

  Sources of public drinking water: National Forest System lands contain watersheds that are important sources of public drinking water. Maintaining these areas in a relatively undisturbed condition saves downstream communities millions of dollars in water filtration costs.

  Diversity of plant and animal communities: roadless areas are more likely than roaded areas to support greater ecosystem health, including the diversity of native and desired non-native plant and animal communities due to the absence of disturbances caused by roads and accompanying activities. Inventoried roadless areas also conserve native biodiversity by serving as a bulwark against the spread of non-native invasive species.

  Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land: roadless areas function as biological strongholds and refuges for many species.

  Primitive, Semi-Primitive Non- Motorized, and Semi-Primitive Motorized recreation opportunities: roadless areas often provide outstanding dispersed recreation opportunities such as hiking, camping, hunting, fishing, nordic skiing and canoeing. While they may have many wilderness-like attributes, unlike Wilderness, mountain bikes and other mechanized uses are often allowed.

  Reference landscapes: knowledge about the effects of management activities over long periods of time and on large landscapes is very limited. Reference landscapes of relatively undisturbed areas serve as a barometer to measure the effects of development on other parts of the landscape.

Natural appearing landscapes with high scenic quality: high quality scenery, especially scenery with natural-appearing landscapes, is a primary reason that people choose to recreate.

Traditional cultural properties and sacred sites: traditional cultural properties are places, sites, structures, art or objects that played an important role in the cultural history of a group. Sacred sites are places with special religious significance to a group. Traditional cultural properties and sacred sites may be eligible for protection under the National Historic Preservation Act. However, many of them have not yet been inventoried, especially those that occur in inventoried roadless areas.

Other locally identified unique characteristics: roadless areas may offer other locally identified unique characteristics and values. Examples include uncommon geological formations, valued for their scientific and scenic qualities, or unique wetland complexes.

- **Research Natural Area Values**: RNA values are specific to each RNA and may include selected aquatic, geologic or vegetation elements.
- **Special Interest Area Values**: SIA values are specific to each SIA and may include unique botanic, cultural, geologic, scenic, historic and memorial features.
- **Wild and Scenic River Values**: For a river to be eligible for Wild and Scenic River designation it must be free-flowing and, with its adjacent land area, must possess one or more outstandingly remarkable values (47 Federal Register 173, September 7, 1982; p. 39454-39461). For the purpose of this analysis Wild and Scenic River or Outstandingly Remarkable (OR) values are interchangeable. OR values are specific to each river segment any may include cultural, ecologic, fish, geologic, historic, scenic, recreation, wildlife or other special and unique features (USDA 1991b).
- **Wilderness Characteristics**: The principal Wilderness characteristics, as described in Forest Service Handbook (FSH) 1909.12, that follow are generally, but not necessarily, listed in order of importance or desirability (USDA 2007a).

Natural: ecological systems are substantially free from the effects of modern civilization and generally appear affected primarily by forces of nature. Effects of modern civilization include:

- The presence of non-native species that alter the composition of natural plant and animal communities (such as non-native plants, animals, fish, livestock, invertebrates, and pathogens).
- Developments that degrade the free-flowing condition of rivers and streams (such as dams or other water diversions and impoundments).
- The presence of light pollution that degrades night sky quality and night sky quality related values
- The presence of pollutants that degrade water quality; and,
- The health of ecosystems, plant communities, and plant species that are rare or at risk.

Undeveloped: the degree to which the area is without permanent improvements or human habitation. A measure of undeveloped is the level of human occupation and modification including evidence of structures, construction, habitations, or other forms of human presence, use and occupation.

Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation: the area provides solitude or primitive and unconfined types of recreation including a wide range of experiential opportunities such as: physical and mental challenge, adventure and self-reliance, feelings of solitude, isolation, self-awareness and inspiration. Solitude is the opportunity to experience isolation from sights, sounds, and the presence of others from the developments and evidence of humans. The opportunity to experience isolation from the evidence of humans, to feel a part of nature, to have a vastness of scale, and a degree of challenge and risk while using outdoor skills are measures of primitive and unconfined recreation.

Special Features and Values: the area provides other values such as those with ecologic, geologic, scientific, educational, scenic, historical, or cultural significance. Examples include unique fish and wildlife species, unique plants or plant communities, connectivity, potential or existing research natural areas, outstanding landscape features and significant cultural resource sites.

Roadless and Special Areas Methodology by Action

The effects of each alternative are described below according to three actions common to all alternatives:

1. **Cross Country Travel**: prohibition of cross country motor vehicle travel is included in all alternatives except Alternative 2 (No Action).
2. **Additions to the NFTS**: all unauthorized routes proposed as additions to the NFTS are added as trails. No unauthorized routes are added to the NFTS as roads in any alternative.
3. **Changes to the Existing NFTS**: includes changes to vehicle class and season of use on the existing NFTS. Impacts caused by changes to vehicle class and season of use on the existing NFTS are described generally by alternative.

Roadless Areas - Affected Environment

Six roadless areas do not contain NFTS or unauthorized motorized routes: Arnot Creek, Cherry Lake, Night, Pacific Valley, Tyron Peak and Wheats Meadow. Table 3.05-2 shows that the remaining eleven roadless areas currently contain 44.88 miles of motorized routes (41.97 NFTS and 2.91 unauthorized) of which 26.63 miles are available for public motorized use.

Table 3.05-2 Existing Motorized Routes: Roadless Areas

Roadless Area	NFTS Roads					NFTS Trails			NFTS total	UNR UNT	total
	ADM	ALL	ML1	HLO	total	ALL	ATV	total			
Bald Peak	0.02	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.02	0.00	0.02
Bell Meadow	0.00	0.16	0.00	0.00	0.16	0.01	0.00	0.01	0.17	0.00	0.17
Carson Iceberg	0.06	2.14	4.44	0.00	6.64	0.00	0.00	0.00	6.64	0.18	6.82
Dome	6.68	4.79	0.25	0.00	11.72	0.64	0.00	0.64	12.36	0.00	12.36
Eagle	0.00	0.01	0.79	0.00	0.80	6.42	0.00	6.42	7.22	0.00	7.22
Mt. Reba	0.30	0.36	0.00	0.00	0.66	3.30	0.70	4.00	4.65	1.66	6.31
North Mountain	0.00	0.17	0.00	0.07	0.24	0.00	0.00	0.00	0.24	0.03	0.27
Raymond Peak	0.00	1.55	0.00	0.00	1.55	0.00	0.00	0.00	1.55	0.21	1.76
Trumbull Peak	1.25	0.00	0.00	0.00	1.25	0.00	0.00	0.00	1.25	0.00	1.25
Tuolumne River	0.76	2.85	0.00	0.00	3.61	0.00	0.00	0.00	3.61	0.83	4.44
Waterhouse	0.84	0.55	2.86	0.00	4.25	0.00	0.00	0.00	4.25	0.00	4.25
total	**9.91**	**12.58**	**8.34**	**0.07**	**30.91**	**10.36**	**0.70**	**11.06**	**41.97**	**2.91**	**44.88**

ADM and **ML1** are closed to public motorized use
UNR and **UNT** are unauthorized roads and unauthorized trails

The following discussions focus on the 17 non-wilderness roadless areas, totaling 136,100 acres on the Stanislaus National Forest (see Figure 3.05-1)

Arnot Creek

The small Arnot Creek portion (100 acres) of the original Carson-Iceberg roadless area is located in the northeast portion of the Forest. The main attraction in this area is a maintained Forest Service non-motorized trail on a gentle grade, next to a creek within walking distance from the two Forest Service campgrounds and two organization camps. Equestrians and hikers pass through the area on their way to the Carson-Iceberg Wilderness. Soils on flat bottomlands are generally deep cobbly sandy loams, developed from glacial alluvium. Vegetative cover consists of lodgepole pine, true fir and Jeffrey pine, with montane shrubs and herbaceous species. This area does not contain any NFTS or unauthorized motorized routes.

Bald Peak

The Bald Peak portion (20,500 acres) of the original Carson-Iceberg roadless area is a proposed Wilderness addition located within a triangle formed by Clark Fork Road, Highway 108 and the Carson-Iceberg Wilderness between Iceberg Meadow and Sonora Peak. Elevations range from 6,000 to 11,462 feet. The area is typified by mountain peaks, steep slopes, scattered pockets of timber and meadows, and considerable granite rock. The Pacific Crest Trail crosses a corner of the area near Sonora Pass. One other hiking trail along Douglas Creek receives only light use. Soils between extensive rock outcrops are generally shallow to moderately deep, stony coarse sandy loams developed from volcanic and granitic bedrock and glacial debris. Meadows have deep, organic, sandy loams developed from alluvium. Red fir and lodgepole pine are the predominant tree species, with Jeffrey pine, incense cedar, and white fir common associates. Hunters use the area in pursuit of deer, grouse and quail. Spotted owl, goshawk, fisher, pine marten, wolverine and red fox inhabit this area. The area is also important as summer range for the Stanislaus Deer Herd. Table 3.05-2 shows the Bald Peak roadless area currently containing 0.02 miles of NFTS motorized routes that are not available for public motorized use. This area does not contain any unauthorized motorized routes.

Bell Meadow

The Bell Meadow roadless area (8,200 acres) is located in the central part of the Forest. Elevations range from 6,300 feet at the trailhead near the west end of Bell Meadow to 7,600 feet on the upper slopes of Bell Mountain. The area receives heavy day use due to its proximity to the popular Pinecrest recreation area. Ten miles of maintained non-motorized trails exist in the area. It is a popular entry point to the Emigrant Wilderness. Moderate livestock grazing occurs. It is heavily hunted for deer in the fall. Soils between extensive rock outcrops on the uplands are generally shallow to moderately deep, stony coarse sandy loams developed from volcanic and granitic bedrock and glacial debris. Bell Meadow has deep, organic sandy loams developed from alluvium. Vegetation is true fir, mixed conifer and lodgepole pine mixed with montane shrubs such as mountain whitethorn. Large stands of aspen as well as other wet meadow and riparian vegetation are found adjacent to the stream courses. This roadless area contains important wildlife habitat, including several key deer fawning areas, and habitat for goshawk and fisher. Bell Meadow (110 acres) is surrounded by large groves of quaking aspen with high scenic value. Table 3.05-2 shows the Bell Meadow roadless area currently containing 0.17 miles of NFTS motorized routes available for public motorized use. This area does not contain any unauthorized motorized routes.

Carson-Iceberg

The Carson-Iceberg portion (14,900 acres) of the original Carson-Iceberg roadless area is located in the north central part of the Forest. The original Carson-Iceberg roadless area was once a large contiguous unit of 132,300 acres within the Stanislaus National Forest. The California Wilderness Act of 1984 designated part of the roadless area as Wilderness. The remaining portions of the Carson-Iceberg roadless area include the western portion of Whittaker's Dardanelles, Shoofly Meadow, Bear Trap Meadow, and Highland Creek from Spicer Meadows dam to the confluence of the North Fork Stanislaus River and the Stanislaus River canyon downstream to Ramsey. Elevations vary from 4,600 feet along the Stanislaus River to 7,800 feet atop Whittaker's Dardanelles. The area is surrounded on three sides by roads, logged and developed areas. The eastern edge of this roadless area abuts the Wheats Meadow roadless area. A scout camp at Sand Flat is a source of much river use. The Spicer-Sand Flat non-motorized trail links the scout camp with Union and Utica reservoirs, Elephant Rock Lake, Summit Lake, Rock Lake and Spicer Meadow Reservoir. A mile and a half of this trail passes through the roadless area. Another non-motorized trail links Ganns on State Highway 4 with the river.

At the western edge of this roadless area access to the river is provided by a 4-wheel drive road to a site known as Ramsey. With 12 miles of maintained non-motorized trail, deer hunting is popular in the upper elevations. Soils are developed mostly from granitic glacial debris and residual rock, while about 1,200 acres are developed from residual volcanic rock. A large proportion of the soils (4,400 acres) are deep or moderately deep, sandy loams or gravelly sandy loams. Vegetation is characterized by mixed conifer, lodgepole pine and true fir forest. Meadows near Whittaker's Dardanelles include aspen and lodgepole pine. The canyons of Highland Creek and the North Fork Stanislaus contain live oak and chaparral. Meadows in the southern portion of the roadless area are important fawning grounds. The area, in general, is important summer range for the Stanislaus Deer Herd. Table 3.05-2 shows the Carson-Iceberg roadless area currently containing 6.82 miles of motorized routes (6.64 NFTS and 0.18 unauthorized) of which 2.32 miles are available for public motorized use.

Cherry Lake

The Cherry Lake roadless area (1,000 acres) is located in the east-central portion of the Forest adjacent to the Emigrant Wilderness and Yosemite National Park. Elevations range from 4,700 to 7,000 feet. The Kibbie Ridge non-motorized trail passes through the northeast corner of the area. This trail is a portal to both Yosemite and the southern portion of the Emigrant. Cherry Lake receives light to moderate use by fishermen and water skiers. Deer hunters use boats to gain access to portions of the roadless area. Much of the area consists of steep bluffs and soils are variable with bare granite outcrops interspersed with shallow to deep sandy loam to clay loam soils developed from granitic bedrock and glacial debris. Vegetation is mixed conifer with black oak and canyon live oak. This area does not contain any NFTS or unauthorized motorized routes.

Dome

The Dome roadless area (11,400 acres) is located in the northeast part of the Forest generally between Highway 108 and Eagle Meadow Road (5N01). Elevations range from 6,200 to 8,700 feet. Recreation use within the area is low due to the steep terrain; however high use campgrounds in the Brightman area and the popular Niagara Rim 4WD trail are adjacent to the area. The Double Dome rock formation is a recognized landmark which can be seen from many view points. Many no longer consider Dome a “true” roadless area due to the presence of over 5 miles of NFTS roads and evidence of past timber harvests completed in the 1980s. Table 3.05-2 shows the Dome roadless area currently containing 12.36 miles of NFTS motorized routes, of which 5.43 miles are available for public motorized use. This area does not contain any unauthorized motorized routes.

Eagle

The Eagle roadless area (16,000 acres) is located in the northeast part of the Forest. Elevations range from 6,300 to 9,700 feet. The area is characterized by bare volcanic ridges and rock outcrops, scattered timberland, and small sub-alpine meadows. Hiking and backpacking occur along Eagle Meadow and Cooper Meadow trails. Soil over most of the area is generally very thin, coarse sandy loam developed mainly from volcanic rock, except for a few areas of granitic rock. Much of the area is covered by bare volcanic rock outcrop. The Three Chimneys rock formation is a recognized landmark which can be seen from many view points. Two of the peaks are on the Emigrant Wilderness boundary. The area contains many key deer fawning sites. Table 3.05-2 shows the Eagle roadless area currently containing 7.22 miles of NFTS motorized routes, of which 6.43 miles are available for public motorized use. This area does not contain any unauthorized motorized routes.

Mt. Reba

The Mt. Reba roadless area (4,100 acres) is located in the north central part of the Forest adjacent to the Mokelumne Wilderness. Elevation ranges from 6,400 to 8,849 feet. An off-highway vehicle trail to Mt. Reba is located on the east side of this area. The western portion of the roadless area includes several jeep trails north of Bear Trap basin. A hiking trail accesses Camp Irene, a camping area on the

Mokelumne River within the Mokelumne Wilderness. The Grouse Valley trail links Highway 4 with the Mokelumne Wilderness in the center of this roadless area. Recreation use within the area is primarily deer hunting with hiking over the trails leading into the Wilderness. Occasional cross country skiers traverse the slopes of Mt. Reba. Soils on the uplands are generally moderately deep to shallow, gravelly sandy loams developed from volcanic and granitic bedrock and glacial debris. Meadow soils are organic sandy loams developed from alluvium. Vegetation includes red fir, lodgepole pine and sub-alpine species. This area is an important deer summer range. Table 3.05-2 shows the Mt. Reba roadless area currently containing 6.31 miles of motorized routes (4.67 NFTS and 1.66 unauthorized) of which 6.01 miles are available for public motorized use.

Night

The Night roadless area (3,100 acres) is located in the northeast part of the Forest. Elevations range from 6,800 to 10,600 feet. It lies between Highway 108 on the north and the Emigrant Wilderness on the south. This area is largely inaccessible and receives little use, except for the portion traversed by the Pacific Crest Trail. The area is used for hiking, deer hunting and nordic skiing. When Highway 108 is plowed over Sonora Pass in late spring, snow play and nordic skiing occur on the gentler slopes. Two low-standard trails access Nightcap Peak and Blue Canyon. Soils between extensive rock outcrops are generally shallow to moderately deep stony, coarse, sandy loams developed from volcanic and granitic bedrock. Vegetative cover consists of true fir, mountain hemlock and other sub-alpine shrubs and herbaceous species. This area does not contain any NFTS or unauthorized motorized routes.

North Mountain

The North Mountain roadless area (8,100 acres) is located in the southeast part of the Forest adjacent to Yosemite National Park. Elevations range from 2,400 to 5,800 feet. The area is characterized by steep slopes and timber in the north, and steep, rocky canyon slopes in the south. The Tuolumne River flows through five miles of the southern portion of the area. Most of the recreation use occurs along the first three miles of the Tuolumne River east of Early Intake in the form of hiking, fishing, swimming and camping. Steep slopes preclude most other uses. Soils are shallow to moderately deep, stony sandy loam to clay loam, developed from granitic rock. Vegetation in the canyon consists of live oak-chaparral on the north-facing slopes with scattered sparse stands of ponderosa pine and annual grass-chaparral on south-facing slopes. Table 3.05-2 shows the North Mountain roadless area currently containing 0.27 miles of motorized routes (0.24 NFTS and 0.03 unauthorized) available for public motorized use.

Pacific Valley

The Pacific Valley portion (10,300 acres) of the original Carson-Iceberg roadless area lies between Highway 4 and the Carson-Iceberg Wilderness in the northeast portion of the Forest. Elevations range from 7,000 to 9,600 feet. Mountain peaks, glaciated valleys with meadows, and scattered timber typify the area. Hiking, backpacking, camping, fishing and hunting, and some cross country skiing occur with most dispersed recreation along the Grouse Creek and Marshall Canyon trails. Soils between extensive rock outcrops on the uplands are generally shallow to moderately deep, stony coarse sandy loams developed from volcanic and granitic bedrock and glacial debris. Meadows have deep, organic sandy loams developed from alluvium. Lodgepole pine and red fir are the predominant tree species. The Pacific Valley further planning area is a deer summer range. This area does not contain any NFTS or unauthorized motorized routes.

Raymond Peak

The Raymond Peak roadless area (3,200 acres) is located in the northeast part of the Forest in a narrow band of land between Highway 4 and the Mokelumne Wilderness. The California Wilderness Act of 1984 designated 13,000 acres of the original 16,200 acre Raymond Peak area as Wilderness.

Elevations range from 7,400 to 3,700 feet. Recreation includes hiking, hunting, nordic skiing, fishing and motorized recreation along 8N02. Soils are generally shallow to moderately deep stony coarse sandy loams developed from volcanic and granitic bedrock and glacial debris. Meadows have deep, organic sandy loams developed from alluvium. Lodgepole pine and red fir are the predominant timber species. The area includes deer summer range. Table 3.05-2 shows the Raymond Peak roadless area currently containing 1.76 miles of motorized routes (1.55 NFTS and 0.21 unauthorized) available for public motorized use.

Trumbull Peak

This Trumbull Peak roadless area (6,300 acres) is located in the southern portion of the Forest. Elevations range from 1,400 to 4,800 feet. It is characterized by steep, south-facing slopes and hot summer temperatures. Vegetative is mostly chamise chaparral and live oak with some ponderosa pine at higher elevations. Soils are generally shallow, gravelly loams and sandy loams developed from meta-sedimentary and granitic rock. Trumbull Peak Lookout is a prominent feature. The area is a major deer winter range for a portion of the Yosemite herd. Table 3.05-2 shows the Trumbull Peak roadless area currently containing 1.25 miles of NFTS motorized routes that are not available for public motorized use. This area does not contain any unauthorized motorized routes.

Tryon Peak

Tryon Peak portion (3,400 acres) of the original Carson-Iceberg roadless area is a proposed Wilderness addition located in the northeast corner of the Forest between the Sierra Nevada crest and Highland Lakes Road. Elevations range from 8,100 to 9,970 feet. Mountain peaks, glaciated valleys with large meadows, and scattered timber characterize the area. Recreation use, primarily hikers from the Highland Lakes area and along the Pacific Crest Trail, is moderate while hunters use the area in the fall. Soils between extensive rock outcrops in the uplands are generally shallow to moderately deep, stony coarse sandy loams developed from volcanic and granitic bedrock and glacial debris. The meadows have deep, organic, sandy loams developed from alluvium. Red fir and lodgepole pine are the predominant tree species with Jeffrey pine and mountain hemlock. This area does not contain any NFTS or unauthorized motorized routes.

Tuolumne River

The Tuolumne River roadless area (17,300 acres) is located in the southwest part of the Forest. Elevations range from 900 to 3,900 feet in an area of steep mountain slopes and river canyons. It contains the lower Clavey River and about 18 miles of the Tuolumne Wild and Scenic River used for whitewater boating and dispersed camping. Three campgrounds outside the roadless area near Lumsden Bridge serve as a base for fishing and general nature study. Some deer and quail hunting occur in the fall. Hikers use about eight miles of existing trails to access the river. Vegetative cover is mostly chamise and manzanita chaparral, annual grass and live oak, with small inclusions of ponderosa pine. Soils are shallow to moderately deep sandy loam or clay on north-facing slopes, developed from meta-sedimentary and granitic rocks; some highly erodible. The area includes key deer winter range on the south-facing slopes of Jawbone Ridge and Paper Cabin Ridge. Table 3.05-2 shows the Tuolumne River roadless area currently containing 4.44 miles of motorized routes (3.61 NFTS and 0.83 unauthorized) of which 3.68 miles are available for public motorized use.

Waterhouse

The Waterhouse roadless area (4,400 acres) is located in the central portion of the Forest just east of Pinecrest Lake adjacent to the Emigrant Wilderness. Elevations vary from 5,700 to 8,200 feet. The area consists of the canyon of the upper South Fork Stanislaus River. This area receives recreation use in the form of hiking, fishing, and hunting. Its proximity to the Pinecrest Lake recreation area makes it readily accessible for day use. A trail extends eastward, up the river canyon, from Pinecrest Lake to a series of attractive granite pools and falls. Vegetation is predominantly red fir forest on upper north slopes with mixed conifer forest on upper south slopes. Lower slopes and the drainage bottom, once scoured by glaciers, are characterized by large expanses of granite with small pockets of vegetation. Pockets of soil are scattered between large expanses of bare, glaciated granitic rock in the lower part of the canyon, while on the ridge to the north, near Pinecrest Peak, soils are very shallow to shallow sandy loams developed from volcanic bedrock. On the slopes between, the soils are shallow to moderately deep, developed from granitic glacial debris. Meadows located in the area are important fawning grounds. Table 3.05-2 shows the Waterhouse roadless area currently containing 4.25 miles of NFTS motorized routes of which 0.55 miles are available for public motorized use. This area does not contain any unauthorized motorized routes.

Wheats Meadow

The Wheats Meadow portion (3,800 acres) of the original Carson-Iceberg roadless area is located in the north-central part of the Forest. Elevations range from 4,900 to 7,700 feet. The northeast portion of the area (1,800 acres) is part of Spicer Meadow Reservoir, and at full reservoir capacity is mostly underwater. Red fir, lodgepole pine, Jeffrey pine, incense cedar and white fir occur in stands and scattered pockets in the western portion of the area. Soils between extensive rock outcrops in the uplands are generally shallow to moderately deep stony coarse sandy loams developed from volcanic and granitic bedrock and glacial debris. Meadows have deep, organic sandy loams developed from alluvium. This area does not contain any NFTS or unauthorized motorized routes.

Table 3.05-3 Additions to the NFTS: Roadless Areas

Route	RD	MI	SRC	Existing			Alternative					Quad		Roadless Area
				SYS	USE	SUR	1	2	3	4	5	#	Name	
17EV130	CAL	0.27	INV	UNT	MC	NAT	MC			MC		4911	Tamarack	Mt. Reba
17EV275	CAL	0.01	INV	UNT	ALL	NAT	ALL			ALL		4911	Tamarack	Mt. Reba
17EV275	CAL	0.02	INV	UNT	MC	NAT	MC			MC		4911	Tamarack	Mt. Reba
17EV278	CAL	0.73	INV	UNT	ATV	NAT	ATV			ATV		4911	Tamarack	Mt. Reba
subtotal		1.02												
17EV320	GR	0.06	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	Tuolumne River
17EV321	GR	0.01	INV	UNT	ALL	NAT	ALL			ALL		4574	Jawbone Ridge	Tuolumne River
17EV327	GR	0.25	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	Tuolumne River
17EV328	GR	0.06	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	Tuolumne River
17EV329	GR	0.05	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	Tuolumne River
17EV330	GR	0.10	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	Tuolumne River
17EV331	GR	0.10	INV	UNT	ALL	NAT	ALL			ALL		4574	Jawbone Ridge	Tuolumne River
17EV332	GR	0.03	INV	UNT	ALL	NAT	ALL			ALL		4574	Jawbone Ridge	Tuolumne River
subtotal		0.65												
18EV301	CAL	0.05	INV	UNT	ALL	NAT	4WD			4WD	4WD	4902	Spicer Mdw Res	Raymond Peak
FR9090	CAL	0.17	MAP	UNT	ALL	NAT	4WD			4WD		4911	Tamarack	Raymond Peak
subtotal		0.21												
FR9441	CAL	0.18	MAP	UNT	ALL	NAT	4WD			ALL	4WD	4911	Tamarack	Carson-Iceberg
subtotal		0.18												
total		2.07												

Roadless Areas - Environmental Consequences

The following section describes how the alternatives affect roadless areas using the following indicators:

- Roadless Area Characteristics (roadless)
- Wilderness Characteristics (wilderness)

Table 3.05-4 Vehicles Class Changes: Roadless Areas

Route	RD	MI	SRC	Existing			Alternative					Quad		Roadless Area
				SYS	USE	SUR	1	2	3	4	5	#	Name	
FR98580	GR	0.03	INV	ML1	ALL	NAT	HLO			ALL		4562	Cherry Lake S	North Mountain
subtotal		0.03												
01N09	GR	2.78	GIS	ML2	ALL	NAT	ADM				ADM	4571	Duckwall Mt	Tuolumne River
01S06B	GR	0.07	GIS	ML2	ALL	NAT	HLO			HLO	HLO	4573	Groveland	Tuolumne River
subtotal		2.85												
03N17Y	MW	0.16	GIS	ML2	ALL	NAT					HLO	4732	Pinecrest	Bell Meadow
subtotal		0.17												
06N33Y	SU	0.92	GIS	ML2	ALL	NAT	HLO				HLO	4903	Donnell Lake	Dome
06N34Y	SU	2.82	GIS	ML2	ALL	NAT	HLO				HLO	4903	Donnell Lake	Dome
06N34YD	SU	0.25	GIS	ML2	ALL	NAT	HLO				HLO	4903	Donnell Lake	Dome
06N36Y	SU	0.75	GIS	ML2	ALL	NAT	ADM				ADM	4904	Dardanelle	Dome
subtotal		4.74												
FR8322	CAL	0.02	MAP	ML2	ALL	NAT	HLO			HLO	HLO	5063	Pacific Valley	Raymond Peak
FR8323	CAL	0.02	MAP	ML2	ALL	NAT	HLO			HLO	HLO	5063	Pacific Valley	Raymond Peak
FR9330	CAL	0.01	MAP	ML2	ALL	NAT	HLO			HLO	HLO	4902	Spicer Mdw Res	Raymond Peak
subtotal		0.05												
06N17B	CAL	0.59	GIS	ML1		NAT	ALL			ALL		4913	Boards Crossing	Carson-Iceberg
06N66YB	CAL	0.43	GIS	ML1		NAT	ALL			ALL		4914	Liberty Hill	Carson-Iceberg
06N80Y	CAL	0.55	GIS	ML1		NAT	ALL			ALL		4914	Liberty Hill	Carson-Iceberg
06N80YA	CAL	0.04	GIS	ML1		NAT	ALL			ALL		4914	Liberty Hill	Carson-Iceberg
subtotal		1.60												
total		9.43												

Alternative 1 (Proposed Action)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

The cross country travel prohibition protects the roadless and wilderness characteristics of each area by preventing route proliferation and reducing the area available for motorized use. Roadless and wilderness characteristics improve over time as unauthorized routes passively restore to natural conditions.

2. Additions to the NFTS

This alternative includes 2.07 miles of unauthorized routes added to the NFTS as trails in roadless areas (see Table 3.05-3) with direct or indirect effects as described below. All routes are located within Forest Plan land allocations allowing motorized use.

Additions to the NFTS affect roadless and wilderness characteristics in the following roadless areas:

- **Carson-Iceberg**: one segment of FR9441 (0.18 miles) accesses the North Fork Diversion Reservoir off 7N17 (Slick Rock). Although this a short trail within and adjacent to an existing developed road corridor, adding a motorized trail could affect non-motorized recreation opportunities by reducing opportunities for solitude in nearby areas.

- **Mt. Reba**: four segments (1.02 miles) in the Jelmini and Bear Trap areas access private property and popular summer and winter motorized and non-motorized opportunities. Noise resulting from motorized use on these routes could affect semi-primitive non-motorized recreation opportunities by reducing opportunities for solitude and increased conflicts between motorized and non-motorized users.
- **Raymond Peak**: one segment of FR9090 (0.17 miles) in Poison Canyon off 7N93 (Mt. Reba Road) and one segment of 18EV301 (0.05 miles) in the Highway 4 corridor above Lake Alpine access popular summer motorized opportunities. Although these are short trails within and adjacent to existing developed road corridors, adding motorized trails could affect non-motorized recreation opportunities by reducing opportunities for solitude in nearby areas.
- **Tuolumne River**: eight segments (0.65 miles) are all in one small area near the intersection of Ferretti and Lumsden roads at the upper reach of the roadless area. Noise resulting from motorized use on these routes could affect semi-primitive non-motorized recreation opportunities by reducing opportunities for solitude in the Tuolumne River canyon.

3. Changes to the Existing NFTS

Vehicle Class Changes

Vehicle class changes would occur on 9.27 miles of NFTS roads including: opening 1.63 miles of closed roads; closing to public use 3.53 miles of open roads; and, converting 4.12 miles of roads from all vehicles to highway legal only (see Table 3.05-4) with direct or indirect effects as described below.

Vehicle class changes affect roadless and wilderness characteristics in the following roadless areas:

- **Carson-Iceberg**: four NFTS road segments (1.60 miles) change from closed to all vehicles. Although these roads are within and adjacent to existing developed road corridors, opening a closed road could affect non-motorized recreation opportunities by reducing opportunities for solitude in nearby areas.
- **North Mountain**: one NFTS road segment of FR98580 (0.03 miles) changes from closed to highway legal only. Although this is a short route within and adjacent to an existing developed road corridor, opening a closed road could affect non-motorized recreation opportunities by reducing opportunities for solitude in nearby areas.

Vehicle class changes do not affect roadless and wilderness characteristics in the following roadless areas:

- **Dom**e: three NFTS road segments (3.99 miles) change from all vehicles to highway legal only, improving roadless and wilderness characteristics because they prohibit non-highway legal vehicles. One NFTS road segment of 6N36Y (0.75 miles) changes from open to closed (administrative use only), improving roadless and wilderness characteristics because it prohibits existing public motorized use.
- **Raymond Peak**: three NFTS road segments (0.05 miles) change from all vehicles to highway legal only, improving roadless and wilderness characteristics because they prohibit non-highway legal vehicles.
- **Tuolumne River**: one NFTS road segment of 1N09 (2.78 miles) changes from open to closed (administrative use only), improving roadless and wilderness characteristics because it prohibits existing public motorized use. One NFTS road segment of 1S06B (0.07 miles) changes from all vehicles to highway legal only, improving roadless and wilderness characteristics because it prohibits non-highway legal vehicles and is a short route within and adjacent to an existing developed road corridor.

Season of Use

Season of use restrictions and wet weather closures protect roadless and wilderness characteristics for undisturbed soil, water and air resources; quality of water resources; and, opportunities for semi-primitive non-motorized recreation opportunities during the closure period.

CUMULATIVE EFFECTS

The past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) do not include any actions likely to affect roadless or wilderness characteristics. Therefore, the direct and indirect effects disclosed above are the only cumulative effects on roadless areas.

Alternative 2 (No Action)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Alternative 2 (No Action)could reduce roadless and wilderness character in all roadless areas because it allows the potential for cross country travel across all 136,100 acres of roadless area outside of designated Wilderness.

Increased noise generated by motor vehicles and more evidence of human activity due to cross country travel with continued route proliferation could significantly alter the following roadless characteristics:

- High quality or undisturbed soil, water and air would be degraded
- Sources of public drinking water would be at higher risk
- Diversity of plant and animal communities would be diminished
- Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land would be degraded
- Primitive and Semi-Primitive Non- Motorized recreation opportunities would be reduced
- Natural appearing landscapes with high scenic quality would be adversely impacted.

Cross country travel with continued route proliferation could significantly alter the following wilderness characteristics:

- **Natural**: ecological systems no longer appear substantially free from the effects of modern civilization and affected primarily by forces of nature due to potential introduction of noxious weed species that alter the composition of natural plant communities and pollutants that degrade water quality.
- **Undeveloped**: increased evidence of human presence, use and occupation due to user-created trail treads with wheel tracks.
- **Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation**: reduced opportunities for solitude or primitive and unconfined types of recreation due to evidence of user-create trail treads with wheel tracks and noise generated by motor vehicles.

2. Additions to the NFTS

No direct or indirect effects on roadless areas because no unauthorized routes are added to the NFTS.

3. Changes to the Existing NFTS

No direct or indirect effects on roadless areas because no changes are made to the NFTS or existing closures.

CUMULATIVE EFFECTS

This alternative contributes towards cumulative effects on roadless areas because additional future route proliferation will adversely affect roadless and wilderness characteristics.

Alternative 3 (Cross Country Prohibited)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Same as Alternative 1.

2. Additions to the NFTS

No direct or indirect effects on roadless areas because no unauthorized routes are added to the NFTS.

3. Changes to the Existing NFTS

No direct or indirect effects on roadless areas because no changes are made to the NFTS or existing closures.

CUMULATIVE EFFECTS

The past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) do not include any actions likely to affect roadless or wilderness characteristics. Therefore, the direct and indirect effects disclosed above are the only cumulative effects on roadless areas.

Alternative 4 (Recreation)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Same as Alternative 1.

2. Additions to the NFTS

Same as Alternative 1.

3. Changes to the Existing NFTS

Vehicle Class Changes

Vehicle class changes would occur on 1.70 miles of NFTS roads including: opening 1.63 miles of closed roads; and, converting 0.07 miles of roads from all vehicles to highway legal only (see Table 3.05-4) with direct or indirect effects as described below.

Vehicle class changes affect roadless and wilderness characteristics in the following roadless areas:

- **Carson-Iceberg**: four NFTS road segments (1.60 miles) change from closed to all vehicles. Although these roads are within and adjacent to existing developed road corridors, opening a closed road could affect non-motorized recreation opportunities by reducing opportunities for solitude in nearby areas.
- **North Mountain**: one NFTS road segment of FR98580 (0.03 miles) changes from closed to highway legal only. Although this is a short route within and adjacent to an existing developed road corridor, opening a closed road could affect non-motorized recreation opportunities by reducing opportunities for solitude in nearby areas.

Vehicle class changes do not affect roadless and wilderness characteristics in the following roadless areas:

- **Raymond Peak**: three NFTS road segments (0.05 miles) change from all vehicles to highway legal only, improving roadless and wilderness characteristics because they prohibit non-highway legal vehicles.
- **Tuolumne River**: one NFTS road segment of 1S06B (0.07 miles) changes from all vehicles to highway legal only, improving roadless and wilderness characteristics because it prohibits non-highway legal vehicles and is a short route within and adjacent to an existing developed road corridor.

Season of Use

Same as Alternative 1.

CUMULATIVE EFFECTS

The past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) do not include any actions likely to affect roadless or wilderness characteristics. Therefore, the direct and indirect effects disclosed above are the only cumulative effects on roadless areas.

Alternative 5 (Resources)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Same as Alternative 1.

2. Additions to the NFTS

This alternative includes 0.23 miles of unauthorized routes added to the NFTS as trails (see Table 3.05-3) with direct or indirect effects as described below.

Additions to the NFTS affect roadless and wilderness characteristics in the following roadless areas:

- **Carson-Iceberg**: one segment of FR9441 (0.18 miles) accesses the North Fork Diversion Reservoir off 7N17 (Slick Rock). Although this is a short trail within and adjacent to an existing developed road corridor, adding a motorized trail could affect non-motorized recreation opportunities by reducing opportunities for solitude in nearby areas.
- **Raymond Peak**: one segment of 18EV301 (0.05 miles) in the Highway 4 corridor above Lake Alpine accesses popular summer motorized opportunities. Although this is a short trail within and adjacent to existing developed road corridors, adding a motorized trail could affect non-motorized recreation opportunities by reducing opportunities for solitude in nearby areas.

3. Changes to the Existing NFTS

Vehicle Class Changes

Vehicle class changes would occur on 7.81 miles of NFTS roads including: closing to public use 3.53 miles of open roads; and, converting 4.28 miles of roads from all vehicles to highway legal only (see Table 3.05-4) with direct or indirect effects as described below.

Vehicle class changes do not affect roadless and wilderness characteristics in the following roadless areas because:

- **Bell Meadow**: one NFTS road segment of 3N17Y (0.16 miles) changes from all vehicles to highway legal only, improving roadless and wilderness characteristics because it prohibits non-highway legal vehicles.

- **Dome**: three NFTS road segments (3.99 miles) change from all vehicles to highway legal only, improving roadless and wilderness characteristics because they prohibit non-highway legal vehicles. One NFTS road segment of 6N36Y (0.75 miles) changes from open to closed (administrative use only), improving roadless and wilderness characteristics because it prohibits existing public motorized use.
- **Raymond Peak**: three NFTS road segments (0.05 miles) change from all vehicles to highway legal only, improving roadless and wilderness characteristics because they prohibit non-highway legal vehicles.
- **Tuolumne River**: one NFTS road segment of 1N09 (2.78 miles) changes from open to closed (administrative use only), improving roadless and wilderness characteristics because it prohibits existing public motorized use. One NFTS road segment of 1S06B (0.07 miles) changes from all vehicles to highway legal only, improving roadless and wilderness characteristics because it prohibits non-highway legal vehicles and it is a short route within and adjacent to an existing developed road corridor.

Season of Use

Same as Alternative 1.

CUMULATIVE EFFECTS

The past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) do not include any actions likely to affect roadless or wilderness characteristics. Therefore, the direct and indirect effects disclosed above are the only cumulative effects on roadless areas.

Research Natural Areas - Affected Environment

The following discussions focus on the 4 RNAs, totaling 2,453 acres on the Stanislaus National Forest (see Figure 3.05-1).

Bell Meadow Research Natural Area

Bell Meadow RNA (490 acres) designated for aspen research is located in the east-central portion of the Forest. It contains 110 acres of aspen stands in Bell Meadow along with wet mountain meadow, riparian habitat and examples of the aspen-meadow complex on deep soils.

Clark Fork Candidate Research Natural Area

Clark Fork Candidate RNA (460 acres) designated for white fir research is located in the northeast portion of the Forest near Clark Fork Campground. It includes various mixtures of white fir and other conifers at a range of elevations. Part of the area (250 acres) is within the Bald Peak proposed addition to the Carson-Iceberg Wilderness and the remainder is within the Clark Fork proposed Wild and Scenic River.

Critchfield (Bourland Meadow) Research Natural Area

Critchfield RNA (1,003 acres) designated for bogs and meadow research is located in the east-central portion of the Forest adjacent to the Emigrant Wilderness. Vegetation consists of seven major associations: red fir, red fir-lodgepole pine, red fir-western white pine-lodgepole pine, red fir-white fir-Jeffrey pine, red fir-white fir, and red fir-aspen. Wet and dry meadows are present and the area is noted for aquatic bog values. Stages of succession are present in several stands, including meadows.

Grizzly Mountain Research Natural Area

Grizzly Mountain RNA (500 acres) designated for black oak research is located in the southern portion of the Forests on the northern slopes of Little Grizzly and Big Grizzly Mountains. Black oak stands occupy most of the area, interspersed with brush and scattered ponderosa pine.

Research Natural Areas - Environmental Consequences

Since unauthorized or NFTS routes do not exist within RNAs the following section describes only the effects of cross country travel on RNAs using the following indicator:

- RNA values

Alternative 1 (Proposed Action)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

The cross country travel prohibition protects the RNA values of each area by preventing route proliferation and reducing the area available for motorized use.

CUMULATIVE EFFECTS

The past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) do not include any actions likely to affect RNA values. Therefore, the direct and indirect effects disclosed above are the only cumulative effects on roadless areas.

Alternative 2 (No Action)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Alternative 2 (No Action) could reduce RNA values in all RNAs because it allows the potential for cross country travel across all 2,453 acres of RNAs. Cross country travel with continued route proliferation could significantly reduce botanic, cultural, heritage, historic and scenic values across all RNAs.

CUMULATIVE EFFECTS

This alternative contributes towards cumulative effects on RNAs because additional future route proliferation will adversely affect RNA values.

Alternative 3 (Cross Country Prohibited)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Same as Alternative 1.

CUMULATIVE EFFECTS

Same as Alternative 1.

Alternative 4 (Recreation)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Same as Alternative 1.

CUMULATIVE EFFECTS

Same as Alternative 1.

Alternative 5 (Resources)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Same as Alternative 1.

CUMULATIVE EFFECTS

Same as Alternative 1.

Special Interest Areas - Affected Environment

Five SIAs do not contain NFTS or unauthorized motorized routes: Bourland Creek, Emigrant Road and the Big Trees-Carson Valley Road, Pacific Madrone, Sonora-Mono Toll Road and Windeler Cave. Table 3.05-5 shows that the remaining six SIAs currently contain 11.71 miles of motorized routes (10.94 NFTS and 0.77 unauthorized) of which 10.29 miles are available for public motorized use.

The following discussions focus on the 11 SIAs, totaling 2,468 acres and three historic road corridors on the Stanislaus National Forest[4] (see Figure 3.05-1).

Table 3.05-5 Existing Motorized Routes: Special Interest Areas

Special Interest Area	NFTS Roads					NFTS Trails			NFTS total	UNR UNT	total
	ADM	ALL	ML1	HLO	total	ALL	ATV	total			
Bull Run	0.00	0.06	0.00	0.00	0.06	0.18	0.00	0.18	0.24	0.00	0.24
Column of the Giants	0.00	0.00	0.00	0.39	0.39	0.00	0.00	0.00	0.39	0.00	0.39
Jawbone Falls	0.00	0.74	0.01	0.00	0.75	0.00	0.00	0.00	0.75	0.00	0.75
Jordan Cr/Bower Cave	0.00	4.33	0.38	0.20	4.91	0.00	0.00	0.00	4.91	0.77	5.68
Niagara Creek and Falls	0.00	1.40	0.68	0.00	2.08	0.05	0.00	0.05	2.12	0.00	2.12
Trumbull Peak	0.00	2.17	0.36	0.00	2.53	0.00	0.00	0.00	2.53	0.00	2.53
total	**0.00**	**8.70**	**1.42**	**0.59**	**10.71**	**0.23**	**0.00**	**0.23**	**10.94**	**0.77**	**11.71**

ADM and **ML1** are closed to public motorized use
UNR and **UNT** are unauthorized roads and unauthorized trails

Bourland Creek Trestle Historic Area

The Bourland Creek Trestle SIA (0.5 acres) contains a large, curved, wooden trestle that once supported rails for the Westside Railroad logging system. It was built in the early 1920s. It is 315 feet long and 76 feet above Bourland Creek. The trestle has 22 bents that are spaced 14 feet on center. It is anchored by rough aggregate concrete abutments and piers. This area does not contain any NFTS or unauthorized motorized routes.

Bull Run Scenic and Geologic Area

The Bull Run SIA (230 acres) consists of a rugged lava-capped ridge of horseshoe shape enclosing a forested bowl. It contains a variety of unique rock formations formed through volcanic and glacial action. Table 3.05-5 shows that the Bull Run SIA currently contains 0.24 miles of NFTS motorized routes of which 0.18 miles are available for public motorized use. This area does not contain any unauthorized motorized routes.

Columns of the Giants Scenic and Geologic Area

Column of the Giants SIA (105 acres) includes a unique formation of columnar basalt. A National Recreation Trail accesses the area. It is a miniature “Devil's Postpile” approximately 21 miles

[4] Five other SIAs are administratively confidential, in order to protect location information for non-renewable resources subject to vandalism.

northeast of Strawberry along Highway 108. Table 3.05-5 shows that the Column of the Giants SIA currently contains 0.39 miles of NFTS motorized routes available for public motorized use. This area does not contain any unauthorized motorized routes.

Emigrant Road and the Big Trees-Carson Valley Road Historic Areas

The Emigrant Road and the Big Trees-Carson Valley Road SIA contains segments of two of the historic routes over the Sierra from the 1800s. The Emigrant Road runs parallel and south of Highway 4 from Mosquito Lakes to Lake Alpine. The Big Trees-Carson Valley Road goes from Lake Alpine south and west to Alpine Station. This area does not contain any NFTS or unauthorized motorized routes.

Jawbone Falls Heritage Area

The Jawbone Falls SIA (47 acres) contains special heritage resources on Jawbone Creek, between Jawbone Falls and Jawbone Meadow. Table 3.05-5 shows that the Jawbone Falls SIA currently contains 0.75 miles of NFTS motorized routes of which 0.74 miles are available for public motorized use. This area does not contain any unauthorized motorized routes.

Jordan Creek/Bower Cave Cultural and Geologic Area

The Jordan Creek/Bower Cave SIA (1,600 acres) includes the former Linkletter Ranch property which was acquired through a land exchange in December, 1990. It is situated in a botanically diverse location due to several geological features. Three prominent drainages cut through the area allowing for a wide variety of slope aspects as well as riparian and meadow habitats. Outcrops of limestone/marble and areas of differing soil depths contribute to the wide variety of plant life. Six plant communities are represented within the SIA: freshwater marsh; mixed-conifer forest; lower montane meadow; streamside riparian; foothill woodland; and chaparral. Bower Cave is a unique limestone cavern, once a popular recreation attraction in the early 1900s and has Native American sacred values. It is located in the southwest portion of the Forest along the North Fork Merced River. Table 3.05-5 shows that the Jordan Creek/Bower Cave SIA currently contains 5.68 miles of motorized routes (4.91 NFTS and 0.77 unauthorized) of which 5.30 miles are available for public motorized use.

Niagara Creek and Falls Scenic and Geologic Area

The Niagara Falls SIA (320 acres) is located adjacent to Donnell Reservoir. It includes a "hanging valley" waterfall over 900 feet high. It is the highest waterfall on the Forest and is the Forest's only true hanging valley waterfall. This portion of Niagara Creek is also a proposed Wild and Scenic River. Table 3.05-5 shows that the Niagara Creek and Falls SIA currently contains 2.12 miles of NFTS motorized routes of which 1.45 miles are available for public motorized use. This area does not contain any unauthorized motorized routes.

Pacific Madrone Botanic Area

The Pacific Madrone SIA (15 acres) contains the two southernmost known groves of Pacific Madrone (*Arbutus menziesii*). About 0.1 miles apart, the two groves together contain 20 mature and sapling trees and some seedlings surrounded by riparian vegetation. This area does not contain any NFTS or unauthorized motorized routes.

Sonora-Mono Toll Road Historic Area

The Sonora-Mono Toll Road SIA is an old trans-Sierra road roughly following Highway 108 from Sonora Pass to Eagle Meadow Road (5N01). Other segments of the historic road are thought to exist west of 5N01, but their exact location is unknown. This area does not contain any NFTS or unauthorized motorized routes.

Trumbull Peak Historic and Botanic Area

The Trumbull Peak SIA (150 acres) includes the upper slopes of Trumbull Peak, the Trumbull Peak Lookout, a railroad spur and two logging inclines. The historical features date back to the 1920s. The abandoned inclines total about 1.75 miles. A railroad spur to the longest incline, overlooking the Merced River Canyon, is about 4,000 feet long. The Trumbull Peak Lookout is located on a ridge south of Trumbull Peak at the end of a 0.25 mile non-motorized trail. The area includes populations of three sensitive plants: *Allium yosemitense, Eriophyllum congdoni, and Lewisia congdonii*. Table 3.05-5 shows that the Trumbull Peak SIA currently contains 2.53 miles of NFTS motorized routes of which 2.17 miles are available for public motorized use. This area does not contain any unauthorized motorized routes.

Windeler Cave Geologic Area

The Windelar Cave SIA (0.5 acres) consists of a limestone cave, thought to be over 2,500 feet long, containing a variety of stalactite and stalagmite formations. This area does not contain any NFTS or unauthorized motorized routes.

Special Interest Areas - Environmental Consequences

The following section describes how the alternatives affect SIAs using the following indicator:

- SIA values

Table 3.05-6 Additions to the NFTS: Special Interest Areas

Route	RD	MI	SRC	Existing			Alternative					Quad		Special Interest Area
				SYS	USE	SUR	1	2	3	4	5	#	Name	
FR10178	GR	0.48	MAP	UNR	ALL	NAT	4WD			4WD		4391	Buckhorn Peak	Jordan Cr/Bower Cave
FR98486	GR	0.21	INV	UNT	ALL	NAT	ALL			ALL		4391	Buckhorn Peak	Jordan Cr/Bower Cave
FR98488	GR	0.05	INV	UNT	ALL	NAT	4WD			4WD		4391	Buckhorn Peak	Jordan Cr/Bower Cave
FR98510	GR	0.04	INV	UNT	ALL	NAT	4WD			4WD		4574	Jawbone Ridge	Jordan Cr/Bower Cave
total		**0.78**												

Table 3.05-7 Vehicles Class Changes: Special Interest Areas

Route	RD	MI	SRC	Existing			Alternative					Quad		Special Interest Area
				SYS	USE	SUR	1	2	3	4	5	#	Name	
02S24Y	GR	0.32	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4391	Buckhorn Peak	Jordan Cr/Bower Cave
FR4898	GR	0.09	GIS	ALL	ALL	NAT	ADM				ADM	4574	Jawbone Ridge	Jordan Cr/Bower Cave
FR4898	GR	0.22	GIS	ALL	ALL	NAT	ADM				ADM	4574	Jawbone Ridge	Jordan Cr/Bower Cave
FR8602	GR	0.23	MAP	ALL	ALL	NAT	ADM				ADM	4574	Jawbone Ridge	Jordan Cr/Bower Cave
subtotal		0.86												
02S20C	GR	0.37	GIS	ML1		NAT	t-ALL			t-ALL		4381	El Portal	Trumbull Peak
subtotal		0.37												
total		**1.23**												

Alternative 1 (Proposed Action)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

The cross country travel prohibition protects the SIA values of each area by preventing route proliferation and reducing the area available for motorized use. SIA values improve over time as unauthorized routes passively restore to natural conditions.

2. Additions to the NFTS

This alternative includes 0.78 miles of unauthorized routes added to the NFTS as trails in SIAs (see Table 3.05-6) with direct or indirect effects as described below. All routes are located within Forest Plan land allocations allowing motorized use.

Additions to the NFTS do not affect SIA values in the following SIA because:

- **Jordan Creek/Bower Cave**: four segments (0.78 miles) in the Jordan Creek area access popular dispersed recreation opportunities, not affecting SIA values because these are short trails within and adjacent to existing developed road corridors.

3. Changes to the Existing NFTS

Vehicle Class Changes

Vehicle class changes would occur on 1.23 miles of NFTS roads including: converting 0.37 miles of closed roads to a trail open to all vehicles; changing 0.32 miles from all vehicles to highway legal only; and, closing 0.54 miles of open roads (see Table 3.05-7) with direct or indirect effects as described below.

Vehicle class changes do not affect SIA values in the following SIAs because:

- **Jordan Creek/Bower Cave**: three NFTS road segments (0.54 miles) change from open to closed (administrative use only), improving SIA values because they eliminate existing motorized use. One NFTS road segment of 2S24Y (0.32 miles) changes from all vehicles to highway legal only, improving SIA values because it prohibits non-highway legal vehicles.
- **Trumbull Peak**: one NFTS road segment of 2S20C (0.37 miles) converts from a closed road to a trail open to all vehicles, not affecting SIA values because it is a short route within and adjacent to existing developed road corridors over 1 mile from the actual Trumbull Peak Lookout site.

Season of Use

Season of use restrictions and wet weather closures protect the special values of all SIAs by prohibiting motorized use during the closure period.

CUMULATIVE EFFECTS

The past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) do not include any actions likely to affect SIA values. Therefore, the direct and indirect effects disclosed above are the only cumulative effects on SIAs.

Alternative 2 (No Action)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Alternative 2 (No Action) could reduce values in all SIAs because it allows the potential for cross country travel across all 2,468 acres of SIAs and one historic road corridor. Cross country travel with continued route proliferation could significantly reduce botanic, cultural, heritage, historic and scenic values across all SIAs.

2. Additions to the NFTS

No direct or indirect effects on SIAs without unauthorized routes added to the NFTS.

3. Changes to the Existing NFTS

No direct or indirect effects on SIAs without changes to the existing NFTS or existing closures.

Cumulative Effects

This alternative contributes towards cumulative effects on SIAs because additional future route proliferation will adversely affect SIA values.

Alternative 3 (Cross Country Prohibited)

Direct and Indirect Effects

1. Cross Country Travel

Same as Alternative 1.

2. Additions to the NFTS

No direct or indirect effects on SIAs without unauthorized routes added to the NFTS as trails.

3. Changes to the Existing NFTS

No direct or indirect effects on SIAs without changes to the existing NFTS or existing closures.

Cumulative Effects

The past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) do not include any actions likely to affect SIA values. Therefore, the direct and indirect effects disclosed above are the only cumulative effects on SIAs.

Alternative 4 (Recreation)

Direct and Indirect Effects

1. Cross Country Travel

Same as Alternative 1.

2. Additions to the NFTS

Same as Alternative 1.

3. Changes to the Existing NFTS

Vehicle Class Changes

Vehicle class changes would occur on 0.69 miles of NFTS roads including: converting 0.37 miles of closed roads to a trail open to all vehicles; and, changing 0.32 miles from all vehicles to highway legal only (see Table 3.05-7) with direct or indirect effects as described below.

Vehicle class changes do not affect SIA values in the following SIAs because:

- **Jordan Creek/Bower Cave**: one NFTS road segment of 2S24Y (0.32 miles) changes from all vehicles to highway legal only, improving SIA values because it prohibits non-highway legal vehicles.
- **Trumbull Peak**: one NFTS road segment of 2S20C (0.37 miles) converts from a closed road to a trail open to all vehicles, not affecting SIA values because it is a short route within and adjacent to existing developed road corridors over 1 mile from the actual Trumbull Peak Lookout site.

Season of Use

Same as Alternative 1.

CUMULATIVE EFFECTS

The past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) do not include any actions likely to affect SIA values. Therefore, the direct and indirect effects disclosed above are the only cumulative effects on SIAs.

Alternative 5 (Resources)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Same as Alternative 1.

2. Additions to the NFTS

No direct or indirect effects on SIAs without unauthorized routes added to the NFTS.

3. Changes to the Existing NFTS

Vehicle Class Changes

Vehicle class changes would occur on 1.23 miles of NFTS roads including: converting 0.37 miles of closed roads to a trail open to all vehicles; changing 0.32 miles from all vehicles to highway legal only; and, closing 0.54 miles of open roads (see Table 3.05-7) with direct or indirect effects as described below.

Vehicle class changes do not affect SIA values in the following SIA because:

- **Jordan Creek/Bower Cave**: three NFTS road segments (0.54 miles) change from open to closed (administrative use only), improving SIA values because they eliminate existing motorized use. One NFTS road segment of 2S24Y (0.32 miles) changes from all vehicles to highway legal only, improving SIA values because it prohibits non-highway legal vehicles.

Vehicle Class Changes

Season of Use

Same as Alternative 1.

CUMULATIVE EFFECTS

The past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) do not include any actions likely to affect SIA values. Therefore, the direct and indirect effects disclosed above are the only cumulative effects on SIAs.

Wild and Scenic and Proposed Wild and Scenic Rivers - Affected Environment

Wild and Scenic Rivers and Proposed Wild and Scenic Rivers are managed to preserve their notable values or features as part of, or for eventual inclusion in, the National Wild and Scenic River System. On the Stanislaus National Forest this management applies to those National Forest lands within 1/4 mile on either side of approximately 29 miles of the Tuolumne Wild and Scenic River; 11 miles of the Merced Wild and Scenic River; and, 160 miles of Proposed Wild and Scenic Rivers.

The Stanislaus Proposed Wild and Scenic River does not contain authorized or unauthorized motorized routes. Table 3.05-8 shows that the remaining 9 Wild and Scenic Rivers and Proposed Wild and Scenic Rivers currently contain 84.29 miles of motorized routes (77.75 NFTS and 6.54 unauthorized) of which 68.66 miles are available for public motorized use.

Table 3.05-8 Existing Motorized Routes: Wild and Scenic Rivers

Wild and Scenic Rivers	NFTS Roads					NFTS Trails			NFTS total	UNR UNT	total
	ADM	ALL	ML1	HLO	total	ALL	ATV	total			
Clark Fork	2.00	1.49	1.14	4.32	8.95	0.00	0.00	0.00	8.95	0.00	8.95
Clavey	0.00	21.86	1.09	3.59	26.54	0.07	0.00	0.07	26.61	5.44	32.05
Merced	1.58	0.00	0.00	0.00	1.58	0.00	0.00	0.00	1.58	0.00	1.58
Middle Fork Stanislaus	2.16	2.77	3.03	10.92	18.88	0.28	0.00	0.28	19.16	0.00	19.16
Niagara Creek	0.00	1.40	0.68	0.00	2.08	0.02	0.00	0.02	2.10	0.00	2.10
North Fork Mokelumne	0.00	1.12	0.00	0.90	2.02	0.00	0.00	0.00	2.02	1.10	3.12
North Fork Stanislaus	2.55	3.85	0.25	2.68	9.34	0.00	0.00	0.00	9.34	0.00	9.34
South Fork Tuolumne	0.00	0.14	0.99	0.20	1.33	0.00	0.00	0.00	1.33	0.00	1.33
Tuolumne	0.00	6.06	0.16	0.44	6.66	0.00	0.00	0.00	6.66	0.00	6.66
total	**8.29**	**38.70**	**7.34**	**23.05**	**77.38**	**0.37**	**0.00**	**0.37**	**77.75**	**6.54**	**84.29**

ADM and **ML1** are closed to public motorized use
UNR and **UNT** are unauthorized roads and unauthorized trails

The following discussions focus on the 2 Wild and Scenic Rivers and 8 Proposed Wild and Scenic Rivers, totaling 200 miles on the Stanislaus National Forest (see Figure 3.05-1). Each provides a brief description of the river listing their OR values. Detailed information about each river is contained in the project record.

Clark Fork

This portion of the Clark Fork Proposed Wild and Scenic River includes the 9 mile Recreational segment from the Carson-Iceberg Wilderness to the Middle Fork Stanislaus. The 8 mile Wild segment within Wilderness is not included. The river is located in the north-central portion of the Forest. OR values include recreation and scenic. Table 3.05-8 shows that the Clark Fork Proposed Wild and Scenic River currently contains 8.95 miles of NFTS motorized routes of which 5.81 miles are available for public motorized use. This area does not contain any unauthorized motorized routes.

Clavey River

The Clavey Proposed Wild and Scenic River includes 28 miles of Wild and 14 miles of Scenic segments including its tributaries Bell Creek and Lily Creek. The 5 miles of Wild segments within Wilderness are not included. OR values include ecologic, fish, recreation, scenic and wildlife. Table 3.05-8 shows that the Clavey Proposed Wild and Scenic River currently contains 32.05 miles of motorized routes (26.61 NFTS and 5.44 unauthorized) of which 30.96 miles are available for public motorized use.

Merced Wild and Scenic River

The Stanislaus National Forest portion of the Merced Wild and Scenic River includes the 11 mile Recreation segment from Yosemite National Park to the lower National Forest boundary. The Stanislaus National Forest portion of the Merced Wild and Scenic River forms the boundary between the Stanislaus and Sierra National Forests[5]. OR values include recreation, scenic and whitewater boating. Table 3.05-8 shows that the Merced Wild and Scenic River currently contains 1.58 miles of NFTS motorized routes that are not available for public motorized use. This area does not contain any unauthorized motorized routes.

Middle Fork Stanislaus River

The Middle Fork Stanislaus Proposed Wild and Scenic River includes 6.5 miles of Wild and 20 miles of Recreational segments including its tributary Deadman Creek. The 15 miles of Wild segments (Kennedy Creek and Summit Creek) within Wilderness are not included. The river is located in the east and central portions of the Forest. OR values include fish, geologic, historic/cultural, recreation,

[5] By special agreement, the Sierra National Forest manages the Merced Wild and Scenic River corridor.

wildlife and other. Table 3.05-8 shows that the Middle Fork Stanislaus Proposed Wild and Scenic River currently contains 19.16 miles of NFTS motorized routes of which 13.97 miles are available for public motorized use. This area does not contain any unauthorized motorized routes.

Niagara Creek

The Niagara Creek Proposed Wild and Scenic River includes the 1 mile eligible Scenic segment from Highway 108 to Donnell Reservoir. The creek is located in the north-central portion of the Forest. OR values include geologic and scenic. Table 3.05-8 shows that the Niagara Creek Proposed Wild and Scenic River currently contains 2.10 miles of NFTS motorized routes of which 1.42 miles are available for public motorized use. This area does not contain any unauthorized motorized routes.

North Fork Mokelumne River

This portion of the North Fork Mokelumne Proposed Wild and Scenic River includes the 9 mile Recreational segment from Highland Lake to the Mokelumne Wilderness boundary. The 18 mile Wild segment within Wilderness is not included[6]. The river is located in the northern portion of the Forest and forms part of the boundary between the Stanislaus and Eldorado National Forests. OR values include recreation and scenic. Table 3.05-8 shows that the North Fork Mokelumne Proposed Wild and Scenic River currently contains 3.12 miles of motorized routes (2.02 NFTS and 1.10 unauthorized) available for public motorized use.

North Fork Stanislaus River

The North Fork Stanislaus Proposed Wild and Scenic River includes 20 miles of Wild and 3 miles of Recreational segments from Highland Creek to the Middle Fork Stanislaus. The river is located in the west-central portion of the Forest. OR values include recreation, scenic, wildlife and other[7]. Table 3.05-8 shows that the North Fork Stanislaus Proposed Wild and Scenic River currently contains 9.34 miles of NFTS motorized routes of which 6.54 miles are available for public motorized use. This area does not contain any unauthorized motorized routes.

South Fork Tuolumne River

The South Fork Tuolumne Proposed Wild and Scenic River includes the 2 mile Scenic segment from the Middle Fork Tuolumne to the Tuolumne. The river is located in the south-central portion of the Forest. OR values include scenic and other. Table 3.05-8 shows that the South Fork Tuolumne Proposed Wild and Scenic River currently contains 1.33 miles of NFTS motorized routes of which 0.34 miles are available for public motorized use. This area does not contain any unauthorized motorized routes.

Stanislaus River

The Stanislaus Proposed Wild and Scenic River includes the 1.5 mile Wild segment from the North Fork/Middle Fork Stanislaus confluence to Clark Flat. The river is located near the western boundary of the Forest. OR values include recreation and scenic. This area does not contain any NFTS or unauthorized motorized routes.

Tuolumne Wild and Scenic River

The Stanislaus National Forest portion of the Tuolumne Wild and Scenic River includes 24 miles of Wild, 4 miles of Scenic and 1 mile of Recreational segments. The river is located in the south-central part of the Forest. OR values include fish, geologic, historic/cultural, recreation, scenic, scientific/educational, whitewater boating and wilderness characteristics. Table 3.05-8 shows that the Tuolumne Wild and Scenic River currently contains 6.66 miles of NFTS motorized routes of which

[6] By special agreement, the Eldorado National Forest manages the North Fork Mokelumne below Salt Springs.
[7] Other: considered sensitive because they are fragile or nonrenewable.

6.06 miles are available for public motorized use. This area does not contain any unauthorized motorized routes.

Wild and Scenic and Proposed Wild and Scenic Rivers - Environmental Consequences

The following section describes how the alternatives affect Wild and Scenic Rivers and Proposed Wild and Scenic Rivers using the following indicator:

- Wild and Scenic River Values (OR values)

Alternative 1 (Proposed Action)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

The cross country travel prohibition protects the OR values of each river by preventing route proliferation and reducing the area available for motorized use. OR values improve over time as unauthorized routes passively restore to natural conditions.

2. Additions to the NFTS

This alternative includes 4.68 miles of unauthorized routes added to the NFTS as trails in Proposed Wild and Scenic Rivers (see Table 3.05-9) with direct or indirect effects as described below. All routes are located within Forest Plan land allocations allowing motorized use.

Additions to the NFTS do not affect OR values on the following Proposed Wild and Scenic Rivers because:

- **Clavey**: eleven segments (3.60 miles) access popular dispersed recreation opportunities in the Scenic segment between the Bell/Lily confluence and Cottonwood Road, not affecting OR values because they are short trails within and adjacent to existing developed road corridors.
- **North Fork Mokelumne**: nine segments (1.08 miles) provide highway legal only access to popular dispersed recreation opportunities in the Recreational segment along Highland Lakes Road, not affecting OR values because they are short trails within and adjacent to existing developed road corridors.

3. Changes to the Existing NFTS

Vehicle Class Changes

Vehicle class changes would occur on 18.46 miles of NFTS roads in Proposed Wild and Scenic Rivers including: converting 0.25 miles of closed to an ATV trail; converting 0.24 miles of all vehicles to a 4WD trail; changing 1.15 miles of closed to administrative use only; closing 0.80 miles of open roads; changing 1.79 miles from highway legal only to all vehicles; and, changing 14.23 miles from all vehicles to highway legal only (see Table 3.05-10) with direct or indirect effects as described below.

Vehicle class changes do not affect OR values on the following Proposed Wild and Scenic Rivers because:

- **Clark Fork**: one segment of 6N06C (0.26 miles) changes from all vehicles to highway legal only, improving OR values because it prohibits non-highway legal vehicles.
- **Clavey**: one NFTS road segment of 3N08Y (0.25 miles) converts from a closed road to an ATV trail, not affecting OR values because it is a short trail within and adjacent to an existing developed road corridor. One NFTS road segment of 1S01 (1.15 miles) changes from closed to administrative use only, not affecting OR values because it does not increase public use.

One NFTS road segment of 2N58 (0.80 miles) changes from open to closed, improving OR values because it prohibits existing public motorized use. Two NFTS road segments (1.79 miles) change from highway legal only to all vehicles, not affecting OR values because they are main Forest roads in existing developed road corridors. Five NFTS road segments (6.98 miles) change from all vehicles to highway legal only, improving OR values because they prohibit non-highway legal vehicles.

- **Middle Fork Stanislaus**: one NFTS road segment of 6N82Y (0.24 miles) converts from an all vehicles road to a 4WD trail, improving OR values because it prohibits non-highway legal vehicles. Twenty-one NFTS road segments (3.70 miles) change from all vehicles to highway legal only, improving OR values because they prohibit non-highway legal vehicles.
- **North Fork Mokelumne**: six NFTS road segments (0.67 miles) change from all vehicles to highway legal only, improving OR values because they prohibit non-highway legal vehicles.
- **North Fork Stanislaus**: four NFTS road segments (0.98 miles) change from all vehicles to highway legal only, improving OR values because they prohibit non-highway legal vehicles. One NFTS road segment of 4N80Y (0.16 miles) and one NFTS road segment of 5N02R (1.48 miles) change from all vehicles to highway legal only, improving OR values because they prohibit non-highway legal vehicles and are located within or adjacent to existing road corridors and developed areas; although these two roads are located within proposed Wild River corridors, continued highway legal only use will not preclude future Wild and Scenic River designation or Wild classification of these segments of North Fork Stanislaus.

Table 3.05-9 Additions to the NFTS: Proposed Wild and Scenic Rivers

Route	RD	MI	SRC	Existing			Alternative					Quad		Proposed Wild and Scenic River
				SYS	USE	SUR	1	2	3	4	5	#	Name	
17EV299	MW	0.59	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	Clavey (Scenic)
17EV51	MW	0.69	INV	UNT	ATV	NAT	ATV			ATV	ATV	4744	Hull Creek	Clavey (Scenic)
17EV51	MW	0.83	INV	UNT	ATV	NAT				ATV		4744	Hull Creek	Clavey (Scenic)
18EV270	MW	0.36	INV	UNT	ALL	NAT	ALL			ALL		4732	Pinecrest	Clavey (Scenic)
18EV271	MW	0.34	INV	UNT	ATV	NAT	ATV			ATV		4732	Pinecrest	Clavey (Scenic)
18EV276	MW	0.10	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	Clavey (Scenic)
18EV278	MW	0.08	INV	UNT	MC	NAT				MC		4732	Pinecrest	Clavey (Scenic)
18EV310	MW	0.56	INV	UNT	ALL	NAT	ALL			ATV		4744	Hull Creek	Clavey (Scenic)
18EV63	MW	0.26	INV	UNT	ATV	NAT	ATV			ALL		4744	Hull Creek	Clavey (Scenic)
18EV95	MW	0.31	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	Clavey (Scenic)
31821C	MW	0.20	GIS	UNR	ALL	NAT	ALL			ALL		4733	Cherry Lake N	Clavey (Scenic)
31821H	MW	0.10	GIS	UNT	ALL	NAT	ALL			ALL		4732	Pinecrest	Clavey (Scenic)
EV681	MW	0.09	INV	UNT	ALL	NAT	ALL			ALL		4732	Pinecrest	Clavey (Scenic)
subtotal		4.52												
19EV110	CAL	0.08	INV	UNT	ALL	NAT	4WD			4WD	4WD	5063	Pacific Valley	NF Mokelumne (Rec)
19EV111	CAL	0.32	INV	UNT	ALL	NAT	4WD			4WD		5063	Pacific Valley	NF Mokelumne (Rec)
19EV111A	CAL	0.14	INV	UNT	ALL	NAT	4WD			4WD	4WD	5063	Pacific Valley	NF Mokelumne (Rec)
19EV112	CAL	0.04	INV	UNT	ALL	NAT	4WD			4WD	4WD	5064	Ebbetts Pass	NF Mokelumne (Rec)
FR8437	CAL	0.13	MAP	UNT	ALL	NAT	4WD			4WD	4WD	4901	Dardanelles Cone	NF Mokelumne (Rec)
FR8784	CAL	0.06	MAP	UNT	ALL	NAT	4WD			4WD	4WD	5064	Ebbetts Pass	NF Mokelumne (Rec)
FR9438	CAL	0.10	MAP	UNT	ALL	NAT	4WD			4WD	4WD	5064	Ebbetts Pass	NF Mokelumne (Rec)
FR9439	CAL	0.16	MAP	UNT	ALL	NAT	4WD			4WD	4WD	5064	Ebbetts Pass	NF Mokelumne (Rec)
FR9440	CAL	0.04	MAP	UNT	ALL	NAT	4WD			4WD	4WD	5064	Ebbetts Pass	NF Mokelumne (Rec)
subtotal		1.08												
total		**5.60**												

Table 3.05-10 Vehicles Class Changes: Proposed Wild and Scenic Rivers

Route	RD	MI	SRC	Existing			Alternative					Quad		Proposed Wild and Scenic River
				SYS	USE	SUR	1	2	3	4	5	#	Name	
06N06C	SU	0.26	GIS	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	Clark Fork (Rec)
subtotal		0.26												
01N01	GR	1.02	GIS	HLO	HLO	AC	ALL			ALL		4562	Cherry Lake S	Clavey (Scenic)
01N10	GR	2.32	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4571	Duckwall Mt	Clavey (Scenic)
01N10	GR	3.60	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	Clavey (Scenic)
01S01	GR	1.15	GIS	ML1		NAT	ADM			t-4WD	ADM	4574	Jawbone Ridge	Clavey (Scenic)
01S52	GR	0.15	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	Clavey (Scenic)
02N58	MW	0.80	GIS	ALL	ALL	NAT	ML1				ML1	4744	Hull Creek	Clavey (Scenic)
03N01	GR	0.77	GIS	HLO	HLO	AGG	ALL			ALL		4733	Cherry Lake N	Clavey (Scenic)
03N08Y	MW	0.25	GIS	ML1	ALL	NAT	t-ATV			t-ATV	t-ATV	4744	Hull Creek	Clavey (Scenic)
03N17Y	MW	0.76	GIS	ALL	ALL	NAT					HLO	4732	Pinecrest	Clavey (Scenic)
03N29A	MW	0.70	GIS	ALL	ALL	NAT					HLO	4732	Pinecrest	Clavey (Scenic)
03N29C	MW	0.77	GIS	ALL	ALL	NAT					HLO	4732	Pinecrest	Clavey (Scenic)
03N43A	MW	0.10	GIS	ML1		NAT				t-ALL		4744	Hull Creek	Clavey (Scenic)
04N26B	SU	0.78	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	Clavey (Scenic)
04N50Y	MW	0.47	GIS	ALL	ALL	NAT					HLO	4732	Pinecrest	Clavey (Scenic)
FR7856	GR	0.14	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	Clavey (Scenic)
subtotal		13.78												
06N07Y	SU	0.08	GIS	ALL	ALL	NAT	HLO				HLO	4893	Sonora Pass	MF Stanislaus (Rec)
06N08Y	SU	0.06	GIS	ALL	ALL	NAT	HLO				HLO	4893	Sonora Pass	MF Stanislaus (Rec)
06N09Y	SU	0.04	GIS	ALL	ALL	NAT	HLO				HLO	4893	Sonora Pass	MF Stanislaus (Rec)
06N12	SU	0.33	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	MF Stanislaus (Rec)
06N14	SU	0.37	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	MF Stanislaus (Rec)
06N16A	SU	0.21	GIS	ALL	ALL	NAT	HLO				HLO	4901	Dardanelles Cone	MF Stanislaus (Rec)
06N36Y	SU	0.04	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	MF Stanislaus (Rec)
06N36Y	SU	0.21	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	MF Stanislaus (Rec)
06N36Y	SU	0.36	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	MF Stanislaus (Rec)
06N37Y	SU	0.09	GIS	ALL	ALL	NAT	HLO				HLO	4893	Sonora Pass	MF Stanislaus (Rec)
06N39Y	SU	0.05	GIS	ALL	ALL	NAT	HLO				HLO	4893	Sonora Pass	MF Stanislaus (Rec)
06N47Y	SU	0.25	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	MF Stanislaus (Rec)
06N82Y	SU	0.24	GIS	ALL	ALL	NAT	t-4WD				HLO	4904	Dardanelle	MF Stanislaus (Rec)
07N13	SU	0.60	GIS	ALL	ALL	NAT	HLO				HLO	4901	Dardanelles Cone	MF Stanislaus (Rec)
07N13A	SU	0.15	GIS	ALL		NAT	HLO				HLO	4901	Dardanelles Cone	MF Stanislaus (Rec)
07N30Y	SU	0.23	GIS	ALL	ALL	NAT	HLO				HLO	4901	Dardanelles Cone	MF Stanislaus (Rec)
07N30YA	SU	0.09	GIS	ALL	ALL	NAT	HLO				HLO	4901	Dardanelles Cone	MF Stanislaus (Rec)
07N30YB	SU	0.09	GIS	ALL	ALL	NAT	HLO				HLO	4901	Dardanelles Cone	MF Stanislaus (Rec)
62127C	SU	0.06	GIS	ALL	ALL	NAT	HLO				HLO	4893	Sonora Pass	MF Stanislaus (Rec)
72032C	SU	0.05	GIS	ALL	ALL	NAT	HLO				HLO	4901	Dardanelles Cone	MF Stanislaus (Rec)
FR14823	SU	0.25	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4901	Dardanelles Cone	MF Stanislaus (Rec)
FR14833	SU	0.09	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4901	Dardanelles Cone	MF Stanislaus (Rec)
subtotal		3.94												
08N01A	CAL	0.12	GIS	ALL	ALL	NAT	HLO			HLO	HLO	5064	Ebbetts Pass	NF Mokelumne (Rec)
FR5219	CAL	0.03	MAP	ALL	ALL	NAT	HLO			HLO	HLO	5063	Pacific Valley	NF Mokelumne (Rec)
FR8322	CAL	0.08	MAP	ALL	ALL	NAT	HLO			HLO	HLO	5063	Pacific Valley	NF Mokelumne (Rec)
FR8323	CAL	0.06	MAP	ALL	ALL	NAT	HLO			HLO	HLO	5063	Pacific Valley	NF Mokelumne (Rec)
FR9331	CAL	0.33	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4901	Dardanelles Cone	NF Mokelumne (Rec)
FS83231	CAL	0.06	MAP	ALL	ALL	NAT	HLO			HLO	HLO	5064	Ebbetts Pass	NF Mokelumne (Rec)
subtotal		0.67												
04N38	CAL	0.01	GIS	ALL	ALL	AC	HLO			HLO	HLO	4751	Stanislaus	NF Stanislaus (Rec)
04N80Y	CAL	0.16	GIS	ALL	ALL	AGG	HLO			HLO	ML1	4751	Stanislaus	NF Stanislaus (Wild)
05N02B	CAL	0.67	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4913	Boards Crossing	NF Stanislaus (Rec)
05N02B	CAL	0.22	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4913	Boards Crossing	NF Stanislaus (Rec)
05N02R	CAL	1.48	GIS	ALL	ALL	NAT	HLO			HLO	ML1	4913	Boards Crossing	NF Stanislaus (Wild)
05N53Y	CAL	0.08	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4913	Boards Crossing	NF Stanislaus (Rec)
subtotal		2.62												
total		**21.26**												

Season of Use

Season of use restrictions and wet weather closures protect OR values by prohibiting motorized use during the closure period.

CUMULATIVE EFFECTS

The past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) do not include any actions likely to affect OR values. Therefore, the direct and indirect effects disclosed above are the only cumulative effects on Wild and Scenic Rivers and Proposed Wild and Scenic Rivers.

Alternative 2 (No Action)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Alternative 2 (No Action) could degrade OR values in all Wild and Scenic Rivers and Proposed Wild and Scenic Rivers because it allows the potential for cross country travel across all 154 miles of Wild and Scenic Rivers and Proposed Wild and Scenic Rivers outside of designated Wilderness. Cross country travel with continued route proliferation could significantly reduce cultural, historic, recreation and scenic OR values across all Wild and Scenic Rivers and Proposed Wild and Scenic Rivers.

2. Additions to the NFTS

No direct or indirect effects on Proposed Wild and Scenic Rivers without unauthorized routes added to the NFTS.

3. Changes to the Existing NFTS

No direct or indirect effects on Proposed Wild and Scenic Rivers without changes to the NFTS or existing closures.

CUMULATIVE EFFECTS

This alternative contributes towards cumulative effects on Wild and Scenic Rivers and Proposed Wild and Scenic Rivers because additional future route proliferation will adversely affect OR values.

Alternative 3 (Cross Country Prohibited)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Same as Alternative 1.

2. Additions to the NFTS

No direct or indirect effects on Proposed Wild and Scenic Rivers without unauthorized routes added to the NFTS.

3. Changes to the Existing NFTS

No direct or indirect effects on Proposed Wild and Scenic Rivers without changes to the NFTS or existing closures.

CUMULATIVE EFFECTS

The past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) do not include any actions likely to affect OR values. Therefore, the direct and indirect effects disclosed above are the only cumulative effects on Wild and Scenic Rivers and Proposed Wild and Scenic Rivers.

Alternative 4 (Recreation)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Same as Alternative 1.

2. Additions to the NFTS

This alternative includes 5.60 miles of unauthorized routes added to the NFTS as trails in Proposed Wild and Scenic Rivers (see Table 3.05-9) with direct or indirect effects as described below. All routes are located within Forest Plan land allocations allowing motorized use.

Additions to the NFTS do not affect OR values on the following Proposed Wild and Scenic Rivers because:

- **Clavey**: thirteen segments (4.52 miles) access popular dispersed recreation opportunities in the Scenic segment between the Bell/Lily confluence and Cottonwood Road, not affecting OR values because they are short trails within and adjacent to existing developed road corridors.
- **North Fork Mokelumne**: nine segments (1.08 miles) provide highway legal only access to popular dispersed recreation opportunities in the Recreational segment along Highland Lakes Road, not affecting OR values because they are short trails within and adjacent to existing developed road corridors.

3. Changes to the Existing NFTS

Vehicle Class Changes

Vehicle class changes would occur on 13.13 miles of NFTS roads in Proposed Wild and Scenic Rivers including: converting 1.50 miles of closed to motorized trails; changing 1.79 miles from highway legal only to all vehicles; and, changing 9.83 miles from all vehicles to highway legal only (see Table 3.05-10) with direct or indirect effects as described below.

Vehicle class changes do not affect OR values on the following Proposed Wild and Scenic Rivers because:

- **Clavey**: three NFTS road segments (1.50 miles) convert from closed roads to motorized trails, not affecting OR values because they are short trails within and adjacent to existing developed road corridors. Two NFTS road segments (1.79 miles) change from highway legal only to all vehicles, not affecting OR values because they are main Forest roads in existing developed road corridors. Four NFTS road segments (6.20 miles) change from all vehicles to highway legal only, improving OR values because they prohibit non-highway legal vehicles.
- **Middle Fork Stanislaus**: two NFTS road segments (0.34 miles) change from all vehicles to highway legal only, improving OR values because they prohibit non-highway legal vehicles.
- **North Fork Mokelumne**: six NFTS road segments (0.67 miles) change from all vehicles to highway legal only, improving OR values because they prohibit non-highway legal vehicles.
- **North Fork Stanislaus**: four NFTS road segments (0.98 miles) change from all vehicles to highway legal only, improving OR values because they prohibit non-highway legal vehicles. One NFTS road segment of 4N80Y (0.16 miles) and one NFTS road segment of 5N02R (1.48 miles) change from all vehicles to highway legal only, improving OR values because they prohibit non-highway legal vehicles and are located within or adjacent to existing road corridors and developed areas; although these two roads are located within proposed Wild

River corridors, continued highway legal only use will not preclude future Wild and Scenic River designation or Wild classification of these segments of North Fork Stanislaus.

Season of Use

Same as Alternative 1.

CUMULATIVE EFFECTS

The past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) do not include any actions likely to affect OR values. Therefore, the direct and indirect effects disclosed above are the only cumulative effects on Wild and Scenic Rivers and Proposed Wild and Scenic Rivers.

Alternative 5 (Resources)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Same as Alternative 1.

2. Additions to the NFTS

This alternative includes 1.45 miles of unauthorized routes added to the NFTS as trails in Proposed Wild and Scenic Rivers (see Table 3.05-9) with direct or indirect effects as described below. All routes are located within Forest Plan land allocations allowing motorized use.

Additions to the NFTS do not affect OR values on the following Proposed Wild and Scenic Rivers because:

- **Clavey**: one segment (0.69 miles) provides access to popular dispersed recreation opportunities in the Scenic segment between the Bell/Lily confluence and Cottonwood Road, not affecting OR values because it is a short trail within and adjacent to an existing developed road corridor.
- **North Fork Mokelumne**: eight segments (0.76 miles) provide highway legal only access to popular dispersed recreation opportunities in the Recreational segment along Highland Lakes Road, not affecting OR values because they are short trails within and adjacent to existing developed road corridors.

3. Changes to the Existing NFTS

Vehicle Class Changes

Vehicle class changes would occur on 19.37 miles of NFTS roads in Proposed Wild and Scenic Rivers including: converting 0.25 miles of closed to an ATV trail; changing 1.15 miles of closed to administrative use only; closing 2.44 miles of open roads; and, changing 15.53 miles from all vehicles to highway legal only (see Table 3.05-10) with direct or indirect effects as described below.

Vehicle class changes do not affect OR values on the following Proposed Wild and Scenic Rivers because:

- **Clark Fork**: one segment of 6N06C (0.26 miles) changes from all vehicles to highway legal only, improving OR values because it prohibits non-highway legal vehicles.
- **Clavey**: one NFTS road segment of 3N08Y (0.25 miles) converts from a closed road to an ATV trail, not affecting OR values because it is a short trail within and adjacent to an existing developed road corridor. One NFTS road segment of 1S01 (1.15 miles) changes from closed to administrative use only, not affecting OR values because it does not increase public use. One NFTS road segment of 2N58 (0.80 miles) changes from open to closed, improving OR values because it prohibits existing public motorized use. Two NFTS road segments (1.79

miles) change from highway legal only to all vehicles, not affecting OR values because they are main Forest roads in existing developed road corridors. Five NFTS road segments (6.98 miles) change from all vehicles to highway legal only, improving OR values because they prohibit non-highway legal vehicles.

- **Middle Fork Stanislaus**: twenty-two NFTS road segments (3.94 miles) change from all vehicles to highway legal only, improving OR values because they prohibit non-highway legal vehicles.
- **North Fork Mokelumne**: six NFTS road segments (0.67 miles) change from all vehicles to highway legal only, improving OR values because they prohibit non-highway legal vehicles.
- **North Fork Stanislaus**: four NFTS road segments (0.98 miles) change from all vehicles to highway legal only, improving OR values because they prohibit non-highway legal vehicles. One NFTS road segment of 4N80Y (0.16 miles) and one NFTS road segment of 5N02R (1.48 miles) change from all vehicles to closed, improving OR values because they eliminate existing motorized use.

Season of Use

Same as Alternative 1.

CUMULATIVE EFFECTS

The past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) do not include any actions likely to affect OR values. Therefore, the direct and indirect effects disclosed above are the only cumulative effects on Wild and Scenic Rivers and Proposed Wild and Scenic Rivers.

Wilderness and Proposed Wilderness - Affected Environment

The Stanislaus National Forest recommended Wilderness designation for the Bald Peak and Tryon Peak "further planning areas" through the land management planning process (USDA 1991a). The following discussions focus on those two Proposed Wilderness additions, totaling 23,900 acres (see Figure 3.05-1).

Bald Peak Proposed Wilderness

The Bald Peak Proposed Wilderness (20,500 acres), a recommended addition to the Carson-Iceberg Wilderness, is located within a triangle formed by Clark Fork Road, Highway 108 and the Carson-Iceberg Wilderness between Iceberg Meadow and Sonora Peak. Elevations range from 6,000 to 11,462 feet. The area is typified by mountain peaks, steep slopes, scattered pockets of timber and meadows, and considerable granite rock. The Pacific Crest Trail crosses a corner of the area near Sonora Pass. One other hiking trail along Douglas Creek receives only light use. Soils between extensive rock outcrops are generally shallow to moderately deep, stony coarse sandy loams developed from volcanic and granitic bedrock and glacial debris. Meadows have deep, organic, sandy loams developed from alluvium. Red fir and lodgepole pine are the predominant tree species, with Jeffrey pine, incense cedar, and white fir common associates. Hunters use the area in pursuit of deer, grouse and quail. Spotted owl, goshawk, fisher, pine marten, wolverine and red fox inhabit this area. The area is also important as summer range for the Stanislaus Deer Herd. Table 3.05-2 shows that Bald Peak Proposed Wilderness currently contains one NFTS road segment of 07N76A (0.02 miles) that is not available for public motorized use. This area does not contain any unauthorized motorized routes.

Tryon Peak Proposed Wilderness

The Tryon Peak Proposed Wilderness (3,400 acres), a recommended addition to the Carson-Iceberg Wilderness, is located in the northeast corner of the Forest between the Sierra Nevada crest and Highland Lakes Road. Elevations range from 8,100 to 9,970 feet. Mountain peaks, glaciated valleys with large meadows, and scattered timber characterize the area. Recreation use, primarily hikers from the Highland Lakes area and along the Pacific Crest Trail, is moderate while hunters use the area in the fall. Soils between extensive rock outcrops in the uplands are generally shallow to moderately deep, stony coarse sandy loams developed from volcanic and granitic bedrock and glacial debris. The meadows have deep, organic, sandy loams developed from alluvium. Red fir and lodgepole pine are the predominant tree species with Jeffrey pine and mountain hemlock. This area does not contain any NFTS or unauthorized motorized routes.

Wilderness and Proposed Wilderness - Environmental Consequences

Since designated Wilderness is not affected by the proposed action or any alternative and unauthorized or NFTS routes open to public motorized use do not exist within Proposed Wilderness the following section describes only the effects of cross country travel on Proposed Wilderness using the following indicator:

- Wilderness Characteristics (wilderness)

Alternative 1 (Proposed Action)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

The cross country travel prohibition protects the wilderness characteristics of each area by preventing route proliferation and reducing the area available for motorized use.

CUMULATIVE EFFECTS

The past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) do not include any actions likely to affect wilderness characteristics. Therefore, the direct and indirect effects disclosed above are the only cumulative effects on Proposed Wilderness.

Alternative 2 (No Action)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Alternative 2 (No Action) could affect wilderness characteristics in all Proposed Wilderness because it allows the potential for cross country travel across all 23,900 acres of Proposed Wilderness. Cross country travel with continued route proliferation could significantly alter the following wilderness characteristics:

- **Natural**: ecological systems no longer appear substantially free from the effects of modern civilization and affected primarily by forces of nature due to potential introduction of noxious weed species that alter the composition of natural plant communities and pollutants that degrade water quality.
- **Undeveloped**: increased evidence of human presence, use and occupation due to user-created trail treads with wheel tracks.
- **Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation**: reduced opportunities for solitude or primitive and unconfined types of recreation due to evidence of user-create trail treads with wheel tracks and noise generated by motor vehicles.

CUMULATIVE EFFECTS

This alternative contributes towards cumulative effects on Proposed Wilderness because additional future route proliferation will adversely affect wilderness characteristics.

Alternative 3 (Cross Country Prohibited)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Same as Alternative 1.

CUMULATIVE EFFECTS

Same as Alternative 1.

Alternative 4 (Recreation)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Same as Alternative 1.

CUMULATIVE EFFECTS

Same as Alternative 1.

Alternative 5 (Resources)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Same as Alternative 1.

CUMULATIVE EFFECTS

Same as Alternative 1.

Summary of Effects Analysis across All Alternatives

Table 3.05-11 provides a brief summary of effects on roadless and wilderness characteristics in roadless areas; Table 3.05-12 provides a brief summary of effects across all alternatives for roadless and special areas; and, Table 3.05-13 provides a summary of effects by roadless and special area indicators.

Compliance with the Forest Plan and Other Direction

Alternatives 1, 3, 4 and 5 meet Forest Plan S&Gs. Alternative 2 does not meet Forest Plan Direction to prohibit cross county travel. Alternatives 1, 3, 4 and 5 implement 36 CFR 212 while Alternative 2 does not.

Table 3.05-11 Effects on Roadless and Wilderness Characteristics in Roadless Areas

<table>
<tr><th>Roadless Area</th><th>Alternative 1 (Proposed Action)</th><th>Alternative 2 (No Action)</th><th>Alternative 3 (X-C Prohibited)</th><th>Alternative 4 (Recreation)</th><th>Alternative 5 (Resources)</th></tr>
<tr><td>Arnot Creek</td><td>none</td><td rowspan="17">Increased noise generated by motor vehicles and more evidence of human activity due to cross country travel with continued route proliferation could significantly alter: high quality or undisturbed soil, water, and air; sources of public drinking water; diversity of plant and animal communities; habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land; primitive and semi-primitive non-motorized recreation opportunities; natural appearing landscapes with high scenic quality</td><td rowspan="17">roadless and wilderness characteristics improve over time as unauthorized routes passively restore to natural conditions</td><td>none</td><td>none</td></tr>
<tr><td>Bald Peak</td><td>none</td><td>none</td><td>none</td></tr>
<tr><td>Bell Meadow</td><td>none</td><td>none</td><td>no direct or indirect effects</td></tr>
<tr><td>Carson-Iceberg</td><td>roadless and wilderness characteristics improve over time as unauthorized routes passively restore to natural conditions; adding routes and opening a closed road could affect SPNM opportunities by reducing opportunities for solitude</td><td>same as Alternative 1</td><td>adding a route could affect SPNM opportunities by reducing opportunities for solitude</td></tr>
<tr><td>Cherry Lake</td><td>none</td><td>none</td><td>none</td></tr>
<tr><td>Dome</td><td>none</td><td>none</td><td>none</td></tr>
<tr><td>Eagle</td><td>none</td><td>none</td><td>none</td></tr>
<tr><td>Mt. Reba</td><td>roadless and wilderness characteristics improve over time as unauthorized routes passively restore to natural conditions; adding routes could affect SPNM opportunities by reducing opportunities for solitude and increased conflicts between motorized and non-motorized users</td><td>same as Alternative 1</td><td>roadless and wilderness characteristics improve over time as unauthorized routes passively restore to natural conditions</td></tr>
<tr><td>Night</td><td>none</td><td>none</td><td>none</td></tr>
<tr><td>North Mountain</td><td>roadless and wilderness characteristics improve over time as unauthorized routes passively restore to natural conditions; opening a closed road could affect SPNM opportunities by reducing opportunities for solitude</td><td>same as Alternative 1</td><td>roadless and wilderness characteristics improve over time as unauthorized routes passively restore to natural conditions</td></tr>
<tr><td>Pacific Valley</td><td>none</td><td>none</td><td>none</td></tr>
<tr><td>Raymond Peak</td><td>roadless and wilderness characteristics improve over time as unauthorized routes passively restore to natural conditions; adding routes could affect SPNM opportunities by reducing opportunities for solitude</td><td>same as Alternative 1</td><td>roadless and wilderness characteristics improve over time as unauthorized routes passively restore to natural conditions; adding a route could affect SPNM opportunities by reducing opportunities for solitude</td></tr>
<tr><td>Trumbull Peak</td><td>none</td><td>none</td><td>none</td></tr>
<tr><td>Tryon Peak</td><td>none</td><td>none</td><td>none</td></tr>
<tr><td>Tuolumne River</td><td>roadless and wilderness characteristics improve over time as unauthorized routes passively restore to natural conditions; adding routes could affect SPNM opportunities by reducing opportunities for solitude in the Tuolumne River canyon</td><td>none</td><td>none</td></tr>
<tr><td>Waterhouse</td><td>none</td><td>none</td><td>none</td></tr>
<tr><td>Wheats Meadow</td><td>none</td><td>none</td><td>none</td></tr>
</table>

Table 3.05-12 Summary of Effects across All Alternatives: Roadless and Special Areas

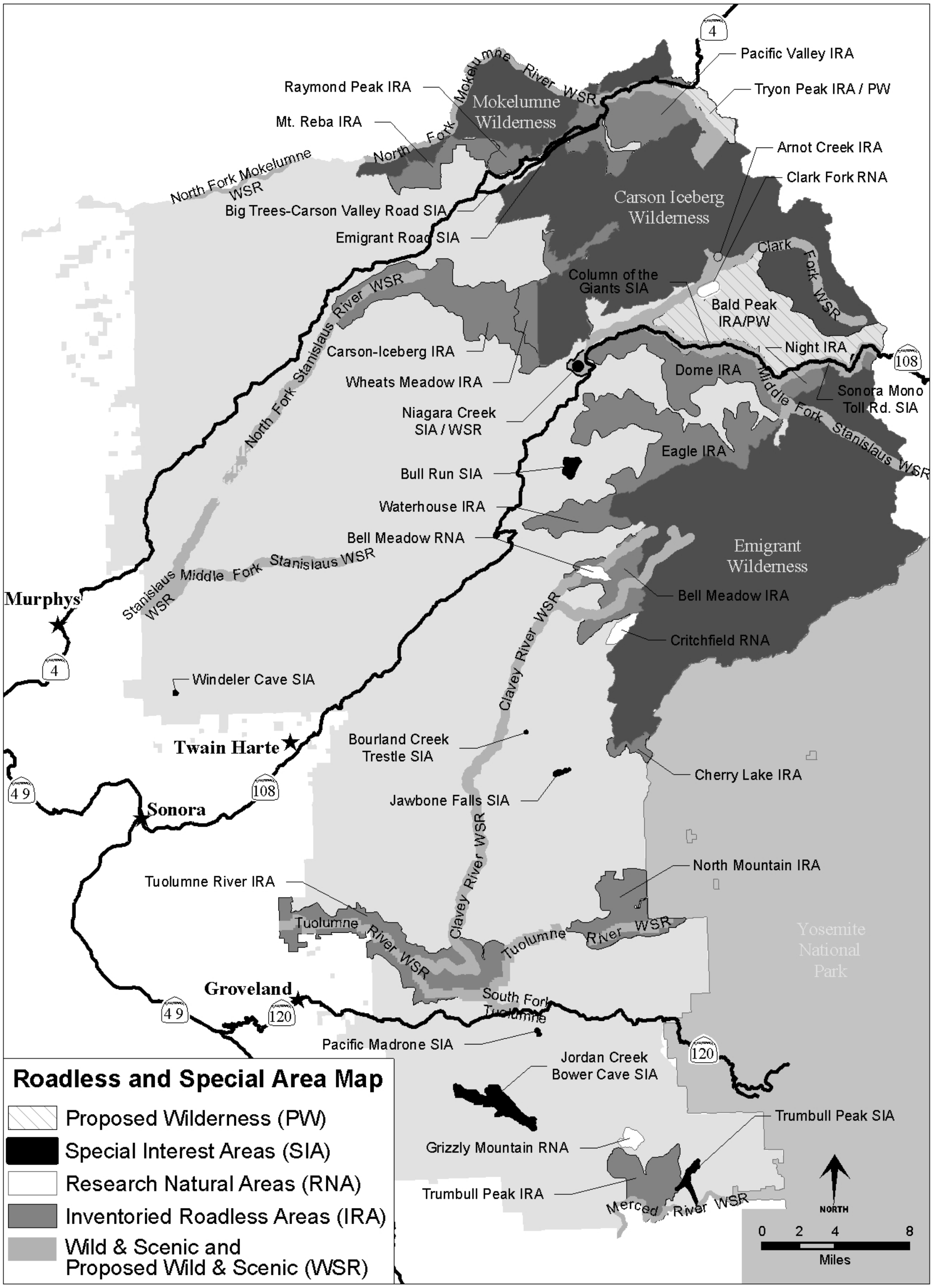
Alternative 1 (Proposed Action)	Alternative 2 (No Action)	Alternative 3 (X-C Prohibited)	Alternative 4 (Recreation)	Alternative 5 (Resources)
roadless characteristics and special area values improve over time as unauthorized routes passively restore to natural conditions; additions to the NFTS and opening closed roads reduce opportunities for solitude in the Carson-Iceberg, Mt. Reba, North Mountain, Raymond Peak and Tuolumne River roadless areas	noise and more evidence of human activity due to cross country travel with continued route proliferation reduce roadless character in all roadless areas; cross country travel with continued route proliferation could reduce values in all Special Areas (Proposed Wilderness, SIAs, RNAs, Wild and Scenic Rivers and Proposed Wild and Scenic Rivers) outside of Wilderness	roadless characteristics and special area values improve over time as unauthorized routes passively restore to natural conditions	roadless characteristics and special area values over time as unauthorized routes passively restore to natural conditions; additions to the NFTS and opening closed roads reduce opportunities for solitude in the Carson-Iceberg, Mt. Reba, North Mountain, Raymond Peak and Tuolumne River roadless areas	roadless characteristics and special area values improve over time as unauthorized routes passively restore to natural conditions; additions to the NFTS reduce opportunities for solitude in the Carson-Iceberg and Raymond Peak roadless areas

Table 3.05-13 Summary of Effects: Roadless and Special Areas

Indicators – Roadless and Special Areas	Rankings of Alternatives for Each Indicator[1]				
	1	**2**	**3**	**4**	**5**
Roadless Area and Wilderness Characteristics (Roadless Areas)	3	1	5	2	4
Research Natural Area Values	5	1	5	5	5
Special Interest Area Values	3	1	5	2	4
Wild and Scenic River Values	3	1	5	2	4
Wilderness Characteristics (Proposed Wilderness)	5	1	5	5	5
total	19	5	25	16	23
Average for Roadless and Special Areas	**3.8**	**1.0**	**5.0**	**3.2**	**4.6**

[1] A score of 5 indicates the alternative is the least impact for this resource; a score of 1 indicates the alternative is the most impact.

Figure 3.05-1 Roadless and Special Area Map



3.06 TRANSPORTATION FACILITIES

This section examines the extent to which alternatives respond to transportation facilities direction established in the Forest Plan. The Forest Plan transportation facilities direction was established under the implementing regulations of NFM) and the National Forest Roads and Trails Act (FRTA). The NFTS consists of roads, trails, and airfields. The NFTS provides for protection, development, management, and utilization of resources on the National Forests. Other routes on the Forest are not currently part of the NFTS. Transportation facilities considered in this analysis include roads and trails that are suitable for public motor vehicle use. This analysis considers changes needed to the NFTS to meet the purpose and need of this analysis. Decisions regarding changes in the transportation facilities must consider: 1) providing for adequate public safety, and 2) providing adequate maintenance of the roads and trails that will be designated for public use. This analysis focuses primarily on these two aspects of the NFTS.

Analysis Framework: Compliance with the Forest Plan and Other Regulatory Direction

Direction relevant to the proposed action as it affects transportation facilities includes:

Title 36, Code of Federal Regulations, Part 212 (36CFR212) is the implementing regulation for the FRTA and includes portions of the Travel Management Rule published in the Federal Register on November 9, 2005. Part 212, Subpart B provides criteria for designation of roads and trails. Providing safe transportation facilities and considering the affordability of maintaining the transportation facilities are two of the criteria used in this analysis.

Forest Service Manual Sections 2350 and 7700 contain agency policy for management of the National Forest Transportation System (NFTS). The policy requires the development of trail management objectives (TMOs) and road management objectives (RMOs). The TMOs and RMOs document the purpose of each trail or road. 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 7709.58 describes the maintenance management system the Forest Service uses and the maintenance standards needed to meet road management objectives (RMOs) for the road system and include considerations for public safety.

Regional Forester’s letters, file code 7700/2350, dated 08/26/06 and 06/20/07 contain procedures National Forests in Pacific Southwest Region will use to evaluate safety aspects of public travel on roads when proposed changes to the NFTS will allow both highway Legal and non-highway Legal traffic on a road (motorized mixed use).

The California Vehicle Code (CVC) 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.

Travel Management Rule (36 CFR 212, 251, 261 and 295): The alternatives in this EIS are designed specifically to implement the requirements of the November 5, 2005, rule for travel management; Designated Routes and Areas for Motor Vehicle Use. In particular, it addresses the requirements of 36 CFR § 212, Subpart B, Designation of roads, motorized trails, and motorized areas which states in part “Motor vehicle use on National Forest System roads, on National Forest System trails, and in areas on National Forest System lands shall be designated by vehicle class and, if appropriate, by time of year by the responsible official on administrative units or Ranger Districts of the National Forest System.”

The Forest Plan provides Motor Vehicle Travel Management direction (Appendix C) for all motorized travel. Every acre of the Stanislaus National Forest treated by the Forest Plan fits into either the Closed or Restricted categories.

Effects Analysis Methodology

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. Where highway and non-highway Legal use was proposed on the same road, a Motorized Mixed Use/Combined Use analysis was conducted (project record). Motorized Mixed Use is defined as the "*designation of an NFS road for use by both highway-Legal and non-highway Legal vehicles*" (FSM 7705). Combined Use is defined as "*In addition to Section 38025 and after complying with subdivision (c) of this section, if a local authority, an agency of the federal government, or the Director of Parks and Recreation finds that a highway, or a portion thereof, under the jurisdiction of the authority, agency, or the director, as the case may be, is located in a manner that provides a connecting link between off-highway motor vehicle trail segments, between an off-highway motor vehicle recreational use area and necessary service facilities, or between lodging facilities and an off-highway motor vehicle recreational facility and if it is found that the highway is designed and constructed so as to safely permit the use of regular vehicular traffic and also the driving of off-highway motor vehicles on that highway, the local authority, by resolution or ordinance, agency of the federal government, or the Director of Parks and Recreation, as the case may be, may designate that highway, or a portion thereof, for combined use and shall prescribe rules and regulations therefore* (California Vehicle Code, Division 16.5, Chapter 1, Section 38026). Refer to the project record for specific mixed use and combined use analysis on each road or trail reviewed.

Motorized mixed use (MMU) on passenger car roads was evaluated under Combined Use standards, as defined under the California Vehicle Code (Division 16.5, Chapter 1, Section 38026). The Combined Use evaluations required a more thorough analysis of issues. Mitigation options for each road were determined from existing factors and identifying those items that would be detrimental to public safety from the mixed motorized traffic.

All high clearance routes considered for new OHV use designations underwent a mixed use analysis. Each analysis evaluated current use, past crash histories, right-of-way issues, road maintenance practices and general topography. These issues were combined to determine the probability and severity of crashes between highway legal and non-highway legal vehicles on the particular route.

Existing unauthorized routes were identified for continued use where no resource conflicts or mitigations were needed, where they provided loop opportunities, reduced user conflicts, or provided access to destination sites. These routes would be added to the trails system for continued management.

Affordability – 36CFR212.55 requires consideration of the need for maintenance and administration of the designated NFTS. Costs for the NFTS include costs for needed maintenance work that has not been completed for various reasons (deferred maintenance) and costs of maintenance that should be performed routinely to maintain the facility to its current standard (annual maintenance). Additional costs may be associated with proposed changes to the NFTS (implementation costs). These costs may be for improving unauthorized routes that will be added to the NFTS, proposed safety and resource improvements, changing maintenance levels, bringing trails up to standard, and closing routes to use by motor vehicles.

Assumptions Specific to Transportation Facilities

1. Changing roads maintained for passenger cars to roads maintained for high clearance vehicles does not present a safety risk when motorized mixed use is not allowed.
2. Roads maintained for high clearance vehicles would remain in the same maintenance category whether or not the vehicle class changes. Maintenance needs for these roads would remain the same, regardless of vehicle use.
3. Public safety will be enhanced by eliminating mixed traffic on those roads converted to trails. Motorized trail eligible vehicle classes are high clearance vehicles (4WD, etc), ATV and motorcycles. Low clearance Highway Legal vehicles are not prohibited on trails but generally do not use trails.
4. The California Vehicle Code (CVC) requires motor vehicles operated on maintenance level (ML) 3, 4, and 5 roads to be highway Legal and be operated by licensed drivers. When roads are designated for combined use, the following additional items are required by CVC for Off-highway vehicles: drivers must be licensed; drivers must have liability insurance; only operate during daytime; have an operational stop light; and have rubber tires. The CVC allows the operation of non-highway Legal vehicles operated by unlicensed drivers on roughly graded roads (ML2). The Stanislaus National Forest considers roads maintained for high clearance vehicles as roughly graded and considers operation of OHVs on these roads to be consistent with state law. Roads maintained for passenger cars are considered highways by CVC, and operation of OHVs on those roads is not consistent with state law. Short stretches of these roads may be designated for combined use where an engineering analysis determines no threat to public safety from this combined use or a line officer determines that safety issues will be mitigated prior to allowing combined use.
5. Motor vehicle use authorized by state law occurs on the NFTS unless Forest specific prohibitions are in effect.
6. Motor vehicle use by special use permit or other permitted activities are outside the scope of this proposal (fuelwood gathering, motorized SUP event, Recreation Residences, mining activities)
7. The Forest Service will bear some cost for maintenance of any route open to motor vehicle use by the public.
8. State law regulating motor vehicle drivers sets the standard of care for the safety of themselves and other users for the NFTS.
9. For cost comparison between alternatives, it is assumed that the maintenance costs are associated with maintaining every mile of road and trail to standard.

Data Sources

1. Infra Database
2. Road maintenance costing spreadsheet 04/16/08 (FY2006 Deferred Maintenance based on Forest Condition Surveys, DM per ML based on March 2008 Miles and Estimate per mile, Miles by Objective ML based on 8 March 2008 Road Core)
3. Stanislaus Forest Road Analysis 1/13/03, revised 4/7/03
4. STF Average Costs for Motorized Route Routine Maintenance/Repair, Oct. 2008

Transportation Facilities Indicators

1. Public Safety
2. Affordability (annual maintenance and implementation cost)

Transportation Facilities Methodology by Action

1. Direct and indirect effects of the prohibition of cross country motorized vehicle travel.

Indicator(s): none

Direct and Indirect Effects from unauthorized use: Resources potentially get damaged from the creation of new routes and new disturbances. Improper location of user created roads and trails can lead to sedimentation from erosion and affect the road bed and trail tread if sediment and erosion dump on to existing transportation facilities. Prohibition of travel off of designated routes will reduce sedimentation and erosion and negative effects to the transportation system.

Methodology: none

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

Long-term time frame: The 20 year time frame looks at routes over the longer term

Spatial boundary: forestwide

Rationale: Mixed Use Analysis Guidelines, Regional Costing Guidelines

2. Direct and indirect effects of adding facilities to the NFTS including identifying seasons of use and vehicle class.

Indicator(s): public safety and affordability

Direct and Indirect Effects from additions to the NFTS: additions to the NFTS will not have a negative effect to the transportation system itself. It should be beneficial in terms of forest visitors knowing where to travel and where to recreate. Public safety would be addressed by determining whether additions would improve public safety or diminish it. Affordability would be compared by alternative in terms of cost to maintain the system and implement the decision.

Methodology: evaluation and comparison of maintenance costs for the entire NFTS for both roads and trails by alternative.

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

Long-term time frame: The 20 year time frame looks at routes over the longer term

Spatial boundary: forestwide

Rationale: Mixed Use Analysis Guidelines, Regional Costing Guidelines

3. Direct and indirect effects of changes to the existing NFTS including identifying seasons of use and vehicle class.

Indicator(s): public safety and affordability

Direct and Indirect Effects from changes to the NFTS: analysis would focus on how changes to the system would enhance or diminish public safety through changes in use on the road and trail system. Changes in public safety would be analyzed and compared in each alternative. Affordability would be compared in relation to the baseline of Alternative 2 and determine whether costs to manage the system were increasing or decreasing in each action alternative. Vehicle class changes vary from converting roads to trails; opening of closed roads; converting closed roads to administrative use only; closing of open roads to public use motorized use; and converting roads from all vehicles allowed to Highway Legal Only. All of these actions improve the safety of the public by providing better management of the resources. Roads would be closed to protect facilities, and private property. Other roads would be opened to access existing NFTS roads, dispersed sites, or property access. Those roads opened to all vehicles improve trail connectivity, and require a mixed use analysis. Those roads changed to Highway Legal Only vehicles reduce mixed traffic implications and probability of crashes with non-highway legal vehicles.

Methodology: comparison of costs to maintain the NFTS by alternative.

Short-term time frame: not applicable.

Long-term time frame: The 20 year time frame looks at routes over the longer term

Spatial boundary: Forestwide.

Rationale: Mixed Use Analysis Guidelines, Regional Costing Guidelines.

Season of Use: Effects on roads from wheeled over the snow use are analyzed within the alternatives for wheeled over snow use.

Wheeled Over Snow Use: Public safety and affordability are analyzed and compared to the baseline alternative (Alternative 2).

4. Cumulative Effects

Indicator(s): public safety and affordability

Direct and Indirect Effects from all reasonable foreseeable actions: Determine whether any other additional actions identified in Appendix B will affect the transportation system.

Methodology: comparison of the alternatives by whether public safety is projected to increase or decrease and whether the system is increasing or decreasing in costs compared to the baseline (Alternative 2).

Short-term time frame: not applicable.

Long-term time frame: The 20 year time frame looks at routes over the longer term

Spatial boundary: Forestwide.

Rationale: Mixed Use Analysis Guidelines, Costing Regional Guidelines.

Affected Environment

The majority of the forest roads in the Stanislaus National Forest were built primarily for timber harvest access between 1950 and 1990, although the higher standard roads were intended and designed for multiple uses including public access. In the 1980s the Stanislaus constructed about 30 miles of new road per year, with a high of 104 miles in 1980. In the 1990s, about 5 miles per year of new road were constructed, and no miles of new road were constructed in 2001 or 2002. The level of timber harvest has declined substantially since implementation of the California Spotted Owl Sierran Province Interim Guidelines in 1993, except during fire salvage operations.

Public use of the road system, however, has grown steadily. In 1950, the nationwide average ratio of recreation to timber traffic on Forest Roads was 10 to 1. In 1975, the ratio was 27 to 1. In 1996, the ratio was estimated at 114 to 1. Approximately 20% of forest visitors who were surveyed in 2003 and 2007 identified driving for pleasure as the primary reason for their visits. When surveyed the visitors felt that road conditions were important to their visit and 65% thought the road conditions were either good or very good when traveling in the General Forest. 87% of the visitors surveyed also felt the road conditions were good or very good when traveling to developed sites or day use areas (National Visitor Use Monitoring Reports, 2004, 2007). Almost all National Forest visitors travel on Forest Service System Roads to access recreation activities, gather forest products, drive for pleasure, or drive through to get to another destination. Roads have opened the Stanislaus National Forest to hundreds of thousands visitors. They provide access for recreation, research, fish and wildlife habitat management, grazing, timber harvesting, fire suppression, fuels reduction, mining, insect and disease control and use of private land.

The Stanislaus National Forest has about 2,947 miles of NFTS roads. Some roads or segments of roads accessing the National Forest are in county-maintained road systems and under county jurisdiction. Some examples are Dunbar Road, Highland Lakes Road, South Fork/Italian Bar Road, Dodge Ridge Road, Clark Fork Road, and Greeley Hill Road. Roads provide needed access for public use of the National Forest and access to some communities and private land. Tourism is the major segment of the local economy, and recreation on the Stanislaus National Forest is an important component. Recreation is now the dominant use on many Forest Service roads.

In addition to the NFTS roads, other routes are not part of the NFTS. Unauthorized routes originate in different ways. Some are built as temporary roads, often for timber access. Some are user-created routes made by unauthorized OHV use. The exact amount of unauthorized roads is not yet known because the entire Forest has not been inventoried. About 490 miles of unauthorized routes have been currently inventoried: 260 miles of roads and 230 miles of trails. Forest Service policy directs that unclassified roads should be inventoried and either added to the road system, added to the trail system or decommissioned. An estimate of 230 miles of wheeled tracks was found in the 2006 OHV Inventory.

In some areas of the Stanislaus National Forest, new routes continue to be developed by people driving their vehicles off existing roads. After one vehicle leaves a set of wheel tracks, other vehicles sometimes follow, creating an unauthorized route.

The Forest Service designates maintenance levels for the NFTS roads to guide how they are managed. Maintenance level 5 roads are those that are maintained with stable smooth surfaces providing a relatively high degree of user comfort, usually paved roads. Maintenance Level 4 roads are managed to provide a moderate level of user comfort; Maintenance Level 3 roads, usually gravel surfaced, are the lowest level considered suitable for passenger cars. Maintenance level 3-5 roads are considered Highway Legal under the CVC and subject to the Federal Highway Safety Act. Maintenance level 2 (ML2) roads are maintained for high clearance vehicles such as trucks and pickup trucks, and non-highway legal vehicles. ML2 roads are considered roughly graded under the CVC and OHVs are generally permitted to drive on them. Roads which are closed to motor vehicle traffic for a period of at least a year at a time are designated Maintenance Level 1 (ML1) (USDA 2003a). The miles of road by maintenance level are listed in Table 3.06-1 below.

Table 3.06-1 NFTS Roads: Objective Maintenance Level

Objective Maintenance Level	Miles	% NFTS
1-Closed, Basic Custodial Care	372.4	12.6
2-High Clearance Vehicles	2,163.7	73.4
3-Suitable for Passenger Cars	243.3	8.3
4-Moderate Degree of User Comfort	54.4	1.9
5-High Degree of User Comfort	112.9	3.8

Roads may be currently maintained at one level and planned to be maintained at a different level at some future date. The operational maintenance level is the maintenance level currently assigned to a road considering today's needs, road condition, budget constraints, and environmental concerns; in other words, it defines the level to which the road is currently being maintained. The objective maintenance level is the maintenance level to be assigned at a future date considering future road management objectives, traffic needs, budget constraints, and environmental concerns.

The miles of road by surface type are listed in Table 3.06-2, below. Bituminous Surface Treatment denotes chip seal on crushed rock base, and Improved Native Surface denotes spot rock.

The NFTS roads are also categorized by Functional Classification. This classification denotes the amount of area served and connectivity to other roads provided by the road. The highest level roads serving the most area and connecting to other major roads are called arterial roads. Local roads are those serving relatively small areas and often ending in dead ends. Collector roads connect with other arterial or collector or local roads and access moderately large areas. The miles of NFTS road by Functional Classification are summarized in Table 3.06-3.

Table 3.06-2 NFTS Roads: Surface Type

Surface Type	Miles	% NFTS
Asphalt	193.2	7
Crushed Aggregate or Gravel	417.5	13
Bituminous Surface Treatment	17.3	1
Improved Native Material	25.1	1
Native Material	2,275.8	78

Table 3.06-3 NFTS Roads: Functional Classification

Functional Classification	Miles	% NFTS
Arterial	293.3	10
Collector	642.5	22
Local	1,992.8	68
Unknown	0.3	0

The great majority of the roads on the Stanislaus are native surfaced, maintenance level 2, local roads which receive relatively light traffic volumes.

Funding Levels and Road Management Capabilities

In the past decade, road maintenance capabilities have declined. The Forest Roads Analysis (2003) had identified three key reasons for the decline: 1) decline in timber harvest related road maintenance, 2) decline in budget, and 3) decline in staffing. Results of this decline in maintenance include loss of access on some roads, declining level of service on some roads, increasing soil erosion and sedimentation, and loss of infrastructure investment. Regional average costs per mile to maintain each operational maintenance level (ML) were developed and applied to the local forest road system to calculate the estimated total cost as shown in Table 3.06-4.(RO communication DM per ML based on 8 March 2008 Miles and Estimate per Mile-project record)

An estimate of the total deferred maintenance for roads on the Stanislaus National Forest is $96,965,742 (Provided by the Regional Office). Note this number is based on a national random sample of deferred maintenance needs done in 2007. It is not statistically valid at the National Forest level; however it can be used as an indicator of maintenance needs for the existing road system. A variety of funding resources are used to maintain roads and trails: grants, appropriated dollars, volunteer work, adopt-a-trail, and adopt-a-road. In Table 3.06-4, the average annual maintenance costs and accomplishments are displayed. “Annuals needs” in this table assume that every mile of road will be fully maintained to standard. Not every road is maintained every year nor needs maintenance every year. The Forest averages $375,000 annually for road maintenance. The remaining funds needed for road maintenance are derived from other funding sources such as grants, special use permits, project contracts requiring maintenance activities within the project contract, etc.

The average costs per mile were derived from condition surveys completed on a randomly selected sample of roads. Work items from the condition survey were input into the IWeb database. This data was then extrapolated to the entire subset of roads by maintenance level to determine the average cost per mile. This random sample was completed in 2007, and the miles were determined by the base inventory as reported in IWeb database in March 2008. Not every mile of road maintained will have the same costs. In some cases, minimal maintenance is needed. Not every mile of road requires maintenance every year. Maintenance activities are generally focused on routes receiving higher use, such as the primary connector routes of ML3, ML4 and ML5. In other situations, more costly maintenance may be needed.

Priorities for road and trail maintenance are established annually in a maintenance plan. Maintenance level 3-5 roads and key Maintenance level 2 (arterials) receive the highest priority. These roads receive the most traffic on the Forest and provide key access to recreation facilities such as campgrounds, boat launches, resorts, skiing, and administrative offices. They are the backbone of the transportation system. Not every mile of road needs maintenance every year. Roads that are needed for other uses such as private property access, fuels reduction projects, and salvage and Forest Health projects are maintained by those who use the road. Some roads have been “adopted” and are maintained under a special use agreement. As the Forest moves through completing other project analyses, a closer look at the transportation system is conducted and unneeded roads are closed, decommissioned, or restored. From averaging the last five years of road reports, only 86.6% of passenger car roads were maintained to standards. High clearance roads were only maintained at a 1.3% level.

Table 3.06-4 Estimated Annual Maintenance Costs by Maintenance Level

ML	Current (miles)	$/mile	Maintained[1] (miles)	Annual Spent $	Annual Needs $
1	372.4	$225.00	0	NA	0
2	2,163.5	$543.33	27.2	NA	$1,175,494
3	243.3	$10,870.00	27.72	NA	$2,644,671
4	54.4	$14,106.67	14.32	NA	$767,366
5	112.9	$14,106.67	54.44	NA	$1,592,643
Total	**2,946.5**	NA	**123.70**	**$370,000**	**$6,180,174**

[1] Average annual from Road Accomplishment Reports 2004-2008
ML - Maintenance Level

Environmental Consequences

Alternative 1 (Proposed Action)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Motorized vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length off of NFTS routes unless otherwise prohibited.

Public Safety: Pubic safety will not be increased or decreased by implementation of a cross country travel prohibition.

Affordability: No changes in costs to maintain the transportation would occur. Increased costs for signing would be a one time expense. Annual maintenance of the signs would be needed.

2. Additions to the NFTS

This alternative includes 157.39 miles of unauthorized routes would be added to the NFTS as trails. Appendix I (Route Data) shows the specified vehicle class, season of use and required mitigations.

Public Safety: Additions to the NFTS should enhance public safety through routine maintenance of trails. Trail maintenance addresses such issues as limbing, solid trail tread, and site distance as needed. Trail signs would show trail difficulty, as well as direction of travel.

Affordability: Funding sources would vary from grants to volunteer work through the Adopt-a trail program. Appropriated dollars would average $10,000 annually for motorized trail maintenance.

Annual costs for trail maintenance if every trail was maintained to standard would be about $230,534 (Table 3.06-8).

3. Changes to the Existing NFTS

Vehicle Class Changes

Vehicle class changes would occur on 623.28 miles of NFTS roads including: opening 67.96 miles of closed roads; converting 5.42 miles of closed roads to administrative use only; closing 45.98 miles of open roads; converting 93.59 miles of roads from Highway Legal only to all vehicles; and, converting 400.49 miles of roads from all vehicles to Highway Legal only. This alternative also converts 63.06 miles of the 623.28 miles of NFTS roads to trails.

Public Safety: Public safety is addressed through increasing the miles of road for highway Legal only vehicles, reducing mixed use. Roads changed to mixed use were analyzed using “Guidelines for Engineering Analysis of Motorized Mixed Use on National Forest System Roads”. Additionally, motorized mixed use on roads considered highways under California state law were assessed for combined use under the California Vehicle Code 38025 and R5 Guidelines (Mixed Use Analysis, project record, RO RF letter June 2007). Crash histories were reviewed for all roads with changes proposed, from reports submitted by the California Highway Patrol. This alternative provides the second highest risk to public safety with regards to mixed or combined use of traffic on roads.

No direct effects exist on the transportation system from changing vehicle use from all use allowed to highway legal on almost 400 miles of roughly graded roads. Some improvements would be needed for increased sight distance through additional brushing (estimated at $650 per mile) and additional signing (estimated at $620). Of the 400 miles of proposed vehicle class changes, 65.8 miles of passenger car roads would be reduced to roughly graded roads for high clearance vehicles. This reduces annual maintenance costs needs by $928,174. An estimated $1,000 per mile would cover costs to remove extra signage and replace route ID markers on each road. Also, the publication of the Motorized Vehicle Use Map is estimated at $30,000, for data entry and map publishing. These additional costs are not funded through special allocations, and would be added expense to the already decreased road maintenance budget.

Affordability: approximately 63 miles of road are converted to motorized trails, reducing the deferred maintenance backlog and reduction in overall annual maintenance needs. 65.3 miles of Maintenance level 3 roads are being changed to Maintenance level 2, reducing annual maintenance level costs by $674,332. The total system maintenance cost is being reduced by $41,549.

Season of Use

Public Safety: Implementing a seasonal closure will increase public safety through closure of roads that are unsafe to travel due to adverse weather conditions such as snow and ice, muddy clay roads. The public will know when road conditions are considered safe to travel on through the implementation of the Motor Vehicle Use Map. Winter closures will ensure that all users will be restricted to the same closure times, dependant on elevation. Seasonal closures will also protect transportation facilities from use during inclement weather when increased rutting, erosion, and compaction would occur from vehicular use.

Affordability: No increased costs to the transportation facilities are due to implementing a seasonal closure other than the annual production of the Motor Vehicle Use Map (Table 3.06-8). Reduced maintenance costs would be realized from reduced vehicle use during the wet season. Wet weather closures will ensure suitable drying has occurred on native surfaced roads, although access will be delayed during the drying period.

Public Safety: Because no mixed use would be occurring with the prohibition of Highway Legal vehicles on the wheeled over snow use routes (snow trails), the risk of crash between higher speed vehicles such as 4WD jeeps and ATVS is significantly reduced.

Affordability: No change to the cost of the management or maintenance of transportation facilities implementing this alternative.

Cumulative Effects

Slightly higher cost to the maintenance of the transportation system due to signing to provide for public safety.

Alternative 2 (No Action)

Under this alternative the agency would take no affirmative action (no change from current management or direction) and cross country travel with continued use of unauthorized routes would occur. It would include only existing closures and would not include any restrictions on motorized dispersed recreation access. The Travel Management direction would not be implemented and no MVUM would be produced. Unauthorized routes would continue to have no status or authorization as NFTS facilities.

Direct and Indirect Effects

1. Cross Country Travel

Motorized vehicle travel off NFTS routes by the public would continue.

Public Safety: Road uses would continue unchanged. New routes would continue to be created. Forest visitors would not know which routes were approved for use and could travel on unsafe, user created roads and trails.

Affordability: The absence of a prohibition of cross country travel does not affect Transportation Facilities costs. Maintenance costs would remain unchanged.

2. Additions to the NFTS

No routes would be added to the NFTS.

Public Safety: No change from the existing condition would occur. Use would continue on the NFTS.

Affordability: If 95.3 miles of NFTS trails were maintained, the cost would be $69,611.

3. Changes to the Existing NFTS

Vehicle Class Changes

No changes are made to the NFTS and existing closures and restrictions based on current Forest Orders (see Table 2.02-7).

Public Safety: Mixed use would continue on most all Level 2 roads. Public safety would not increase or decrease with this alternative. Current management plans would continue to guide management of the project area. No changes would be made to the current NFTS and no cross country travel prohibition would be put into place. Public safety risks could be increased during cross county travel off the roads and trail corridors. Unauthorized routes would continue to be unregulated, and overall road and trail density could increase. This alternative provides no change in mixed or combined use routes, thus no direct change to public safety.

Affordability: This alternative provides the baseline costs for maintenance of the transportation system. If every road were maintained to standard, the cost would be $6,180,174. Maintenance costs would continue as they are now with no change in management. No MVUM would be produced, so added costs to publish the map would not be anticipated. Deferred maintenance costs would also continue as no changes to the road system are recommended.

Season of Use

Current forest restrictions would remain in effect (see Table 2.02-7). No changes in cost to transportation management of facilities would occur.

CUMULATIVE EFFECTS

Cumulative effects would be a static road maintenance program, but fewer roads managed efficiently. Without publishing a MVUM map, understanding of designated routes for motorized traffic by public users will not occur.

Alternative 3 (Cross Country Prohibited)

Alternative 3 responds to the administration and resource issues by prohibiting cross country travel without adding any new facilities 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 and trails). None of the currently unauthorized routes would be added to the NFTS under this alternative.

Alternative 3 would not change the use of the NFTS and would not add any miles to the NFTS. Under this alternative the agency will prohibit cross country travel eliminating continued use of unauthorized routes. It would include seasonal closures on routes with existing closures and prohibit motorized access beyond existing NFTS routes.

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Motorized vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length off of NFTS routes unless otherwise prohibited.

Public Safety: Travel would be confined to the NFTS of roads and trails. The public would know where to travel and what type of vehicle could be used.

Affordability: No change in costs to maintain the transportation system would occur.

2. Additions to the NFTS

Same as Alternative 2.

3. Changes to the Existing NFTS

Same as Alternative 2.

CUMULATIVE EFFECTS

Cumulative effects would be a static road maintenance program, but fewer roads managed efficiently. However, publishing a MVUM will enhance the public education of where motorized use can occur.

Alternative 4 (Recreation)

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Motorized vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length off of NFTS routes unless otherwise prohibited.

Public Safety: By prohibiting travel off of designated routes, the public will not travel on unauthorized routes, reducing the risk of traveling on unmaintained, and user created routes which may be poorly located.

Affordability: The prohibition of cross country travel does not affect Transportation Facilities costs.

2. Additions to the NFTS

This alternative includes 181.72 miles of additions to the NFTS. Appendix I (Route Data) shows the specified vehicle class, season of use and required mitigations.

Public Safety: By adding trails to the NFTS which describe difficulty, location, vehicle class, and season of use, the public will know where to recreate and what skills they need to ride on these trails.

Affordability: Adding these trails increases trail maintenance costs by $207,497 (Table 3.06-8) if every trail were maintained every year.

3. Changes to the Existing NFTS

Vehicle Class Changes

Vehicle class changes would occur on 371.32 miles of NFTS roads including: opening 101.83 miles of closed roads; converting 2.47 miles of closed roads to administrative use only; closing 10.66 miles of open roads; converting 99.76 miles of roads from Highway Legal only to all vehicles; and, converting 145.76 miles of roads from all vehicles to Highway Legal only. This alternative also converts 99.86 miles of the 371.32 miles of NFTS roads to trails.

Public Safety: Roads analyzed for motorized mixed use was assessed for compliance with the California Vehicle Code (see project record- Mixed Use Analysis Report). Crash histories were reviewed for all roads with changes proposed, from reports submitted by the California Highway Patrol. This alternative provides the highest risk to public safety with regards to mixed or combined use of traffic on roads.

Affordability: Direct effects include the improvements to 146 miles of road. The improvements would cover additional brushing (estimated at $650 per mile) and additional signing (estimated at $620). In addition, 65.8 miles of passenger car roads would be reduced to roughly graded roads for high clearance vehicles, reducing road maintenance costs by $679,517.

An increase in $102,913 in road maintenance dollars would occur (Table 3.06-8). An estimated $1,000 per mile would cover costs to remove extra signage and replace route ID markers on each road. Also, the publication of the Motorized Vehicle Use Map is estimated at $30,000, for data entry and map publishing. These additional costs are not funded through special allocations, and would be added expense to the already decreased road maintenance budget.

Alternative 4 is the most expensive to implement and maintain (Table 3.06-8).

Season of Use

Same as Alternative 1

CUMULATIVE EFFECTS

Higher cost to the maintenance of the transportation system due to signing to provide for public safety and trail maintenance.

Alternative 5 (Resources)

Alternative 5 responds to the administration, private property, recreation and resource issues by limiting additions to the NFTS and increasing restrictions that would reduce conflicts and provide additional resource protection. This alternative would limit motorized recreation opportunities (including those accessing dispersed recreation activities) by providing greater protection for forest resources.

DIRECT AND INDIRECT EFFECTS

1. Cross Country Travel

Motorized vehicle travel off NFTS roads and NFTS trails by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length off of NFTS routes unless otherwise prohibited.

Public Safety: By prohibiting travel off of designated routes, the public will not travel on unauthorized routes, reducing the risk of traveling on unmaintained, and user created routes which may be poorly located.

Affordability: No changes in costs to the transportation facilities are incurred with the implementation of a cross country travel prohibition.

2. Additions to the NFTS

This alternative includes 31.51 miles of additions to the NFTS. Appendix I (Route Data) shows the specified vehicle class, season of use and required mitigations.

Public Safety: This alternative increases public safety through the reduction of motorized mixed use. 441 miles of road change to Highway Legal Only, increasing public safety from Alternatives 1 and 4.

Affordability: No changes in road maintenances would occur. Changing the use would not change the maintenance level and they would continue to be maintained as roughly graded roads. Trail maintenance costs would increase by $38,648 over Alternative 2 (Table 3.06-8). An estimated $1,000 per mile would cover costs to place extra signage and replace route ID markers on each road. The publication of the MVUM is estimated at $30,000 for data entry and map production. These additional costs are not funded through special allocations, and would be added expense to the already decreased road maintenance budget.

3. Changes to the Existing NFTS

Vehicle Class Changes

Vehicle class changes would occur on 531.39 miles of NFTS roads including: opening 11.66 miles of closed roads; converting 5.42 miles of closed roads to administrative use only; closing 59.03 miles of open roads; and, converting 441.10 miles of roads from all vehicles to Highway Legal only. This alternative also converts 21.51 miles of the 531.39 miles of NFTS roads to trails (the mileage overlaps with the other changes described above and shown in Chapter 2).

Public Safety: 441 miles of roads are changed from All Vehicles to Highway Legal Only, which eliminates the possibility of mixed traffic on routes. This alternative increases public safety through the reduction of motorized mixed use.

Affordability: Direct effects include the change in use of 441 miles from all vehicles allowed to travel on these roads to Highway Legal Only allowed with no change in road maintenance costs. These roads would continue to be managed as roughly graded for high clearance vehicles.

An estimated $1,000 per mile would cover costs to place extra signage and replace route ID markers on each road. Also, the publication of the Motorized Vehicle Use Map is estimated at $30,000, for data entry and map publishing. These additional costs are not funded through special allocations, and would be added expense to the already decreased road maintenance budget.

Season of Use

This alternative provides the maximum amount of protection to transportation facilities and public safety through seasonal closing of roads and trails to the public during inclement weather. Travel is allowed when roads are usually fully open and free from snow. Roads at mid elevations are dried out and not as subject to rutting and erosion as during the wetter periods of the year.

Reduced maintenance costs would be realized through fewer repairs of road rutting and erosion from vehicle use during the wet season. Wheeled over snow use would be prohibited except where allowed by permit or other authorization.

CUMULATIVE EFFECTS

Cumulative effects would be a static road maintenance program, but fewer roads managed efficiently. However, the publishing of the MVUM map will enhance the public education of designated routes for motorized traffic by public users.

Summary of Effects Analysis across All Alternatives

The transportation system remains too extensive to fully maintain all the roads. Alternatives 2 and 3 would not change current management of the road system. Alternatives 1, 4 and 5 change vehicle use which either improves public safety or improves recreation opportunities.

1. ***Direct and indirect effects of the prohibition of cross country motorized vehicle travel.***

   The prohibition of cross country travel does not affect the transportation facilities.

2. ***Direct and indirect effects of adding facilities to the NFTS including identifying seasons of use and vehicle class.***

   Alternatives 2 and 3 have no increased costs to implement as no changes are made to the existing NFTS. Annual maintenance will remain the same as will deferred maintenance. Alternatives 1, 4, and 5 will increase annual maintenance costs for increased safety precautions such as installation and maintenance of signing. Alternatives 1 and 4 will reduce maintenance costs for routine road maintenance by reducing the number of miles of higher standard roads to lower standard roads (Table 3.02-6). Alternatives 1, 3, 4 and 5 would require the publication of a Motorized Vehicle Use Map (MVUM), which will require additional administrative expense.

3. ***Direct and indirect effects of changes to the existing NFTS including identifying seasons of use and vehicle class.***

   Vehicle class changes vary from converting roads to trails; opening of closed roads; converting closed roads to administrative use only; closing of open roads to public use motorized use; and converting roads from all vehicles allowed to Highway Legal Only. All of these actions improve the safety of the public by providing better management of the resources. Roads would be closed to protect facilities and private property. Other roads would be opened to access existing NFTS roads, dispersed sites, or property access. Those roads open to all vehicles improve trail connectivity, but required a mixed use analysis. Those roads changed to Highway Legal Only vehicles reduce mixed traffic implications and probability of crashes with non-highway Legal vehicles.

4. ***Cumulative Effects***

   The transportation system remains too extensive to fully maintain all the roads. Alternatives 2 and 3 would not change current management of the road system. Alternatives 1, 4 and 5 have changes in vehicle use which either improves public safety or improves recreation opportunities. From averaging the last five years of road reports, only 86.6% of passenger car roads were maintained to standards. High clearance roads

Public Safety

Alternatives 1 and 4 present the greatest risks to public safety, as they contain the most miles where motorized mixed use would occur on roads. Alternative 5 provides the least risk to public safety, with the most miles changed from All Vehicles to Highway Legal Only, which eliminates mixed motorized traffic on the same route. Alternatives 2 and 3 have no net change from the current transportation system. In Chapter 2, Table 2.05-5 compared the alternatives in terms of the actions resulting from the changes to the existing NFTS. Table 3.06-5 displays the NFTS roads maintenance level and vehicle class by alternative. Table 3.06-6 compares the alternatives in terms of maintenance level changes. Table 3.06-7 displays public safety indicator measures by alternative.

Table 3.06-5 NFTS Roads: Maintenance Level and Vehicle Class

ML and Vehicle Class	**Alternative** (miles)				
	1	**2**	**3**	**4**	**5**
ML1	294.8	366.8	366.8	263.5	351.7
ML2 Administrative Use Only (ADM)	81.1	45.1	45.1	55.1	80.2
ML2 Highway Legal Only (HLO)	431.1	20.6	20.6	173.5	415.9
ML2 All Vehicles (ALL)	1,377.8	1,734.9	1,734.9	1,674.3	1,232.9
ML3 Highway Legal Only (HLO)	317.1	408.5	408.5	308.9	462.2
ML3 All Vehicles (ALL)	16.5	0.0	0.0	18.4	0.0
total	**2,518.4**	**2,575.9**	**2,575.9**	**2,493.7**	**2,542.9**

ML - Maintenance Level
ADM and **ML1** are closed to public motorized use

Table 3.06-6 NFTS Roads: Maintenance Level Changes

Change	**Alternative** (miles)				
	1	**2**	**3**	**4**	**5**
ML3 (SLO) to ML2 All	65.8	0.00	0.00	65.8	0.00
ML1 to ML2 All	12.7	0.00	0.00	12.7	0.00

Table 3.06-7 Public Safety Indicator Measures

Public Safety Indicator Measures	**Alternative** (miles)				
	1	**2**	**3**	**4**	**5**
Roads Changed from ALL to HLO	400.50	0.00	0.00	145.80	441.00
Roads changed from HLO to ALL	93.60	0.00	0.00	100.00	0.00
Roads changed to trails	64.21	0.00	0.00	102.83	21.51
Unauthorized routes added as roads	0.00	0.00	0.00	0.00	0.00
Unauthorized routes added as trails	158.03	0.00	0.00	182.37	31.54
MMU, High clearance roads, high severity crash	49.40	0.00	0.00	48.73	2.88
MMU, High clearance roads, high probability of crash	52.15	0.00	0.00	60.45	0.00
MMU, Passenger Car roads, high severity crash	16.51	0.00	0.00	18.35	0.00
MMU, passenger car roads, high probability of crash	5.17	0.00	0.00	7.10	0.00
MMU, consistent with CVC	0.00	0.00	0.00	0.00	0.00
MMU, not consistent with CVC[1]	16.51	0.00	0.00	18.44	0.00

[1] The mileages listed for MMU, not consistent with CVC, would require further approval or concurrence from the CHP to be consistent with State Law.

Affordability

Table 3.06-8 displays the affordability indicator measures for each alternative. The costs shown are based on estimates for the types of work needed to complete the changes. Costs may include safety enhancements or resource improvements such as increased signage, brushing, surfacing, and washout repairs. The total cost shown includes the estimated annual maintenance costs for roads and trails as well as implementation costs from the Mixed Use and Combined Use Reports.

Table 3.06-8 Affordability Indicator Measures

Affordability Indicator Measures	**Alternative** (miles)				
	1	**2**	**3**	**4**	**5**
NFTS Roads (miles)	2,882.30	2,946.50	2,946.50	2,800.70	2,925.00
NFTS Trails (miles)	315.80	95.30	95.30	376.90	148.30
Annual Maintenance					
Roads	$5,873,000	$6,180,174	$6,801,174	$5,873,000	$6,180,174
Dispersed Access Trails[1]	$0	$0	$0	$0	$0
OHV Trails	$230,534	$69,611	$69,611	$277,108	$108,259
subtotal	$6,103,534	$6,249,785	$6,249,785	$6,150,108	$6,288,433
Implementation Costs					
Passenger car roads reduced to high clearance road[2]	$93,590	$0	$0	$99,760	$ 0
Roads converted to motorized trails[3]	$64,210	$0	$0	$102,830	$21,510
Trails converted to roads	$0	$0	$0	$ 0	$ 0
Roads removed from the NFTS	$0	$0	$0	$ 0	$ 0
Cost of implementing MVUM[2]	$30,000	$0	$ 30,000	$30,000	$30,000
subtotal	$187,800	$0	$30,000	$232,590	$51,510
total	**$6,291,334**	**$6,249,785**	**$6,279,785**	**$6,382,698**	**$6,339,943**

1 Dispersed access maintenance costs included in OHV trails
2 Assume $30,000 for MVUM publication costs
3 Assume $1,000/mile reductions

Compliance with the Forest Plan and Other Direction

The action alternatives 1, 3, 4 and 5 implement the Travel Management Rule by designating those routes for motorized use by type of vehicle and time of year. They also follow Forest Plan direction which states that every acre within the Stanislaus National Forest will be designated in either a Closed or Restricted Category for Motorized Vehicle Travel management.

Alternative 2 (No Action) does not implement the Travel Management Rule (36 CFR 212, 251, 261 and 295). Specifically, it does not address the requirements of 36 CFR § 212, Subpart B, Designation of roads, motorized trails, and motorized areas which states in part “Motor vehicle use on National Forest System roads, on National Forest System trails, and in areas on National Forest System lands shall be designated by vehicle class and, if appropriate, by time of year by the responsible official on administrative units or Ranger Districts of the National Forest System.”

Table 3.06-9 shows the mixed use road findings and recommendations to comply with the Forest Plan and other regulatory direction. Table 3.06-10 shows the same for combined use roads and Table 3.06-11 for other roads.

Table 3.06-9 Mixed Use Roads

Road	Sec	BMP	EMP	Crash Probability	Crash Severity	Recommendations
01N01 (GPS Pt 230-01N46)	1	6.00	14.50	High	High	Surface Maintenance, Brushing and Signing
01N01 (FR4221-01N01A)	2	25.20	32.20	High	Low	Surface Maintenance, Brushing and Signing
01N37		0.00	1.35	Low	Low	Surface Maintenance, Brushing and Signing
01S04		1.00	1.60	High	Low	Surface Maintenance, Brushing and Signing
01S45Y		0.00	0.04	Low	Low	Dispersed site
01S73Y		0.00	2.00	Low	High	Surface Maintenance, Brushing and Signing
1S1922A		0.00	0.29	Low	Low	Road Closed
02N05		0.00	0.83	Low	Low	Surface Maintenance, Brushing and Signing
02N14		0.00	8.05	Low	Low	Surface Maintenance, Brushing and Signing
02S02		0.00	7.82	High	High	Verify ROW, Surface Maintenance, Brushing and Signing
02S07		0.00	3.50	Low	High	Surface Maintenance, Brushing and Signing
02S41		0.00	1.60	Low	High	Surface Maintenance, Brushing and Signing
02S68		0.00	1.81	Low	Low	Not Accessible with passenger vehicle
03N26YB		0.00	0.28	N/A	N/A	Road Closed
04N09		0.00	0.62	High	High	Rehab washout, Brushing and Signing
05N01		0.00	6.88	N/A	N/A	Road Closed for Paving, analysis not completed
05N14		0.00	11.76	High	High	Surface Maintenance, Brushing and Signing
06N58		0.00	5.62	High	High	Surface Maintenance, Brushing and Signing
06N62		0.00	1.35	Low	Low	Surface Maintenance, Brushing and Signing
07N09	1	0.00	0.40	Low	High	Improve Mixed traffic signing and brushing
07N09	2	0.00	2.80	Low	Low	Surface Maintenance, Brushing and Signing
07N09	3	0.00	0.60	Low	High	Surface Maintenance, Brushing and Signing
07N28		0.00	3.23	Low	Low	Surface Maintenance, Brushing and Signing
07N49Y		0.00	0.36	Low	Low	Not Accessible with passenger vehicle

Table 3.06-10 Combined Use Roads

Road	Sec	BMP	EMP	Crash Probability	Crash Severity	Recommendations
01S03		0.30	1.20	Low	High	Surface Maintenance, Brushing and improved mixed traffic signing
01S03		2.00	4.20	Low	High	Surface Maintenance, Brushing and improved mixed traffic signing
01S03		9.40	10.30	Low	High	Surface Maintenance, Brushing and improved mixed traffic signing
02S30		2.66	3.82	Low	High	Improved mixed traffic signing
03N01 (1N89-1N05)	5	0.00	0.20	High	High	Surface Maintenance, Brushing and improved mixed traffic signing
03N01 (1N08-2N10Y)	6	0.00	0.30	High	High	Surface Maintenance, Brushing and improved mixed traffic signing
03N01(2N14-18EV63)	1	0.00	2.10	High	High	Surface Maintenance, Brushing and Signing
03N01 (2N82 – end of Pavement)	2	0.00	1.40	High	High	Surface Maintenance, Brushing and Signing
04N25		0.00	0.44	High	High	Surface Maintenance, Brushing and improved mixed traffic signing
07N01		0.00	0.09	High	High	Improved mixed traffic signing
07N05		0.00	0.53	Low	High	Surface Maintenance, Brushing and improved mixed traffic signing
07N09	4	0.00	4.60	Low	High	Change signs, Surface Maintenance, and Brushing
07N75		0.00	1.84	High	High	Surface Maintenance, Brushing and improved mixed traffic signing

Table 3.06-11 Other Roads

Road	Sec	BMP	EMP	Crash Probability	Crash Severity	Recommendations
11715A		0.00	0.52	N/A	N/A	No route located
11806A		0.00	0.71	Low	Low	Dispersed site
11808B		0.00	0.03	Low	Low	Dispersed site
21802H		0.00	0.17	Low	Low	Dispersed site
31527C		0.00	0.57	N/A	N/A	Trail
31623G		0.00	0.41	Low	Low	Surface Maintenance, Brushing and Signing
31724C		0.00	0.17	Low	Low	Road Closed
31801F		0.00	0.10	N/A	N/A	Not Accessed
31802C		0.00	0.08	N/A	N/A	Not Accessed
31824D		0.00	0.27	N/A	N/A	Trail
31825A		0.00	0.06	N/A	N/A	Trail
31830L		0.00	0.13	N/A	N/A	Trail
31906B		0.00	0.05	Low	Low	Not Accessible
41736B		0.00	0.18	Low	Low	Road Closed
41834J		0.00	0.07	Low	Low	Dispersed site
FR10738		0.00	0.19	Low	Low	Dispersed site
FR2990		0.00	0.28	Low	Low	Signing
FR5034		0.00	0.23	Low	Low	Dispersed site
FR5320		0.00	0.20	Low	Low	Dispersed site
FR5821		0.00	0.28	Low	Low	Signing
FR7356		0.00	0.11	Low	Low	Road Closed
FR8165		0.00	0.05	Low	Low	Signing
FR8291		0.00	0.15	Low	Low	Signing
FR83630		0.00	0.21	Low	Low	Dispersed site
FR8531		0.00	0.25	Low	High	Surface Maintenance, Brushing and Signing
FR8612		0.00	0.16	Low	Low	Road Closed
FR9380		0.00	0.11	Low	Low	Road Closed
FR9584		0.00	0.23	Low	Low	Surface Maintenance for passenger car use
FR9712		0.00	0.03	Low	Low	Dispersed site
FR9723		0.00	0.12	Low	Low	Road Closed
FR9730		0.00	0.10	Low	Low	Dispersed site
FR9782		0.00	0.10	Low	Low	Dispersed site

3.07 Society, Culture and Economy

This section presents information useful to understand and analyze the economic effects in the surrounding area and the potential social effects. In addition to economic impacts, the assessment of environmental justice and impacts to communities provide measures of success used to assess how effectively the proposed activities meet the project's purpose and need.

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

Multiple statutes, regulations and executive orders identify the general requirement for the application of economic and social evaluation in support of Forest Service planning and decision making. These include, but are not limited to, the Multiple-Use Sustained Yield Act of 1960 (74 Stat. 215: 16 USC 528-531), National Environmental Policy Act of 1969 (83 Stat. 852; 42 USC 4321, 4331-4335, 4341-4347), and the Planning Act of 1974. 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. 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.

Effects Analysis Methodology

Assumptions Specific to Society, Culture and Economy

1. The Environmental Justice analysis will report what effects might occur to minority and low-income populations. Of particular concern is whether job or income discrimination might occur to these groups in the area during or resulting from the proposed project.

Data Sources

1. IMPLAN - Pro input-output modeling system and 2006 IMPLAN data.
2. National Visitor Use Monitoring (NVUM)

Society, Culture and Economy Indicators

Indicators used in the analysis of economic effects (Table 3.07-1) include jobs and labor income in the economic impact analysis. Non-market values, such as the value of recreation experiences and ecological services, by their nature are difficult to quantify. Direction provided in 40 CFR 1502.23 and Forest Service Handbook 1909.15, (7/6/04) and 22.35 (01/14/05) provides for the use of qualitative analysis to evaluate the effects of these non-market values. The non-market aspects of each proposed activity will be described in other resource sections and specialist reports.

Table 3.07-1 Indicators and Methods

Measures of Success	Analysis Method	Analysis Tool
Employment & Labor Income Impacts	Input-Output Analysis	IMPLAN, 2006
Impacts to area communities	Assess Impacts to area Lifestyle, Attitudes, Values and Beliefs	Discussion in text
Environmental Justice	Examination of area trends and current characteristics	Discussion in text

Society, Culture and Economy Methodology

Economic Effects

Economic effects can be categorized as direct, indirect and induced. Direct effects are changes directly associated with spending by a recreation visitor. Indirect and induced effects are the multiplier effects resulting from subsequent rounds of spending in the local economy.

Input-output analysis was used to estimate the direct, indirect and induced employment and labor income effects stemming from motorized and non-motorized use. Input-output analysis (Hewings 1985) is a means of examining relationships within an economy both between businesses as well as between businesses and final consumers. It captures all monetary market transactions for consumption in a given time period. The resulting mathematical representation allows one to examine the effect of a change in one or several economic activities on an entire economy. This examination is called impact analysis. Input-output analysis requires the identification of an economic impact area. The economic area that surrounds the Stanislaus National Forest used for this jobs and income analysis was four counties in Central California surrounding the Stanislaus National Forest (STF). Mono County to the east was omitted because it would distort the findings. The counties included are Alpine, Calaveras, Mariposa and Tuolumne.

The IMPLAN Pro input-output modeling system and 2006 IMPLAN data (the most recent data available) were used to develop the input-output model for this analysis (IMPLAN Professional 2004). IMPLAN translates changes in final demand for goods and services into resulting changes in economic effects, such as labor income and employment of the affected area's economy. For the economic impact area, employment and labor income estimates were generated that were attributable to all current recreation use (wildlife and non-wildlife activities), motorized, non-motorized and other activities for the STF.

The expenditure and use information collected by the NVUM survey are crucial elements in the economic analysis. As reported earlier, the NVUM survey collects use and expenditure information for various activity types. The expenditure information is collected by twelve activity groups within four trip segments (non-local overnight trips, non-local day trips, local day trips and local overnight trips) (Stynes and White 2005; Stynes and White 2006). The reported spending for each of the spending categories is allocated to the appropriate industry within the IMPLAN model (the allocation process, also referred to as "bridging," was conducted by the USDA Forest Service, Planning Analysis Group in Fort Collins, CO). The bridged IMPLAN files were used to estimate economic effects (e.g., employment and labor income) related to changes in spending (i.e., changes in spending; technically referred to as changes in final demand are caused by changes in use).

Estimated economic effects (full and part-time jobs and labor income) are presented. Estimated economic effects are displayed in the following ways:

1. Direct, and indirect and induced employment and labor income response coefficients by activity type (jobs and labor income per 1,000 visits); and
2. Estimated employment and labor income by motorized and non-motorized activity types.

Jobs and Labor Income

The economic impacts to the local economy affected by the treatments proposed are measured by estimating the employment (full and part-time jobs) and labor income generated by the alternatives. The direct employment and labor income benefit employees and their families and therefore directly affect the local economy. Additional indirect and induced multiplier effects (ripple effects) are generated by the direct activities. Together the direct and multiplier effects comprise the total economic impacts to the local economy.

The assessment of economic impacts attempts to identify potential effects that Forest Service management decisions may have on local, county, and regional economic systems and on people using the natural resources that the STF provides. In particular, would changes in the use of the National Forest for recreation and the amount of change in the designation of Forest roads and trails be large enough or significant enough to cause measurable economic changes? Is the economy of the local area diverse enough and robust enough that the proposed changes will be insignificant or will they be felt in very specific segments of the local economy?

Lifestyles, Attitudes, Values and Beliefs

The description of Lifestyles, Attitudes, Values and Beliefs provides further context to evaluate the alternatives based on concerns and issues held by communities. People may also be interested in or concerned with management issues for reasons other than income or recreational opportunities. Research indicates that people may hold a variety of values towards forests, and that these values may play a critical role in identifying ecosystem management goals, setting the context for decision making, and guiding our choices. A variety of forest values exist and include aesthetic value, cultural value, economic value, historic value, recreational value, and spiritual value (Brown and Reed, 2000). Examination of these Lifestyles, Attitudes, Values and Beliefs may suggest why people value the STF and why potential conflict may exist over travel management related decisions.

National Visitor Use Monitoring (NVUM)

The National Visitor Use Monitoring (NVUM) program provides reliable information about recreation visitors to National Forest system managed lands at the national, regional, and forest level. Information about the quantity and quality of recreation visits is required for National Forest plans, Executive Order 12862 (Setting Customer Service Standards), and implementation of the National Recreation Agenda. To improve public service, the agency’s Strategic and Annual Performance Plans require measuring trends in visitor satisfaction and use levels. NVUM information assists Congress, Forest Service leaders, and program managers in making sound decisions that best serve the public and protect valuable natural resources by providing science based, reliable information about the type, quantity, quality and location of recreation use on public lands. The information collected is also important to external customers including state agencies and private industry. NVUM methodology and analysis is explained in detail in the research paper entitled Forest Service National Visitor Use Monitoring Process: Research Method Documentation; English, Kocis, Zarnoch, and Arnold; Southern Research Station; May 2002 (www.fs.fed.us/recreation/programs/nvum).

The STF participated in the National Visitor Use Monitoring (NVUM) project from October 2002 through September 2003 and again from October 2006 to September 2007. Approximately 1,800,000 National Forest visits occur on the STF during each survey period (National Visitor Use Monitoring Report 2004, project record).

Affected Environment

Located between Lake Tahoe and Yosemite National Park, the STF includes portions of four central California counties: Alpine, Calaveras, Mariposa and Tuolumne. These counties are the STF study area as referred to in the following sections. Table 3.07-2 reports the total county size in acres and the proportion of land base that is in the STF.

In relation to some of the metropolitan counties in California, the study area counties have low population densities but are growing faster than the state average. The interactions between the Forest and local communities are important for the social and economic well-being of the area. Alpine county is the least populated county in the state with more than 91% of its land base being National Forest lands. The Stanislaus NF portion includes mostly high elevation lands, much of it within designated Wilderness. The other three counties (Tuolumne, Mariposa and Calaveras) are within the heart of California’s historic Mother Lode. The nearby foothill communities date back to the Gold

Rush era. All four counties rely on tourism as a primary source of jobs, and the Forest contributes to the available opportunities along with the following choices: Yosemite National Park, Bureau of Land Management, New Melones Recreation Area, Don Pedro Recreation Area, Calaveras Big Trees State Park, Columbia State Historic Park, Railtown1897 State Historic Park, and many private providers.

Table 3.07-2 Stanislaus National Forest Lands by County

County	Total Acres	Forest Acres	Percent of County
Alpine	465,030	124,285	27
Calaveras	663,290	75,072	11
Mariposa	934,690	84,456	9
Tuolumne	1,467,300	611,395	42

Although this report focuses on the above four local counties, it is important to mention that a significant amount of the visitation on the Forest is by residents of the California Central Valley and the greater San Francisco Bay Area. These visitors travel a greater distance and stay longer, once they have arrived. Many have second homes or cabins and live in the area for a part of the year. During scoping for the Proposed Action, the local community was interested in this project from a variety of perspectives. Actions that restrict access, as it relates to use of the National Forest, are considered negative by some members of the public, while others strongly feel the need to protect environmental values. Some individuals desire to maintain existing access while also caring about natural resources. They share the Forest Service concern about effectively managing the increasing recreational use.

Background

People have lived in the STF area for thousands of years. Paleo-Indians were the original inhabitants of the Forest and lived 10,000 – 11,000 years ago at the end of the last Ice Age. Since that time, the various native cultures that have lived in this area specialized in their adaptation to locally available resources. Native Americans still collect various plant resources and use certain locations for traditional cultural and religious practices.

The first Euro-American explorers in the area arrived in the early 1800s. The cultural values of the Euro-Americans differed considerably from those of the Indian Americans, and the ecological impacts to the land were often severe. Settlement of the area rapidly increased following the discovery of gold in 1849. Mining operations (and related services), sawmills, and ranching activities transformed the area. Today people in the STF Region derive their livelihood in diverse ways. Ranching is still a component of the community, and many of the families that are ranching today have historic roots in the area. Many of the Native American families are also descended from historic families. The Forest supports employment opportunities from which local residents may generate income. This includes direct employment for the federal agencies, harvest of products from the forest, or employment in the tourism service industry. Residents of the local area identify with the Forest for both recreational and personal values. For example, some recreation cabins have been in the family for generations, and the local ranching communities have historical ties with the forest’s resources for production purposes. Many people outside of the local area also have strong ties with the Forest, returning throughout their lives to campsites, hunting areas, and other special places.

Current Population, Growth Trends and Demographics

Population, age and racial distributions of counties are important socioeconomic considerations in land management planning. The following sections highlight demographic trends in the STF study area. Population forecasts provide a projection of future population levels, which may help to indicate the potential for increased pressures for uses and recreational opportunities on the STF. Age distributions provide insights into the socioeconomic dynamic in the local area in terms of assessing the proportion of individuals in the working age group versus retirees and minors who typically use local services in different ways. Similarly, the racial composition of the local area may affect the cultural uses of public lands. Over the last 35 years, population growth in the STF study area has outpaced that of the state and the nation. From 1970 to 2005 the population grew by 80,208 people, a 188% increase (Figure 3.07-1). The lower graph is indexed to1970 being 100. A value of 100 indicates that it has not changed since 1970. Population growth is not generally impacted by national recessions.

Figure 3.07-1 Population Trends and Comparisons

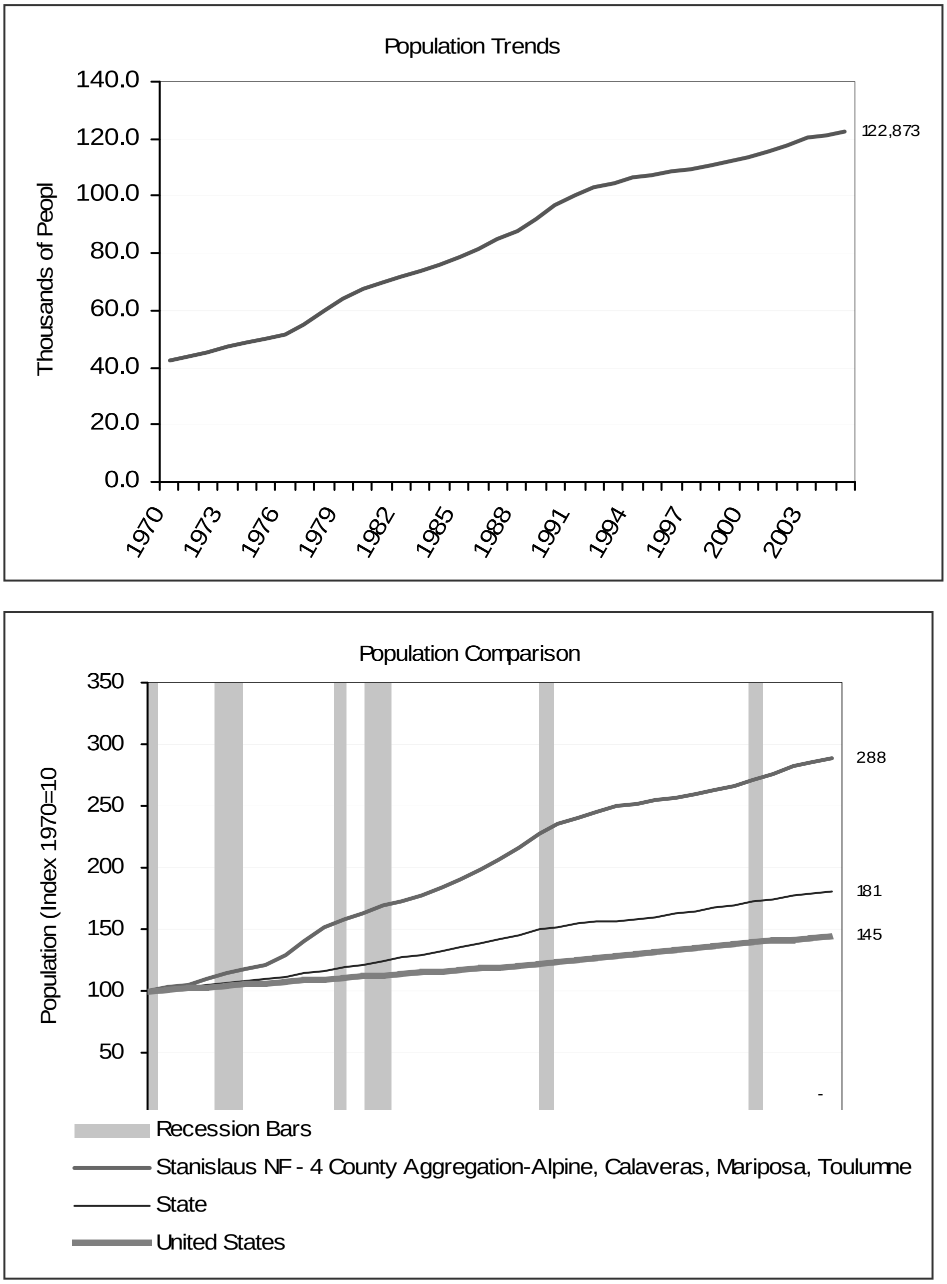


Table 3.07-3 Population Demographics

	Totals	Under 20 years	40 - 54 (Baby Boom in 2000)	65 years and over	Median Age	Density (pop/mi^2)

		Number	Share	Number	Share	Number	Share		
Total Population									
2000	113,393	27,119	24%	28,041	25%	20,500	18%	43.5	21
1990	95,869	24,189	25%	17,907	19%	16,261	17%	38.1	18
10 Yr. Change	17,524	2,930	-1%	10,134	6%	4,239	1%	5.4	3
10 Yr Change (%)	18%	12%		57%		26%		14%	18%
2000 Gender Breakout									
Male	58,257	14,232	24%	14,331	25%	9,695	17%	42.1	
Female	55,136	12,887	23%	13,710	25%	10,805	20%	44.9	
Male/Female Split	51% / 49%	52% / 48%		51% / 49%		47% / 53%			

The total population in 2000 was 113,393 people, up 18% from 95,869 in 1990 (Table 3.07-3). The median age of the population has gotten older since 1990. The median age in 2000 is 43.5 years, up from 38.1 years in 1990. The California median age is 33.3 years, significantly lower than the study area. The largest age category is 45 to 49 years old (9,743 people or 8.6% of the total). The age group that has grown the fastest, as a share of total, is 50 to 54 years, up 4,149 people. Their share of total rose by 2.9%. The trend has been towards an increase in average age.

Table 3.07-4 Racial Composition

Total Population by Race		% of Total	California
White	101,856	89.8%	44.4%
Hispanic or Latino (of any race)	8,633	7.6%	34.9%
African American	1,571	1.4%	6.4%
American Indian & Alaska Native	2,527	2.2%	.6%
Asian	866	0.8%	
Native Hawaiian and Other Pacific Islander	152	0.1%	13.3%
Some other race	2,890	2.5%	
Two or more races	3,531	3.1%	

Minority composition in the study area is lower than that of California with the exception of American Indian which is almost 4 times the state average (Table 3.07-4).

Household and personal income of the study area increased over the past several decades. It is likely that this trend will continue, but this does not necessarily mean that income will grow faster than cost of living. During the last 10 years, housing costs have increased more rapidly than income.

In 1999, for every household that made over $100K, 4.3 households made under $30K. 10 years earlier, for every household that made over $100K, 19.2 households made under $30K. The lower income categories have grown more slowly than the higher income.

Since total personal income includes income from 401(k) plans as well as other non-labor income sources like transfer payments, dividends, and rent, it is possible for per capita income to rise, even if the average wage per job declines over time. In other words, non-labor sources of income can cause per capita income to rise, even if people are earning less per job. Per capita income, adjusted for inflation, has risen from $19,406 in 1970 to $28,598 in 2005. In 2005, per capita income was lower than the state ($36,936) and the nation ($34,471) (Figure 3.07-3).

Figure 3.07-2 Household Income

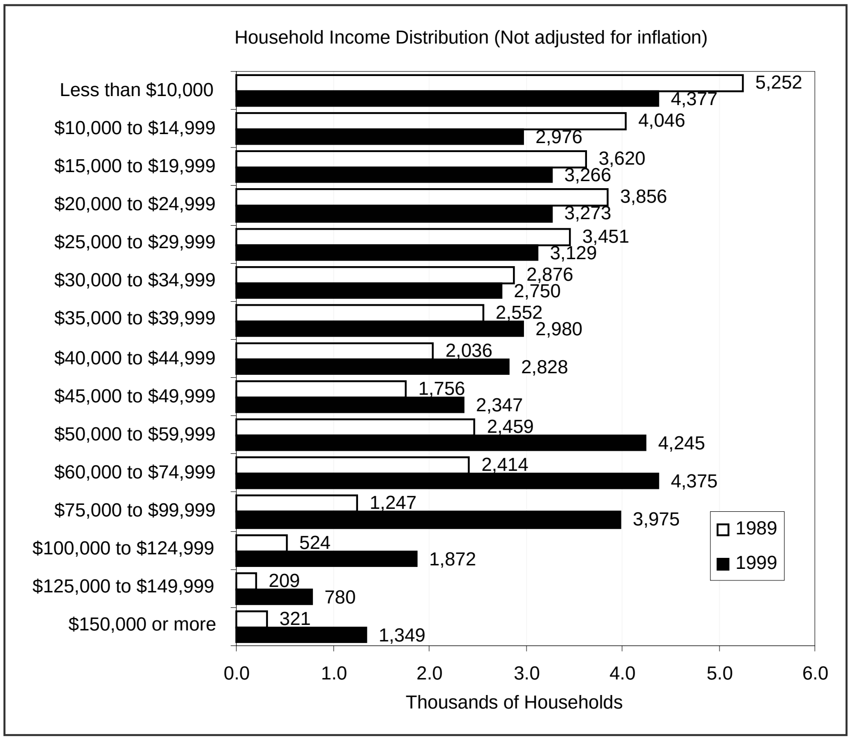
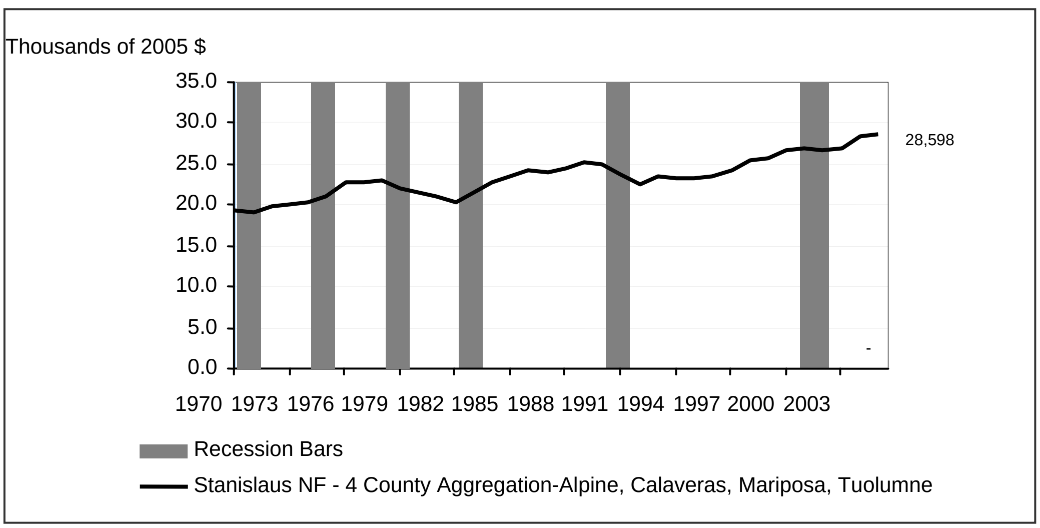


Figure 3.07-3 Per Capita Income



Lifestyles, Attitudes, Beliefs and Values

While local communities are most affected economically by changes as a result of implementing a decision on motorized use, many visitors of the Forest, seeking a variety of benefits, could be affected. These benefits are both direct and indirect and often difficult to predict or measure. Individuals potentially affected may live locally, but often they are not, as previously discussed in the NVUM results.

Lifestyles encompass the way people live and their relationship with the Forest.

The Forest Plan used the following categories to discuss lifestyle differences and social impacts (USDA 1991d):

- Native Americans (local tribes)
- Long Time Residents (ranchers, working families).
- Newcomers and Second Home Residents (retirees)
- Regional Recreationists: Developed Site and Motorized Dispersed (activity oriented).
- Local, Regional and Global Environmentalists

The plan made the following characterizations:

- Native Americans and Long Time residents share values, supporting commodity production/local jobs, hunting, fishing, and firewood gathering. Newcomers and Second home residents value the aesthetic backdrop, amenity values, and recreation opportunities of the Forest.
- Regional Recreationists have similar interests as Newcomers but are less connected to local community life, since they may live far away from the Forest. They come to the Forest setting for a specific activity or set of activities.
- Environmentalists value the integrity of ecosystems and oppose human activities that may impact natural systems.

Comments received as part of public scoping for this project are a reflection of the above categories, covering many points of view and perspectives.

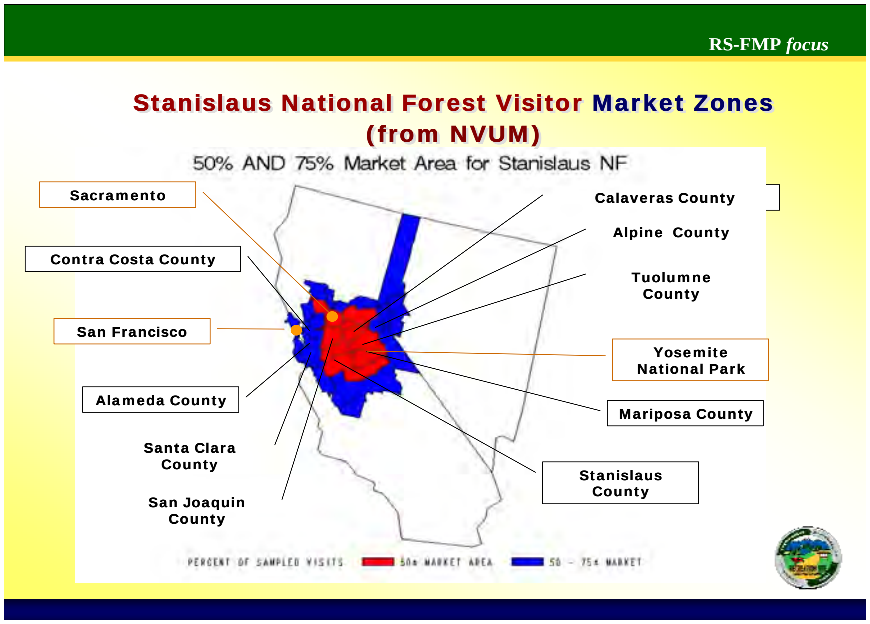
Attitudes, belief and values shape the way people think about the Forest, including perceptions and opinions. The following discussion explores attitudes, beliefs, and values of the individual. Similar to Maslow's hierarchy of motivation (Maslow 1943), people may seek basic and direct utilitarian benefits (gathering firewood/hunting game) at the basic level, or seek spiritual renewal and healing in the grandeur of the high Sierra (self actualization). Most recreation activities occur between these extremes or in combinations. Aesthetics may be based upon the success of the hunt alone, but usually involves factors such as beauty of the setting, companionship, challenge, etc. These secondary setting factors may be more important than the primary motivation, especially if the hunt is not successful. A popular local saying is; "If you're lucky enough to be in the Mountains, you're lucky enough!" The spectacular setting of the Forest adds value to any activity, but almost always a set of several activities are part of the recreation experience, which includes both motorized and non-motorized forms. It is usually not exclusively one or the other.

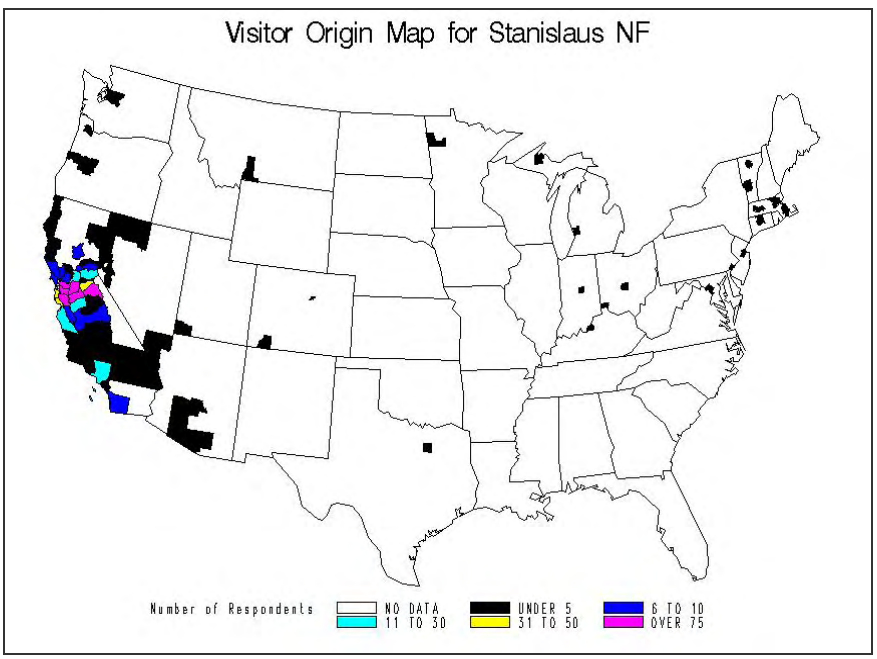
Place Attachment: Family traditions and memories are often developed while spending time in the mountains. The discovery of "special places" and attachment to them occurs with familiarity. The term "Topofilia" coined by Yfu-Tuan (Tuan 1974) means "love of land". Many authors suggest that repeated experiences in natural landscapes have benefits far beyond the experience alone. Paul Shepard (1998), Terry Tempest Williams (2004) and Kaplan (1993) suggest individuals in modern society needs wild places to maintain health and balance. Once a place has meaning to an individual, family, or group, change is not welcome. Access to these places is an important consideration.

Geo-Touring: The ability to move through the landscape in a motorized vehicle can be an experience unto itself. The cultural geographer Yfu Tuan (1993) suggested that movement through landscapes is a sixth sense, and that speed increases sensation. Tours or trail rides may have qualities similar to places described above.

Freedom and Entitlement: Access to these places and travel through the landscape gives a sense of freedom, which is important in the West and an expression of the Forest Service recreation niche. Motorized access to dispersed recreation activities is uniquely Forest Service. Implementation of access restrictions has been controversial in the past. The Sagebrush Rebellion and Home Rule Movement were partly a response to perceived loss of freedom and independence.

Figure 3.07-4 Visitor Origin Maps





Intrinsic values and environmentalism: As scientific knowledge and understanding of the environment has become more common, an appreciation for the interactions and interdependencies in nature has gained support. Gobster (1999) and others refer to this as an ecological aesthetic, meaning that pleasure is derived by knowing that natural systems are healthy and fit. The deep ecology movement and mother earth “Gaia” beliefs have blended science-based biodiversity and “web of life” knowledge with spiritual and symbolic value. This belief system may be intolerant of motor sports, viewing them as destructive and out of place in pristine wild landscapes.

Sustainable Benefits: The above discussion points out that these benefits derived from recreation activities in the Forest depend on the belief system of the participant. Some people may be intimately familiar with the Forest while others feel strongly on issues without direct familiarity. Differing "world views" will lead to a different response to any proposed changes through implementation of a decision on motorized use. Due to increasing population, leading to more demand, it will be a challenge to maintain a range of quality opportunities for all visitors. Management strategies are targeted at maintaining maximum choices and minimum conflict between uses while protecting the resource.

Recreation Use

The economic analysis that follows uses the four county STF study area to model the impact of activities, since this is where economic effects of management changes will be felt the most. In contrast, social effects may be felt by visitors that are from the market zone, which is larger than the STF study area. In Figure 3.07-4 on the previous page, the red counties account for 50% of the visitation. The blue counties account for an additional 25%. The remaining 25% is scattered around the country as illustrated in the lower map. The following information is derived from the NVUM surveys and census data.

Figure 3.07-5 breaks down visitation into categories of local, which conforms closely to the STF study zone, and non-local visitors that come from outside the zone. The STF has a very high participation by non-locals for day use and overnight visits.

Figure 3.07-5 Visitor Characteristics: Segmentation of Visitors

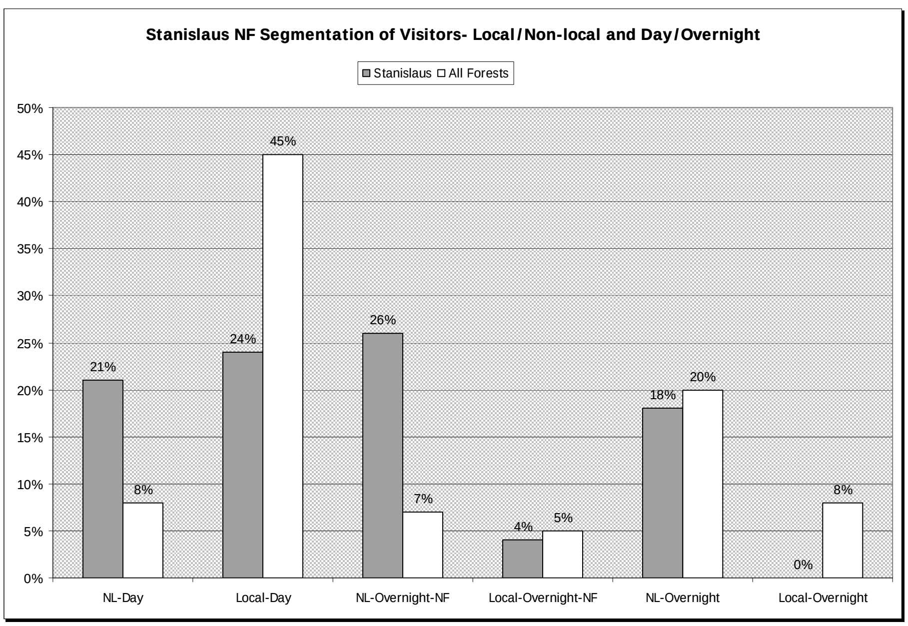


Figure 3.07-6 compares the ethnic makeup of the market zone to actual National Forest visitors. Forest visitors are very close in ethnicity to the make up of the STF study area. Similar to other National Forests, men participate at a higher rate (68.4%) than women (31.6%).

Figure 3.07-6 Visitor Characteristics: Ethnicity

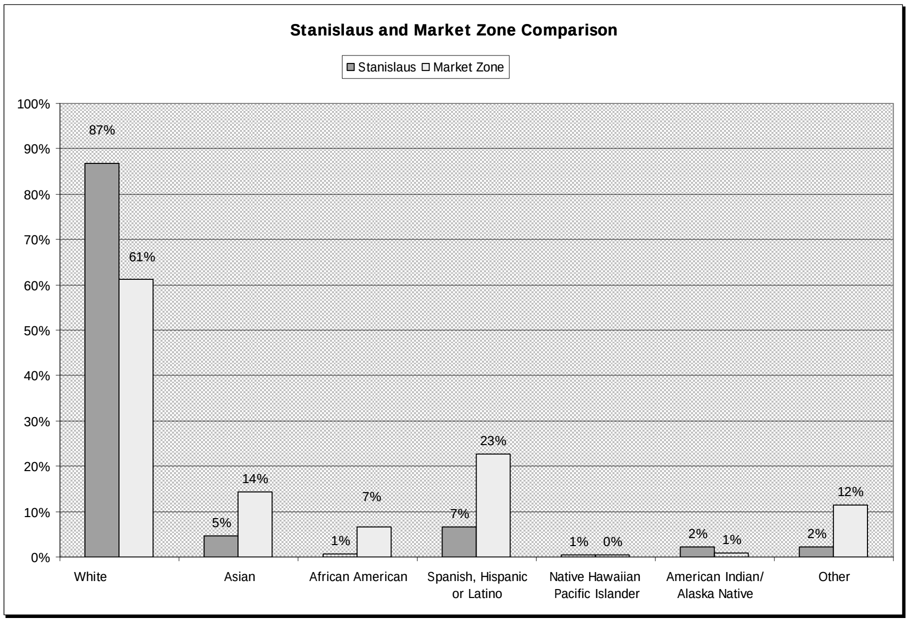
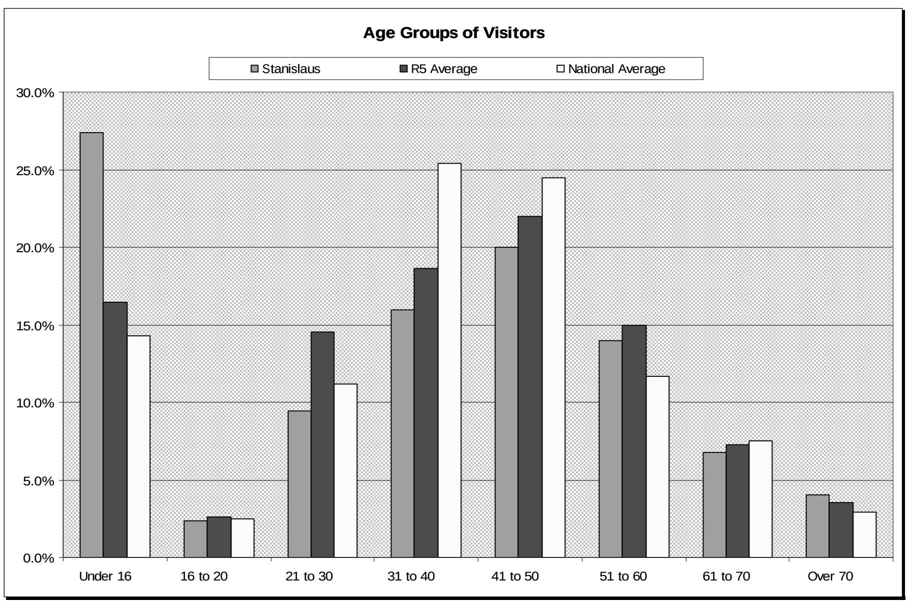


Figure 3.07-7 Visitor Characteristics: Age Distribution



The STF has very high participation by children, almost double the national average.

Activity Types

Table 3.07-5 presents participation rates by activity for the STF during the NVUM survey period. The Total Activity Participation (%) column of the table presents the participation rates by activity. Participation rates will exceed 100% since visitors can participate in multiple activities. The Percent as Main Activity column presents the participation rates in terms of primary activity.

Table 3.07-5 Activity Participation

Activity	Activity Emphasis for Road & Trail Use	Total Activity Participation (%)[1]	Percent as Main Activity (%)[2]
Snowmobiling	Motorized	1.5	1.3
Driving for Pleasure	Motorized	15.0	2.0
OHV Use	Motorized	7.3	4.2
Other Motorized Activity	Motorized	0.5	0.5
Motorized Subtotal	7.89		
Hiking / Walking	Non-motorized	36.5	6.2
Bicycling	Non-motorized	5.9	0.9
Other Non-motorized	Non-motorized	18.3	4.1
Cross-country Skiing	Non-motorized	2.1	1.1
Backpacking	Non-motorized	4.3	1.9
Horseback Riding	Non-motorized	1.6	0.3
Non-motorized Subtotal	14.5		
Downhill Skiing	Other	18.1	17.0
Fishing	Other	23.5	10.0
Viewing Natural Features	Other	43.1	5.6
Relaxing	Other	48.5	15.0
Motorized Water Activities	Other	5.9	0.4
Hunting	Other	1.4	1.0
Non-motorized Water	Other	8.7	2.0
Developed Camping	Other	15.9	7.2
Primitive Camping	Other	5.4	0.5
Picnicking	Other	20.6	2.2
Viewing Wildlife	Other	37.6	1.4
Sightseeing	Other	0.0	0.0
No Activity Reported	Other	20.3	21.9
Resort Use	Other	7.1	1.4
Visiting Historic Sites	Other	5.3	0.1
Nature Study	Other	3.2	0.4
Gathering Forest Products	Other	4.5	0.5
Nature Center Activities	Other	5.3	0.1
Other Subtotal	86.8		
Total	109.2		

[1] Survey respondents could select multiple activities so this column may total more than 100%. The number in this column is the percent of survey respondents who indicated participation in this activity.
[2] Survey respondents were asked to select just one of their activities as their main reason for the forest visit. Some respondents selected more than one, so this column may total more than 100%. The number in this column is the percent of survey respondents who indicated this activity was their main activity.

The primary activity participation rates (Percent as Main Activity) displayed in Table 3.07-5 were used to estimate use by activity emphasis. The emphasis areas were grouped into those emphasizing motorized, non-motorized, and other activities. Motorized activities were those that used motor vehicles on Forest Service roads and trails. Non-motorized activities still used the Forest’s roads and trails, but on foot or by non-motorized transportation such as cross country skis or bicycles. All other activities are all the other Forest based activities measured by the NVUM survey that didn’t utilize roads or trails to pursue their primary activity. Examples of “other” are downhill skiing, motorized water activities, etc. Motor vehicles may have been used to reach a destination or participate in the activity, but it was not the primary emphasis of the visit.

Table 3.05-7 displays the number of visits for these activities. The number of visits is based on the primary purpose for the visit (Percent as Main Activity) displayed in Table 3.05-6 and the total number of visits of 1,800,000 reported in the STF NVUM report. Visitors were determined to be either local or non-local based on the miles from the visitor’s residence to the Forest boundary. If the visitor reported living within 50 miles of the Forest boundary, they are considered local; if over 50 miles, they are considered non-local. It is critically important to distinguish between local and non-local spending as only non-locals bring new money and new economic stimulus into the local community. Local spending is already accounted for in the study area base data. It is currently not possible to predict how locals would have spent money if they didn’t have local recreation opportunities on the National Forest, but it's a safe estimate that much of that money would not have been lost to the local economy. People tend to substitute other local recreation activities or change the time or place for continuing the same activity rather than traveling long distances and incurring high costs to do the same activity. Recreation visits to the STF are divided into local and non-local visitors. If the visitor reported living within 50 miles of the forest boundary, they are considered local; if over 50 miles, they are considered non-local. Results for the STF indicated that approximately 28 percent of recreation visitors were from the local area while 60 percent were non-locals. The remaining 12 percent are classified as non-primary visitors, or those who indicated that recreating on the National Forest was not their primary purpose.

Table 3.07-6 Party-Trips by Activity

Activity	Use (Party-Trips)				
	Non-local Day Use	Non-local Overnight	Local Day use	Local Overnight	Non-Primary activity
Non-motorized					
Hiking/Walking	3,745	7,267	34,410	2,681	2,185
Bicycling	563	1,092	5,170	403	328
Other Non-motorized	2,475	4,801	22,736	1,772	1,444
Cross-country Skiing	647	2,005	4,251	315	72
Backpacking	0	5,369	0	5,826	258
Horseback Riding	182	352	1,668	130	106
Motorized					
Snowmobiling	632	1,032	4,920	922	827
Driving for Pleasure	899	1,089	12,405	429	1,441
OHV Use	3,494	6,137	16,010	4,670	1,026
Other Motorized Activity	383	672	1,753	511	112
Other					
Fishing	8,736	16,573	37,816	6,988	3,025
Hunting	374	1,655	4,625	1,821	236
Viewing Wildlife	915	2,118	3,842	667	1,355
Motorized Water Activities	341	599	1,563	456	100
Non-motorized Water	1,216	2,360	11,174	871	709
Downhill Skiing	18,388	29,759	56,507	8,208	2,839
Developed Camping	521	18,020	764	17,016	2,768
Primitive Camping	0	1,378	0	1,495	66
Resort Use	746	1,760	4,479	1,433	386
Picnicking	1,186	2,795	7,116	2,277	613
Viewing Natural Features	3,558	8,236	14,943	2,594	5,271
Visiting Historic Sites	26	62	159	51	14
Nature Center Activities	64	147	267	46	94
Nature Study	235	544	987	171	348
Relaxing	7,963	18,769	47,776	15,288	4,119
Gathering Forest Products	265	624	1,588	508	137
Sightseeing	0	0	0	0	0
No Activity Reported	11,616	27,380	69,694	22,302	6,008
Subtotal	**57,809**	**136,263**	**346,851**	**110,992**	**29,901**

Local and non-local visitors were further divided by those staying overnight on and off the forest and those on day trips. Thus the seven trip type segments are listed below:

1. Visitors who reside greater than 50 miles from visited Forest:
   - Non-local residents on day trips
   - Non-local residents staying overnight on the Forest
   - Non-local residents staying overnight off the Forest

2. Visitors who live within 50 miles of the visited the Forest:
   - Local residents on day trips
   - Local residents staying overnight on the Forest
   - Local residents staying overnight off the Forest
   - Non-primary visitors

Table 3.07-6 indicates the most popular non-motorized use are hiking and walking, followed by other Non-motorized (which is primarily swimming). The most popular motorized use is driving for pleasure, followed by OHV use. Hunting is categorized as “other” meaning it is neither motorized nor non-motorized in the following tables. On the STF, evidence suggests that most hunting is motorized and therefore should have been added to the motorized grouping. Hunting has about the same economic influence as snowmobiling. Had this been done, values would be 15-20% higher for motorized category.

Table 3.07-7 indicates that snowmobilers spend the most per visit and backpackers the least. Disregarding these two activities, non-motorized spending is almost double that of motorized for non-locals. Visitors that travel some distance to the Forest spend more per visit than local visitors, primarily because of overnight lodging expenditures. Motorized day use expenditures are generally higher than for non-motorized activities. Non-local overnight visitors engaged in non-motorized activities generally expend more than non-local motorized visitors (except for snowmobiling).

Table 3.07-8 displays the estimated employment and labor income response coefficients (employment and labor income per 1,000 visits) by local and non-local activity types. The response coefficients indicate the number of full and part-time jobs and dollars of labor income per thousand visits by activity type. The response coefficients are useful in: 1) understanding the economic effects tied to a given use level; 2) understanding projected employment effects for various use scenarios (sensitivity analysis); and 3) understanding the differences in employment effects by activity type. The response coefficients in Table 3.07-8 along with the visits presented in Table 3.07-6 were used to estimate the economic effects for local and non-local use by activity type.

Table 3.07-8 indicates the following: First, economic effects tied to local visitation generate lower employment and labor income effects. This is a result of local visitors spending less per visit in comparison to non-local visitors (Table 3.07-7). Second, economic effects vary widely by motorized and non-motorized activity types. The lowest employment effect is tied to local hiking/walking, bicycling, and other non-motorized and horseback riding activities (Note: the economic effects are identical for these categories since they share the same spending profile). Third, the largest economic effect is associated with non-local cross-country skiing, but is followed fairly closely by non-local snowmobiling. In general, economic effects vary by the amount of spending and by the type of activity, but it can not be generalized that motorized or non-motorized activities contribute more or less to the local economy on a per visit basis. It is also important to be careful with the use of response coefficients. They reflect an economic structure that is a snapshot in time, that is, they are not applicable to visitation numbers that are dramatically different from current recreation levels. If recreation activities and/or visits changed radically, the economy would shift as spending patterns changed and these response coefficients would no longer reflect underlying economic processes.

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.

Table 3.07-7 Expenditures by Activity

Activity	Expenditures ($ per visit)				
	Non-local Day Use	Non-local Overnight	Local Day use	Local Overnight	Non-Primary
Non-motorized					
Hiking/Walking	17.62	106.96	11.11	39.55	7.41
Bicycling	17.62	106.96	11.11	39.55	7.41
Other Non-motorized	17.62	106.96	11.11	39.55	7.41
Cross-country Skiing	18.93	119.64	14.78	87.39	13.60
Backpacking	0.00	40.38	0.00	36.15	0.00
Horseback Riding	17.62	106.96	11.11	39.55	7.41
Motorized					
Snowmobiling	49.09	128.80	29.57	68.93	28.33
Driving for Pleasure	17.62	66.54	13.33	42.73	10.00
OHV Use	28.57	64.80	19.00	48.50	14.62
Other Motorized Activity	28.57	64.80	19.00	48.50	14.62
Other					
Fishing	21.00	95.65	20.00	48.00	20.00
Hunting	38.10	116.32	30.00	79.47	25.50
Viewing Wildlife	20.80	82.59	10.80	53.75	10.00
Motorized Water Activities	28.57	64.80	19.00	48.50	14.62
Non-motorized Water	17.62	106.96	11.11	39.55	7.41
Downhill Skiing	36.36	117.93	25.24	89.13	27.89
Developed Camping	0.00	50.36	0.00	41.29	0.00
Primitive Camping	0.00	40.38	0.00	36.15	0.00
Resort Use	18.52	70.36	15.00	49.20	12.41
Picnicking	18.52	70.36	15.00	49.20	12.41
Viewing Natural Features	20.80	82.59	10.80	53.75	10.00
Visiting Historic Sites	18.52	70.36	15.00	49.20	12.41
Nature Center Activities	20.80	82.59	10.80	53.75	10.00
Nature Study	20.80	82.59	10.80	53.75	10.00
Relaxing	18.52	70.36	15.00	49.20	12.41
Gathering Forest Products	18.52	70.36	15.00	49.20	12.41
Sightseeing	0.00	0.00	0.00	0.00	0.00
No Activity Reported	18.52	70.36	15.00	49.20	12.41

Motorized and Non-motorized Use

Table 3.07-9 displays the estimated employment and labor income effects for current use levels reported by NVUM for local and non-local non-motorized and motorized activities. Table 3.07-10 expresses these employment and labor income effects as a percent of total employment and income for each activity. In general, the estimated economic effects are a function of the number of visits and the dollars spent locally by the visitors. For example, non-local visitors typically spend more money per visit than local visitors. Also, activities that draw more visitors will be responsible for more economic activity in comparison to activities that draw fewer visitors, holding constant spending per visit. Given that the analysis is dependent on visitation and expenditure estimates, any changes to these estimates affect the estimated jobs and labor income.

Table 3.07-9 indicates that approximately 97 total average annual jobs in the 4 county area (direct, indirect and induced, full-time, temporary, and part-time) and $2.6 million total labor income (direct, indirect and induced) are attributable to non-motorized visitation on the STF. The two largest activities among those in the table are hiking/walking and other non-motorized. Together these account for about 11.2% of the jobs and 10.3% of the income generated from the activities analyzed, accounting for about 65 jobs and $1.7 million in labor income to the four county areas.

Motorized activities were responsible for approximately 46 total jobs (direct, indirect and induced) and $1.3 million total labor income (direct, indirect and induced). The two largest motorized uses are OHV Use and snowmobiling. These two activities contribute about 6.4% of the jobs from the activities in the table, and provide about 6.0% of the labor income. Together these two activities contribute 37 jobs and provide about $1.0 million in labor income to the area.

Table 3.07-8 Employment and Labor Income Response Coefficients by Activity Type

Activity	Type	Employment (Jobs per 1,000 Party-Trips)		Labor Income (2006 dollars) ($ per 1,000 Party-Trips)	
		Direct Effects	Indirect Effects	Direct Effects	Indirect Effects
Non-motorized Use					
Hiking/ Walking, Bicycling, Horseback Riding, Other Non-motorized	Local Day	0	0	$4,409	$1,549
	Local OVN	1	0	$20,561	$7,896
	Non Local Day	0	0	$9,462	$3,105
	Non Local OVN	3	1	$64,356	$24,578
	NP	0	0	$4,409	$1,549
Backpacking	Local Day	0	0	$0	$0
	Local OVN	1	0	$19,671	$7,600
	Non Local Day	0	0	$0	$0
	Non Local OVN	1	0	$25,302	$8,847
	NP	1	0	$19,671	$7,600
Motorized Use					
OHV Use	Local Day	0	0	$7,921	$2,765
	Local OVN	1	0	$21,197	$8,018
	Non Local Day	0	0	$12,451	$4,347
	Non Local OVN	1	0	$35,329	$13,363
	NP	0	0	$7,921	$2,765
Driving	Local Day	0	0	$4,964	$1,650
	Local OVN	1	0	$26,852	$10,241
	Non Local Day	0	0	$7,806	$2,594
	Non Local OVN	2	1	$44,761	$17,072
	NP	0	0	$0	$0
Snowmobile	Local Day	1	0	$14,292	$4,866
	Local OVN	2	1	$49,206	$19,230
	Non Local Day	1	0	$23,666	$8,332
	Non Local OVN	4	1	$82,015	$32,051
	NP	1	0	$14,292	$4,866
Cross Country Ski	Local Day	0	0	$7,880	$2,963
	Local OVN	2	1	$53,510	$21,178
	Non Local Day	1	0	$12,378	$4,655
	Non Local OVN	4	1	$89,189	$35,299
	NP	0	0	$4,964	$1,650
All Other Use					
All Other Activities	Local Day	0	0	$8,347	$2,858
	Local OVN	1	0	$33,917	$10,756
	Non Local Day	1	0	$13,973	$4,561
	Non Local OVN	2	1	$65,147	$19,943
	NP	0	0	$8,347	$2,858

"All Other Activities" (Table 3.07-7) are significant economic contributors for the activities studied. They provide 422 jobs, or 75% of the jobs from the activities analyzed. Labor income is about $12.4 million, or 76% of the income generated by all activities.

Table 3.07-10 shows that about 17% of the jobs provided from all activities are from non-motorized use, 8% from motorized use and 75% from "Other Activities." The contributions to labor income are 16% non-motorized use, 8% motorized use and 76% from "Other Activities."

Table 3.07-9 Employment and Labor Income Effects by Activity Type

Activity Type	Employment (full & part-time jobs)		Labor Income(2008 dollars)	
	Direct	Indirect & Induced	Direct	Indirect & Induced
Non-Motorized Use				
Backpacking - Local	4	1	$118,631	$45,832
Non-local	5	2	$140,625	$49,170
Hiking/Walking - Local	9	2	$214,107	$77,102
Non-local	22	6	$520,785	$196,923
Horseback Riding - Local	0	0	$10,377	$3,737
Non-local	1	0	$25,240	$9,544
Bicycling - Local	1	0	$32,168	$11,584
Non-local	3	1	$78,244	$29,586
Cross-country Skiing - Local	2	1	$52,117	$19,942
Non-local	8	2	$193,365	$76,365
Other Non-motorized - Local	6	2	$141,470	$50,945
Non-local	14	4	$344,105	$130,116
Total Non-motorized	**76**	**21**	**$1,871,236**	**$700,845**
Subtotal	**97**	**$2,572,080**		
Motorized Use				
OHV Use - Local	9	3	$233,730	$84,587
Non-local	10	3	$269,481	$100,619
Driving for Pleasure - Local	3	1	$75,660	$25,727
Non-local	3	1	$57,700	$21,650
Snowmobiling - Local	5	1	$119,745	$43,131
Non-local	5	1	$103,124	$39,701
Other Motorized Activity - Local	1	0	$25,599	$9,264
Non-local	1	0	$29,515	$11,020
Total Motorized	**36**	**10**	**$914,553**	**$335,700**
Subtotal	**46**	**$1,250,253**		
All Other Use				
All Other Activities - Local	118	36	$3,479,854	$1,170,332
Non-local	207	60	$5,804,886	$1,938,891
Total Other	**325**	**97**	**$9,284,740**	**$3,109,222**
Subtotal	**422**	**$12,393,962**		
Grand Total	**438**	**128**	**$12,070,529**	**$4,145,767**
Grand subtotal	**566**	**$16,216,296**		

Table 3.07-12 shows the relationship of jobs and income generated from all recreation activities studied compared to total jobs and income in the 4 county areas. All of the recreation related jobs together only account for about 1.23% of the total jobs in the area, and the income generated is about 0.92% of the total labor income in the area studied. Since only a fraction of the overall recreation use on the Forest is affected, the differences between alternatives are too small for comparison of effects.

Predictions about changes in the study area economy from recreational use on the Forest are difficult to make and would be highly speculative. The Forest Service believes that under all action alternatives, levels of use would be relatively static, although the use patterns may change. For example, even though the overall number of available roads and trails is reduced in all of the action alternatives, the same levels of motorized use would concentrate in the remaining areas. At some point some visitors would no longer attain the experience they desire and would likely seek other areas, off-forest, or not participate in the activity. The effect on economics would be speculative and the point in time when this would occur is speculative. Qualitative factors are discussed in more detail in the lifestyles, attitudes, beliefs, and values section.

Table 3.07-10 Employment and Labor Income Effects by Activity Type

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	0.8%	0.2%	0.7%	0.3%
Non-local	0.9%	0.3%	0.9%	0.3%
Hiking/Walking - Local	1.5%	0.4%	1.3%	0.5%
Non-local	3.8%	1.0%	3.2%	1.2%
Horseback Riding - Local	0.1%	0.0%	0.1%	0.0%
Non-local	0.2%	0.1%	0.2%	0.1%
Bicycling - Local	0.2%	0.1%	0.2%	0.1%
Non-local	0.6%	0.2%	0.5%	0.2%
Cross-country Skiing - Local	0.4%	0.1%	0.3%	0.1%
Non-local	1.5%	0.4%	1.2%	0.5%
Other Non-motorized - Local	1.0%	0.3%	0.9%	0.3%
Non-local	2.5%	0.7%	2.1%	0.8%
Total Non-motorized	**13.5%**	**3.7%**	**11.5%**	**4.3%**
Motorized Use				
OHV Use - Local	1.6%	0.5%	1.4%	0.5%
Non-local	1.8%	0.5%	1.7%	0.6%
Driving for Pleasure - Local	0.5%	0.1%	0.5%	0.2%
Non-local	0.4%	0.1%	0.4%	0.1%
Snowmobiling - Local	0.8%	0.2%	0.7%	0.3%
Non-local	0.8%	0.2%	0.6%	0.2%
Other Motorized Activity - Local	0.2%	0.0%	0.2%	0.1%
Non-local	0.2%	0.1%	0.2%	0.1%
Total Motorized	**6.4%**	**1.8%**	**5.6%**	**2.1%**
All Other Use				
All Other Activities - Local	20.8%	6.4%	21.5%	7.2%
Non-local	36.7%	10.7%	35.8%	12.0%
Total Other	**57.5%**	**17.1%**	**57.3%**	**19.2%**
Totals	**77.4%**	**22.6%**	**74.4%**	**25.6%**
	100.0%		**100.0%**	

Table 3.07-11 Employment and Labor Income Effects

Activity	Type	Employment Effects (full and part time jobs)	Labor Income (2008 $)
Non-Motorized Use	Local	29	778,012
	Non Local	68	1,794,069
Motorized Use	Local	23	617,443
	Non Local	24	632,810
All Other Use	Local	154	4,650,186
	Non Local	268	7,743,776
Grand Total	Local	206	6,045,641
	Non Local	360	10,170,655
	Total for Area	**566**	**16,216,296**

Figure 3.07-8 Employment and Labor Income by Activity

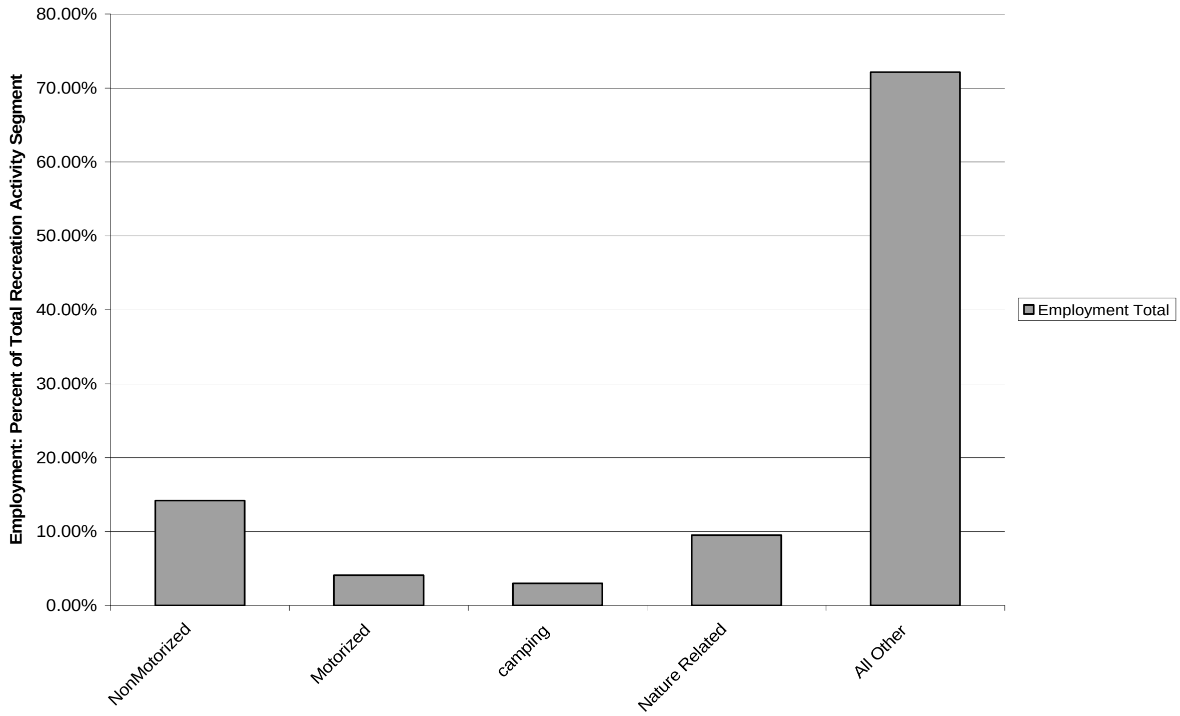


Table 3.07-12 Employment and Labor Income Effects

Activity	Type	**Employment Effects (full and part time jobs)** Percent of Total Employment	**Labor Income (2008 dollars)** Percent of Total Labor Income
	Non-Motorized		
All Non-Motorized	Local	0.062%	0.043%
	Non Local	0.148%	0.099%
Total Non-Motorized [1]	0.213%	0.144%	
Motorized			
All Motorized	Local	0.049%	0.034%
	Non Local	0.051%	0.035%
Total Motorized[1]	**0.103%**	**0.071%**	
	Nature Related		
Fishing	Local	0.056%	0.040%
	Non Local	0.108%	0.075%
Hunting	Local	0.012%	0.008%
	Non Local	0.010%	0.007%
Nature Related	Local	0.013%	0.009%
	Non Local	0.084%	0.055%
Total Nature Related[1]	**0.290%**	**0.200%**	
	All Other		
All Other	Local	0.253%	0.203%
	Non Local	0.378%	0.296%
Total All Other[1]	**0.641%**	**0.507%**	
Study Area Total	**46,179**	**1,792,717,000**	

[1] Percent calculations for Totals included Non-Primary, NP.

Roads and Trails Budget Projections

The road system was largely constructed and maintained in the past as a component of timber sales. The significant reduction in timber harvest has left much of the system without needed maintenance. The current emphasis on fuel reduction will result in limited maintenance in some areas. The roads on the Forest are gradually deteriorating due to surfacing being worn out and/or storm damage. Some of the roads are being encroached upon by brush; and unless the brush is cleared, the roads will eventually become impassable. In some cases vegetation encroachment may result in less sight distance for drivers, which may result in a safety concern over time.

In the past, trail funding has been used primarily to maintain Wilderness trails. Non-motorized trails outside of the Wilderness have received maintenance by several volunteer groups. The value of this service was not available to be reflected in Table 3.07-13. OHV trail maintenance was funded through the California OHV grant program at a higher level prior to 2004. The lack of funding has contributed to an increase in deferred maintenance similar to roads. The Forest is hopeful that it will be competitive in the future for trail maintenance funding through the California OHV grant program. The Forest continues to be competitive in receives law enforcement funding through this program.

Table 3-07-13 Road and Trail Construction and Maintenance Budget

Fiscal Year	Roads Total	Road Maintenance [4]	Trails Total	OHV Trails Maintenance
FY04	$575,000	$345,000	$117,094	$16,500 [2]
FY05	$932,336	$559,400	$187,000	$13,000 [1]
				$30,900 [2]
FY06	$735,000	$441,000	$177,227	$30,000 [3]
				$50,334 [2]
FY07	$842,000	$505,000	$71,000	$53,942 [2]
FY08	$777,000	$466,200	$162,000	$50,000 (est.) [2]

[1] OHV State of California grant funding for Operations and Maintenance, included Enforcement and trail maintenance
[2] A number of trails have been adopted by OHV clubs who provide trail maintenance. This is the annual volunteer dollar value contributed
[3] Appropriated amount
[4] Approximately 40/60 split of funds between planning and road maintenance activities

Appropriated funding has been uneven over the past five years and no prediction or trend is apparent. Appropriated funding alone is not adequate to sustain the system in the long run. If this funding does not increase in the future, the Forest will need to rely on outside funding sources, partnerships, and volunteers to accomplish this work.

Environmental Consequences

The following descriptions by alternative focus on the amount of change that is proposed under each alternative.

Alternative 1 (Proposed Action)

DIRECT AND INDIRECT EFFECTS

This alternative seeks a balance between quality OHV riding opportunity and protection of resources. Compared to Alternative 2, major changes would be felt by some individuals but fewer than Alternatives 3 or 5. Some desirable additions or changes to the exiting road system would occur. Season of use would change, but less than Alternatives 4 or 5. Some established patterns of backcountry travel would be affected. Motorized access to dispersed recreation sites would not continue, except along NFTS routes. New campsites would proliferate over time, impacting land and the driving experience. Social effects will vary by location and the values/preferences of individuals. At the forest scale, opportunities remain for all visitors.

CUMULATIVE EFFECTS

An examination of the past, present or reasonably foreseeable future actions identified in Appendix B (Cumulative Effects Analysis) shows that opportunities for jobs and income to the counties will continue indefinitely. Forest projects such as thinning, shredding, fuels reduction, vegetation management and grazing will continue into the future. Jobs related to those projects will also be available. Forest Service recreation associated businesses (permitted) such as resorts and their associated services of lodging, restaurants and boat rentals; ski areas; organization camps; and, concessionaire managed campgrounds are examples of where jobs would be available to the local community. The additional Payment in Lieu of Taxes (PILT) and Secure Rural Schools Act funding continues to support jobs and spending locally. No actions in this project would jeopardize these funding programs. Future consideration of dispersed recreation access routes (not included in this analysis) would increase the number of NFTS routes available for motorized access and restore historical motorized use.

Alternative 2 (No Action)

DIRECT AND INDIRECT EFFECTS

This alternative would have the least change, but over time would have undesirable effects. Route proliferation, impacts to private land, and inability to enforce/restrict inappropriate use would continue and increase over time. Motorized recreation opportunities and travel for other reasons (firewood gathering, prospecting, etc.) would continue. Since human activities are dispersed, fairly low levels of motorized use occur over expansive areas. Motorized freedom would have few limitations, resulting in conflict with non motorized uses and private land. Enforcement would be ineffective and monitoring of trail conditions difficult. Resource impacts at some locations would not be acceptable. This is the only alternative that would not significantly reduce motorized access to dispersed recreation sites. Season of use would not change.

Although this alternative presents little or no short-term change, this approach is not sustainable given our mission. The quality of the recreation setting and the ability to manage the resource will degrade over time. Conflicts between uses will increase.

CUMULATIVE EFFECTS

Same as Alternative 1.

Alternative 3 (Cross Country Prohibited)

DIRECT AND INDIRECT EFFECTS

This alternative would eliminate cross country travel resulting in the least amount of motorized opportunities and the greatest increase in non-motorized opportunities. This alternative has the greatest degree of change for affecting uses (contrasting with alternative 2). It will affect the most people. Under this alternative, non-street-legal vehicle use would be extremely limited, resulting in concentrated use at the existing NFTS opportunities. Desirable additions or changes to the exiting road system would not occur. Season of use would not change, but established patterns of backcountry travel would be affected. Motorized access to dispersed recreation sites would not continue, except along existing NFTS routes.

The implementation of this alternative would have an immediate impact on capacity which will become more severe over time. Since demand would not be met on many areas of the Forest, use would have to go to other locations on the Forest, to other locations off the Forest (if available), or abandon the activity. Dispersed camping sites along NFTS routes would likely proliferate over time, impacting land and the driving experience.

CUMULATIVE EFFECTS

Same as Alternative 1.

Alternative 4 (Recreation)

DIRECT AND INDIRECT EFFECTS

This alternative would emphasize quality OHV riding opportunity while also and protecting the resource. Compared to Alternative 2, major changes would be felt by some individuals but fewer than Alternatives 1, 3 or 5. Demand would be met for off-road OHV use without concentrations of use that would change the experience. Some desirable additions or changes to the exiting road system would occur. Season of use would change, allowing a longer season of use than Alternatives 1 or 5. Some established patterns of backcountry travel would be affected, but many route and loop opportunities would continue. Motorized access to dispersed recreation sites would be reduced, but not as much as Alternative 1, 3 or 5. New campsites would proliferate over time, impacting land and the driving experience.

CUMULATIVE EFFECTS

Same as Alternative 1.

Alternative 5 (Resources)

DIRECT AND INDIRECT EFFECTS

This alternative would emphasize resource values and non-motorized forms of recreation over OHV riding opportunity. Compared to Alternatives 2, 3 and 5, fewer changes would be felt by some individuals. Some desirable additions or changes to the exiting road system would occur. Season of use would change, offering fewer restrictions than Alternatives 1 or 4. Many established patterns of backcountry travel would be affected since many proposed routes fail to create loop opportunities. Motorized access to dispersed recreation sites would be limited, and less than Alternatives 1 or 4.

The implementation of this alternative would have an immediate impact on capacity which will become more severe over time. Since demand would not be met on many areas of the Forest, use would have to go to other locations on the Forest, to other locations off the Forest (if available), or abandon the activity. Dispersed camping sites along NFTS routes would likely proliferate over time, impacting land and the driving experience.

CUMULATIVE EFFECTS

Same as Alternative 1.

Summary of Effects Analysis across All Alternatives

While many opportunities on other public lands for non-motorized activities exist, the STF is the major public provider in the area for OHV use and the primary provider of motorized access to dispersed recreation sites. Since theses types of use are not allowed or can not be accommodated by the other recreation providers, OHV advocates are justifiably concerned about a potential loss of opportunity. The significance of OHV use on the Forest is discussed in more detail in section 3.04 Recreation Resources. The surge in demand and reduction of capacity (with elimination of routes through or near private land) would potentially translate into one or more of the following change scenarios:

- Higher concentrations of use will occur where allowed, resulting in displacement of non-motorized activities to other areas. Negative impacts would occur to resources at those concentrated locations in Alternatives 3 and 5.
- Many areas will become free of motorized use in Alternatives 3 and 5, less so in 1 and 4.

- Long distance touring opportunities will be reduced as some current loops and interconnected routes lose continuity in Alternatives 3 and 5.
- Degradation in the recreation experience for many off-highway users (more traffic, more dust, more noise and fumes) would occur in Alternatives 3 and 5. This will become more like an OHV park and less like a motorized ride in a natural landscape. Alternatives 1 and 4 would spread out use and possibly be able to better absorb increased use. Alternatives 3 and 5 concentrate OHV use.
- Many familiar routes and special places will not have motorized access in the future. Some routes will have limitations on the type of motorized use. This loss of dispersed access occurs in Alternatives 1, 3, 4, and 5.
- The above effect will be felt more significantly by users of non highway legal vehicles (dirt bikes, ATVs, rock crawlers, etc.).
- The experience of driving for pleasure on forest roads that have mixed uses of ATVs, dirt bikes, rock crawlers and high clearance vehicles such as SUVs, varies between alternatives. Alternatives 1 and 4 have the most mixed use, thereby diminishing driving for pleasure while Alternatives 3 and 5 have the least amount of mixed use. Alternative 2 is difficult to evaluate whether this activity benefits or not.
- The access to motorized camping in undeveloped areas will be concentrated at the designated routes that were able to be analyzed in this project or be relocated along NFTS roadsides. Where this displacement occurs it will degrade both the dispersed camping activity and driving experience for road travelers because of close proximity to the routes.

Motorized access to dispersed recreation sites varies by alternative similar to OHV use, so the two different activities can be lumped together for summary purposes. With the exception of Alternative 2, all alternatives would implement the Travel Management Rule and prepare an MVUM. These actions will result in better understanding of types of use allowed and locations for the opportunity. This will direct motorized activity to specific locations. OHV and non-motorized users will benefit from the clarity and make better choices on where to recreate. Conflicts between the two uses would be less likely, since visitors can plan non-motorized (quiet recreation) activities away from OHV use. These visitors will have more areas available for quiet recreation. Enforcement of unauthorized activity will be easier. Alternative 2 has the most expansive opportunities for motorized use (the least for quiet recreation) followed by 4, 5, 1 and 3.

Economic Effects

The employment and labor income effects stemming from current motorized and non-motorized activities occurring on the STF were estimated. The economic effects of all other types of recreation combined on the Stanislaus NF have also been reported for comparison purposes. Economic effects tied to motorized and non-motorized activities were estimated to address the economic impact issues tied directly to proposed actions associated with motorized use. Also, the marginal economic effects (employment and labor income effects per 1,000 visits) of motorized and non-motorized use are provided. The marginal effects (also called “response coefficients”) are useful for performing sensitivity analyses of various management alternatives.

All of the recreation related jobs together only account for about 1.23% of the total jobs in the area, and the income generated is about 0.92% of the total labor income in the area studied. Since only a fraction of the overall recreation use on the Forest is affected, the differences between alternatives are too small for comparison of effects.

Social Effects

The changes resulting from any of the alternatives, except 2, have the potential to impact the quality of life for some individuals that may be positive or negative. Alternatives with the most change proposed (alt.3 and 5) are most likely to affect people. Nearby residents that live adjacent to the STF or that visit the Forest frequently, are most likely to be affected. This depends on their location, their values, and the activities that they participate in. Individuals that own vehicles that are not highway legal would be affected most by a reduction in riding opportunity. Displaced motorized recreation from dispersed recreation sites may use developed campgrounds, go elsewhere, or give up the sport. Individuals, families, and small groups will be impacted, but not a predictable effect forest-wide.

Compliance with the Forest Plan and Other Direction

Much of the Forest Plan direction for Recreation (see Appendix C) is intended to sustain high quality recreation opportunities that result in quality recreation experiences. Minimizing conflict between visitors is a primary goal. It is also a goal to make opportunities available to all types of visitors.

Environmental Justice

Environmental Justice (EJ) is an executive order (EO 12898) which requires, in brief, that each Federal Agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low income populations.

Potentially affected tribes have been consulted and effects have been considered on their rights and concerns within the analysis of alternatives. American Indian populations will not be disproportionately impacted under any alternative with avoidance of heritage resources, consideration of traditional values, and reasonable access allowed through agreements, permits and recognition of their sovereignty and legal rights. None of the alternatives would have a disproportionate economic impact on any minority or low-income community as the motorized use decisions are spread throughout the forest and do not cause any adverse effect to any particular minority population. The effects to jobs and income within the STF study area are a very small portion of the overall jobs and income (less than 1%). Losses in motorized use are partially compensated for in non-motorized recreational activities as these uses are enhanced. Non motorized access will be a burden to some individuals, particularly those with mobility related disabilities, young children, or heavy objects that would be difficult to transport. Individuals or small groups that have traditionally used motorized access to a “special place” may need to change the way in which they recreate or find another location. The scale of this project has prevented a complete analysis of all motorized dispersed access routes that may be important to individuals, families, or small groups.

The Forest held a series of meetings in several nearby communities during the past several years. This included Sonora, West Point, Groveland, Greeley Hill, Arnold, and Modesto. The route designation process was explained and the public was encouraged to ask questions. The meetings were well-staffed by specialists who interacted one-on-one with interested members of the public. These meetings were attended by advocates of OHV recreation, opponents of OHV recreation, and interested citizens that were aligned with neither point of view. All people were encouraged to provide comments.

At this time, no evidence suggests that actions being considered (in their entirety) have disproportionately high and adverse impact on minority and low-income populations.

Monitoring Recommendations

Develop a system to track comments by individuals as proposed changes are implemented. If evidence appears that the decision is unduly impacting a segment of society, further analysis would be conducted. If warranted, actions may be adjusted to reduce impact to affected individuals or groups. Monitor for the impacts caused by proliferation of campsites along NFTS routes.

3.08 SOIL RESOURCE

A healthy and functional watershed relies on an equilibrium, or balance, in the soil productivity, soil quality, water quantity, and water quality. The soil resource provides many essential functions for National Forest lands. It sustains plant growth that provides forage, fiber, wildlife habitat, and watershed protection. It absorbs precipitation, stores water for plant growth, and gradually releases surplus water which attenuates runoff rates. It sustains microorganisms which recycle nutrients for continued plant growth. The National Forest Management Act of 1976 and other acts recognized the fundamental need to protect, and where appropriate improve, the quality of soil.

Protection of soil resource is an important part of the mission of the Forest Service. Management activities on National Forest lands must be planned and implemented to protect soil quality and the hydrologic functions of forest watersheds. The use of roads, trails, and other areas on National Forests for public operation of motor vehicles has potential to affect the soil resource through interception of runoff, compaction of soils, and detachment of sediment (Foltz, 2006). Management decisions to eliminate cross-county motorized travel, add new routes to the NFTS, and make changes to the existing NFTS must consider effects on soils and watersheds.

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

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

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

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

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

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

Analysis or evaluation of soil condition is the intended use of the thresholds and indicators in R5 FSH Supplement 2509.18-95-1.They are not a set of mandatory standards or requirements. They should not be referred to as binding or mandatory requirements in NEPA documents. Forest Plan S&Gs provide the relevant substantive standards to comply with NFMA. The thresholds and indicators represent desired conditions for the soil resource. Use of the thresholds and indicators provides a consistent method to analyze, describe, and report on soil condition throughout the region.

The Forest Plan provides S&Gs for management areas (USDA 2005a) that include:

1. Maintain soil productivity by applying guidelines to areas where management prescriptions are applied.
2. Monitor for implementation and effectiveness. Areas not meeting guidelines will be rehabilitated. As a minimum, 85 percent of areas affected by soil disturbing activities will not exceed soil property thresholds.
3. Soil porosity is at least 90 percent of its natural conditions.
4. The organic matter in the upper 12 inches of soil should be at least 85 percent of its natural conditions.
5. Design management activities not to exceed an R5 Erosion Hazard Rating of moderate.
6. During project planning, verify areas where soil productivity has been degraded.
7. Field verify the Order 3 SRI during the planning phase of each site disturbing or vegetation manipulating project. (SRI order describes the level of intensity of a soil survey). Develop specific soil mitigation measures and soil conservation management practice for each project site as needed.

Effects Analysis Methodology

Soil quality effects analysis was based on identifying areas of risk on the Stanislaus National Forest. This analysis used GIS and the published Order 3 SRI to rank proposed routes by erosion potential. Overlaying the proposed routes from the Alternatives 1 through 5 over GIS coverage layers, a general soil erosion risk assessment was completed. The risk assessment was used to prioritize field review. The following is a description of the methodology:

1. From the Order 3 SRI the Maximum Erosion Hazard Rating (MEHR) was tabulated. When the MEHR for a soil was low or moderate only minimal field checking was completed.
2. When the MEHR was high or very high, then the route was screened by GIS to determine the gradient of the proposed route. From the Digital Elevation Model (DEM), GIS calculated the gradient of proposed routes. The methodology applies to additions to the NFTS which are unauthorized routes proposed for public use as a motorized trail under one of the alternatives.
3. Steep routes (>15% grade) were systematically field checked to develop a correlation between soil type, gradient, and condition. The green/yellow/red monitoring criteria was used to judge the observed trail condition and to validate the initial office GIS risk assessment.
4. Routes with lower gradients and moderate MEHR were considered low risk, assuming routine maintenance. These routes were randomly checked in the field to observe trail condition and validate the assumption.
5. Routes with higher gradients and high or very high MEHR were considered high risk. These routes were further evaluated by GIS and field work to determine potential for adverse effects such as loss of water control on roads and trails. A secondary indicator, Hydrologic Function Class (HFC) was used to predict where some roads may be sensitive to damage and loss of hydrologic function. HFC was used as a tool for prioritizing field work and as an indicator to compare alternatives.
6. Trails that were found to be in poor condition during field work or having a high potential for adverse effects (surface erosion and loss of water control) were considered for mitigation or closure. Mitigation was documented by route. Recommendations for closure were based on field review of trail condition, soil type, and gradient of the route.

Assumptions Specific to the Soil Resource

Four assumptions are specific to the soil resource analysis:

1. Route Proliferation: Routes will continue to increase without prohibition of cross country motorized travel. This applies only to Alternative 2 (No Action) since cross country travel would continue. The rate of proliferation is estimated to be 2.25 miles per year across the forest based on utilizing the same proliferation rate that has occurred during the past 20 years. For purposes of the water resources analysis the route proliferation in Alternative 2 was assumed to occur in the concentrated use watersheds since these are expected to continue to be the locations of demand for off-highway motorized travel.
2. New Construction: While no new route construction occurs in the proposed action or alternatives, about five miles are expected to be built in the next 10 years. These are primarily segments that would connect existing routes to enhance motorized travel opportunities. These routes exist in, and the effects are accounted for, in the CWE analysis of concentrated use watersheds.
3. Passive Recovery: Existing routes not added to the NFTS are assumed to passively recover; that is, heal over in time as forest litter (e.g., pine needles, twigs, branches) and vegetation re-occupies the route surface. The rate of recovery will vary by location, type of route (i.e., motorcycle or ATV trail, road), and by soil type and route gradient. The range of time is expected to be from about two to ten years; trails in forested areas that have been closed have been observed to accumulate an acceptable amount of ground cover within two years while trail segments in forest openings may take up to a decade to recover.
4. Wheeled Over Snow (WOS) use does not affect the soil resource since the use is on existing NFTS routes that are open to public motorized use during the normal summer driving season.

Data Sources

1. Route-specific data collected in the field using established protocols for road erosion inventories and OHV green/yellow/red inventories.
2. Route inventories collected as a part of Step 1 of R5 Route Designation Guidebook (2004) and associated tabular data sets.
3. Forest soil survey and associated GIS layers.
4. Field observations or anecdotal information documenting the time required for passive recovery of routes closed to motor vehicle traffic.

Soil Resource Indicators

1. Miles of authorized and unauthorized routes displayed by MEHR (as defined by the R-5 Maximum Erosion Hazard Rating).
2. Miles of authorized and unauthorized routes displayed by Hydrologic Function Class (HFC).

HFC is a soil hazard interpretation that predicts where roads and trails are prone to failure of drainage structures and loss of water control. Some roads are more sensitive to damage and loss of hydrologic function. In extreme cases a loss of the facility is possible. HFC is based on soil properties that determine how a native surface road or trail will mechanically rut and erode with traffic. Hydrologic Function Classes are adapted from R5 Soil Interpretations (USDA 1999). HFC is a filter or method to predict weak areas in the trail system that may require a higher level of maintenance, mitigation, and in some cases a recommendation to close the trail.

Classes and soils are described below:

- Mechanical Rutting and High Erosion - Granitic Holland soil is an example of a soil type in this risk category that is known to rut and erode easily. Holland and Holland-like soils have clay loam subsoils that rut deeply when wet and once rutted have a tendency to form gullies.

- Mechanical Rutting (wet) - Metamorphic soil types such as Jocal (Josephine) and Sites are examples of soils that have clay or clay loam subsoils that are prone to mechanical rutting under wet conditions.
- Mechanical Rutting (dry) - Volcanic McCarthy soil is an example of a soil type prone to mechanical rutting under dry summer conditions, although this is not a problem on strongly compacted surfaces such as a designed road. McCarthy soils lose their natural structure and the motorcycle and ATV trail turns to powder, hence they are rated as having a high mechanical rutting potential. This is particularly noticeable on steep and very steep grades. GIS assessed the gradient of routes (unauthorized and additions to NFTS) and grouped routes into gradient classes. Gradients were field checked and found accurate. Where the R/Y/G trail condition rating was completed, a rating of red or yellow matched up well with soil types and steeper gradients. Steep gradients are 16-25% and very steep gradients are 26% and higher. Gradients of 20% are difficult to hold on McCarthy soils because of the dry rutting problem.

Soil types (or soil map units) across the Forest were rated based upon the above general risk categories and then GIS was used to sort route segments that have mechanical rutting and erosion concerns based on the above hazard classes. The hazard classes were verified by field observation.

Soil Resource Methodology by Action

1. Direct and indirect effects of the prohibition of cross country motorized vehicle travel

The prohibition of cross-country travel is focused on the effects from unauthorized use. Considerations and the indicators of effects are given below:

Indicator(s): Miles of unauthorized routes displayed by (1) MEHR and (2) Hydrologic Function Class. Both indicators are a soil hazard interpretation that ranks miles of route by potential for erosion and loss of water control. The assumption is that effects are related to the miles of unauthorized routes to remain open under current use with no maintenance.

Direct Effects from unauthorized use: Generally for the existing unauthorized routes, direct effects have already occurred. The direct effects were: physical displacement of soil caused by unauthorized motorized vehicle traffic; loss of soil productivity from the displacement and loss of soil depth; loss in soil hydrologic function due to loss of soil and loss of soil cover.

Indirect Effects from unauthorized use: The removal of vegetation and exposure of soil in unauthorized routes will result in erosion. These unauthorized use areas were not designed and have no runoff water control to protect the soil resource. Further loss of productivity will occur and diminished hydrologic function. A loss of water control on and off of the un-maintained trail is an indirect effect.

Methodology: Unauthorized routes open for motor vehicle use are compared to GIS layers displaying MEHR and HFC.

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

Long-term time frame: The 10 year time frame looks at routes over the longer term. It provides time for passive recovery on closed routes. Passive recovery is an assumed benefit. Factors such as soil type, precipitation and temperature affect rates of vegetative recovery. An addition of 2.2 miles of route proliferation per year is assumed for the “no action” alternative. The same time frame is used for Cumulative Watershed Effects.

Spatial boundary: Forest.

Rationale: General guidelines in the National Soil Management Handbook and Region 5 Soil Management Handbook Supplement.

2. Direct and indirect effects of adding facilities to the NFTS including identifying seasons of use and vehicle class

The effects of adding facilities are focused on presently unauthorized roads and trails that would be added to the system routes. This is a change from unauthorized and un-maintained to NFTS status. Considerations and the indicators of effects are given below:

Indicators: Miles of unauthorized routes added to the system displayed by MEHR and Hydrologic Function Class.

Direct Effects: Generally direct affects have already occurred from the soil displacement caused by the unauthorized use. The effects were a loss of soil productivity from the displacement and loss of soil depth and a loss in soil hydrologic function due to loss of soil and loss of soil cover. The assumption is that effects are related to total miles of route converted from unauthorized to authorized status.

Indirect Effects: The indirect effects that will occur from the addition of a previously unauthorized use route to the designated system will be dependent upon a number of factors: (1) what soil type it is located on; (2) its erosion potential; (3) slope or gradient of the route; and (4) the assumption that necessary runoff water control work will be accomplished before the previously unauthorized route will be open for legitimate use.

Methodology: Unauthorized routes added to the system are compared to GIS layers displaying MEHR and Hydrologic Function Class. Routes are compared with zones of varying erosion potential risk. Field observations of soil type response are used to formulate the expected direct, indirect and cumulative soil effects for each alternative.

Short-term timeframe: 1 year.

Long-term timeframe: 10 years

Spatial boundary: Forest.

Rationale: Analysis guidelines in the National Soil Management Handbook and Region 5 Soil Management Handbook Supplement.

3. Direct and indirect effects of changes to the existing NFTS including identifying seasons of use and vehicle class

Changes to existing NFTS include (1) roads closed to roads open; (2) roads open to roads closed; (3) changes in vehicle class and season of use. Considerations and the indicators of effects are given below:

Indicator(s): Miles of NFTS routes (closed to open/open to closed) displayed by (1) MEHR and (2) Hydrologic Function Class. The indicators are a soil hazard interpretation that ranks miles of route by potential for erosion and loss of water control.

Direct Effects: Opening level 1 roads is considered as having the larger soil impact compared with the effects of closing routes or the effects of changing vehicle class. Routes that are closed and put to bed produce less sediment and require less maintenance than high use routes, particularly on soil types that are prone to erosion or loss of hydrologic function. The effects of changing vehicle class are mostly a road width issue. The assumption is that a change in vehicle class will either keep the existing road width the same or the road will eventually narrow if used by ATVs or motorcycles. A change in vehicle class only would represent no increase of soil or land area for routes.

Indirect Effects: An action alternative may place control on the season of use for an area. This will generally have a positive indirect effect because it will reduce damage to the facility tread and its erosion control structures and therefore reduce the risk of erosion to soil downslope.

Methodology: GIS analysis is done to compare the location of the trail/roads in each alternative with the zones of varying erosion potential risk. Field observations of soil type response formulate the discussion of expected effects for each alternative.

Short-term timeframe: 1 year

Long-term timeframe: 10 years

Spatial boundary: Forest.

Rationale: Analysis guidelines in the National Soil Management Handbook and Region 5 Soil Management Handbook Supplement.

4. Cumulative Effects

Soil cumulative effects parallel the water cumulative effects. The common ground is the Equivalent Roaded Acre (ERA) concept. All ground disturbances in the watershed is given a coefficient value. Roads, mechanical thinning operations, prescribed fire, wildfire, etc. are accounted for relative to past, present and expected future management activity levels. The USDA Forest Service Region 5 methodology is used to determine the overall disturbed footprint. The disturbed footprint is a semi-quantitative measure of acres of detrimental soil disturbance and hence an approximation of change in Soil Quality as defined by the R5 Soil Quality Standards (USDA 1995c).

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

Long-term timeframe: The period used for long-term effects analysis is 20 years. It is the same recovery period as for the Cumulative Watershed Effects analysis.

Spatial boundary: The analysis area is the National Forest.

Indicator(s): (1) Cumulative effects on soil productivity from unauthorized use (No Action); (2) Cumulative effects on soil productivity in unauthorized areas that are expected to recovery (in the given long term analysis time period) after a cross country closure is implemented; (3) Cumulative effects on soil productivity in areas that are not expected to recover passively (in the given long term analysis period) after a cross country closure is implemented; (4) Cumulative effects on soil productivity from implementation of the particular travel system for each alternative.

Methodology: Utilize observations and understanding of short term effects to soil productivity to estimate long term expected cumulative effects on soil productivity. Utilize the ERA analysis as a semi-quantitative measure of acres of detrimental soil disturbance and hence an approximation of change in Soil Quality.

Rationale: Analysis guidelines in the National Soil Management Handbook and Region 5 Soil Management Handbook Supplement.

Affected Environment

The Stanislaus National Forest has a high diversity of soil types. Soils are broadly zoned based on differences in geology and elevation. Four zones or subsections (USDA 1997) are present in the analysis area: Lower Foothills Metamorphic Belt; Batholith and Flows; Upper Batholith and Flows; and the Glaciated Batholith and Flows. Elevations range from below 3,000 feet to over 8,000 feet within the footprint of the proposed actions. Soils are formed from granitic, volcanic, and meta-sedimentary parent materials.

At the lowest elevation are soils of the Lower Foothills Metamorphic Belt. The Groveland District south of highway 120 is the type location for this area. The general landform is that of a highly dissected block of land that is crossed by major river canyons such as the Tuolumne and Merced Rivers. The upland surface generally slopes to the west. Major rivers have downcut their channels as much as 2,000 feet. Rocky, thin soils are found on the canyon slopes. Weathered red colored soils with high clay content are found on the more stable upland surface. Mariposa and Jocal soils are the most common. Soils are weathered from very old metamorphic rock and support chaparral, hardwoods, hardwood-conifer, and conifer vegetation. Coniferous forests are dominated by ponderosa pine.

At somewhat higher elevations are soils of the Batholith and Flows subsection. These soils are derived from granitic and volcanic rock within an elevation range of 3,500 feet to 6,000 feet. The Deer Creek area north of Twain Harte is in this zone. This land is a tilted, uplifted block with major river channels dissecting the block into long ridges and sideslopes. Ridges trend in a westerly direction. The volcanic Mehrton formation caps the ridge tops and upper sideslopes. Lower sideslopes, canyons and basins are often granitic lands. Soils are generally medium textured productive soils. Holland soils are common on granite lands and McCarthy and Holland, dark surface soils are common on the upper sideslopes of volcanic lands. Shallow unproductive soils are found on the lava caps. Soils within this broad zone support forests of mixed coniferous species known as the Sierra Nevada mixed conifer type.

The Upper Batholith and Flows subsection is a higher elevation version of the Batholith and Flows. The transition to “Upper” Batholith and Flows occurs at about 6,000 feet as white fir becomes a significant component of mixed conifer forests. Most of the soils in this zone have a frigid temperature regime, range in elevation from 6,000 to 8,000 feet and are covered with snow through-out the winter. Soils in the Pinecrest area and Dodge Ridge are typical of the zone. Windy soils are common on volcanic flows and Gerle, Tallac, and Wintoner soils occur on granitic lands. These soils support upper montane forests generally characterized by the presence of red fir, lodgepole pine, and Jeffery pine. Jeffery pine types are common on rocky or droughty soils, often on ridges or south facing slopes.

Soils of the Glaciated Batholith and Flows subsection occur at elevations of 8,000 feet to over 11,000 feet at the top of the Sierras. The Carson Iceberg wilderness (although outside the analysis area) and Bear Valley are examples of this landscape. The transition from “Upper” to “Glaciated” Batholith and Flows occurs when a combination of factors change. Soil temperatures are colder. Most of the soils have a cryic temperature regime and snow persists into June in most years. Mountain Hemlock or Western White Pine becomes a component in red fir stands on north facing slopes. Glacial eroded landforms become more prominent, hence shallow soils and rock outcrop can dominate the landscape. Soils are weakly developed (sandy soils, rocky, with little clay). In general the soils support a sparsely vegetated landscape of open red fir and mixed subalpine forests. Wet meadow soils are relatively common. A dry forb habitat known as dry volcanic meadow is extensive on high elevation volcanic soils. Few routes are found in this zone.

Many soils exist on the Forest; however key soils can be used as examples. In fact, the soil affected environment can be simplified by rating soils (or soil map units) across the Forest based upon engineering properties important to roads and trails. Soils were grouped into general risk categories known as HFC. HFC or Hydrologic Function Class is a soil hazard interpretation that predicts where roads and trails are prone to failure of drainage structures and loss of water control. HFC organizes the soil environment into useful information; and it is an indicator to compare the five alternatives in the Environmental Consequences section.

GIS was used to sort routes based on the following classes:

- High rut and erosion potential. The granitic Holland soil is an example of a soil type in the high rut and erosion potential category that is known to rut and erode easily.
- Mechanical rutting potential (dry). The volcanic McCarthy soil is an example of soils prone to mechanical rutting under dry summer conditions, although it is not a problem on strongly compacted surfaces such as a designed road.
- Mechanical rutting potential (wet). Metamorphic soil types such as Jocal and Sites are examples of soils that have clay or clay loam subsoils that are prone to mechanical rutting under wet conditions.
- Other soils - Lava cap soils and other shallow soils.

Existing Condition Methodology: GIS analysis of steep gradients, soil hazard classification (HFC), and R/Y/G survey results were used to construct the existing soil condition. The same tools were used to determine problem areas and prescribe mitigation.

Figure 3.08-1 shows 252 miles of unauthorized routes displayed by soil hazard classification or HFC. As such, it is an approximation of the existing condition and the No Action, Alternative 2. About 35% of the existing unauthorized routes occur on soils with high rutting and erosion potential. About 12% of existing unauthorized routes occur on steep grades (>15%).

The concentrated use areas of Deer Creek, Hull Creek, and Trout Creek (note routes located south of Strawberry) have a concentration of lava cap soils and soils with a potential for rutting and high erosion. Thin, rocky lava cap soils can be difficult to re-vegetate once disturbed, although they will provide a hard stable running surface once eroded down to bedrock. Routes in the Groveland area south of highway 120, generally have clay subsoils that rut easily when wet. Soils in the Bear Valley area are rocky and are generally more stable relative to rutting and erosion.

Red/Yellow/Green Condition Survey (see project record): Approximately 245 miles of routes were surveyed in 2008. Most of the routes were motorcycle and ATV routes. The survey showed 55 miles of red or yellow routes, and 190 miles of green routes. The red and yellow routes were commonly found on steep grades or on soils susceptible to mechanical rutting and erosion (as predicted by HFC).

Environmental Consequences

Alternative 1 (Proposed Action)

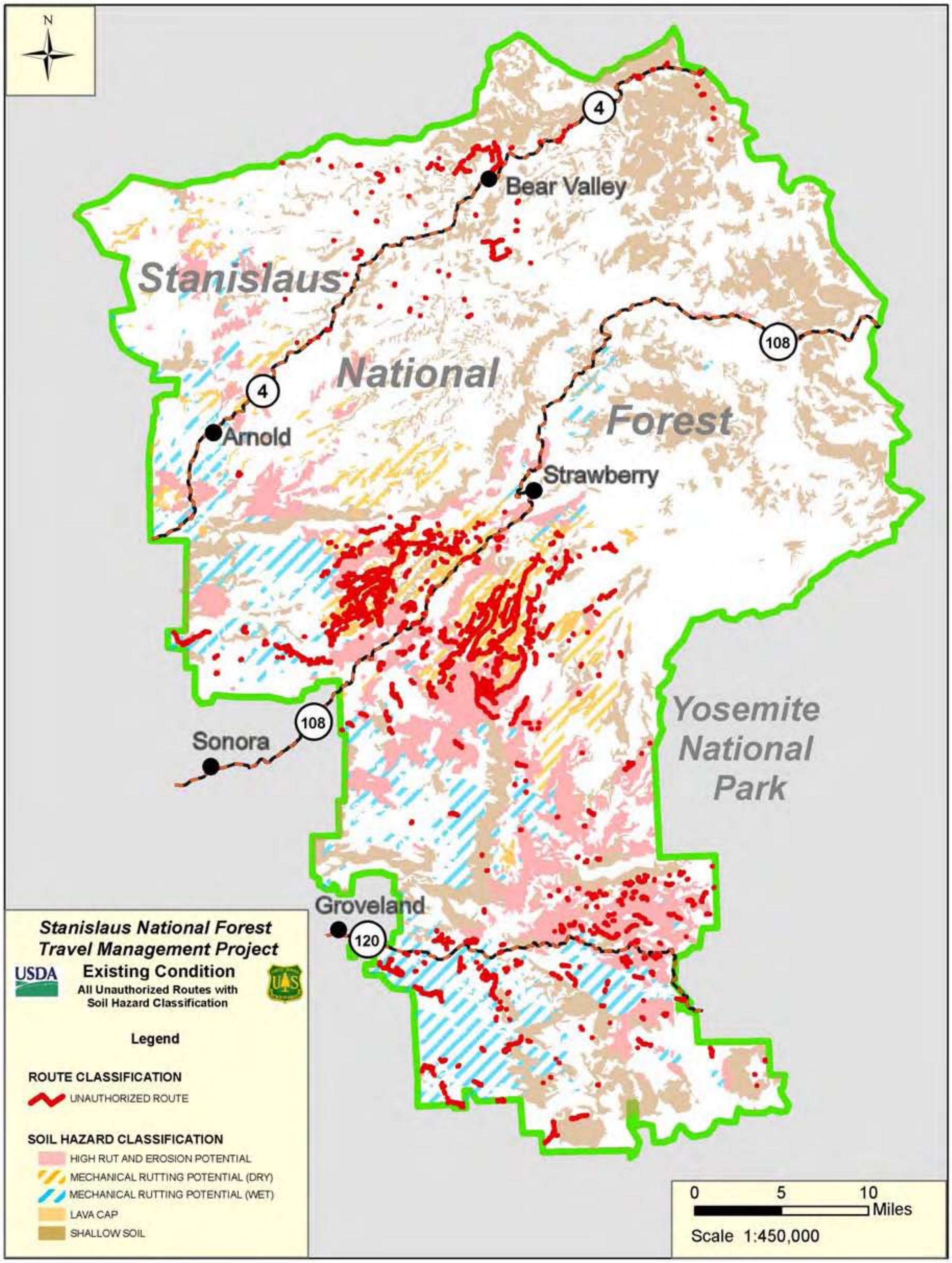
Direct and Indirect Effects

Cross Country Travel: Cross-Country travel is prohibited in Alternative 1. Unauthorized routes are converted to system routes or closed. Proliferation of unauthorized routes is assumed zero or minor. Use will be discontinued on 92 miles of unauthorized routes. The routes will be closed to use and allowed to passively recover. Passive recovery and re-vegetation is expected within a 10 year period. Disturbed areas on shallow soils, particularly above 8,000 feet elevation (cold temperature), will recover more slowly. These changes will have a positive effect on soil conditions as compared to the No-action Alternative.

Additions to the NFTS: Alternative 1 will add 157.4 miles of unauthorized roads and trails to the present NFTS. These routes already exist on the ground. An indicator of soil effects is the Maximum Erosion Hazard Rating (MEHR). GIS analysis was used to overlay routes and erosion hazard.

MEHR: About 128 miles of additions to the NFTS occur on high MEHR soils. This suggests that “off trail” accelerated erosion is more likely to occur where concentrated flow of water is directed off the trail. Mitigation will lower the actual EHR to low or moderate. Definitions of maintenance and mitigation treatments (see Appendix F, Mitigations) are described and the route cards specify site specific treatments.

Figure 3.08-1 Existing Condition: All Unauthorized Routes with Soil Hazard Classification



Approximately 17% of all additions to the NFTS included in Alternative 1 have steep segments (Table 3.08-4). About 26 miles of additions to the NFTS have steep gradients (>15% grade). This implies higher maintenance needs and costs for some segments. This does not imply that the routes should not be added to the system, only that the routes are prone to tread loss and need mitigation, particularly on steep grades. Soil condition is expected to improve compared to the Alternative 2 because 157.4 miles of unauthorized routes will now be subject to mitigation and brought up to standards before the routes are added to the NFTS

Changes to the Existing NFTS: Change would occur on a total of 623 miles of NFTS roads. All existing seasonal closures are replaced by winter closures of all routes based on elevation and wet weather closures on native surfaced routes. The alternative opens 68 miles of roads and closes 46 miles. Other changes in vehicle class (509 miles) includes converting 63 miles of road to trail, converting 5 miles of closed road to open to administrative use only, and minor changes to vehicle class.

Opening the 68 miles of closed roads is the larger change relative to soil effects. The change from closed to open status will increase use of the route; and erosion and sedimentation rates will increase on some route segments (prone to a loss of road hydrologic function and water control). The season of use requirements in zone 2 and 3 along with required maintenance and erosion control measures are expected to mitigate both on/off trail loss of water control concerns.

Minor changes in vehicle class on 509 miles of existing NFTS routes will have minimal effect relative to soil erosion, because these roads where constructed to traditional road standards of compaction and drainage control. For example, a change from Highway Legal Only (HLO) to All Vehicles is expected to have a minimal effect on surface erosion and life of the facility. The effect would be limited in scope, with winter and wet weather requirements.

Soil Effects: Soil effects are based on a GIS analysis of routes and HFC. The Hydrologic Function Class sorts route segments that are more prone to loss of water control and eventual loss of facility (the trail itself). *The rating is simply a soil hazard classification or method to predict weak areas in the trail system that rut and erode easily and may require a higher level of mitigation.*

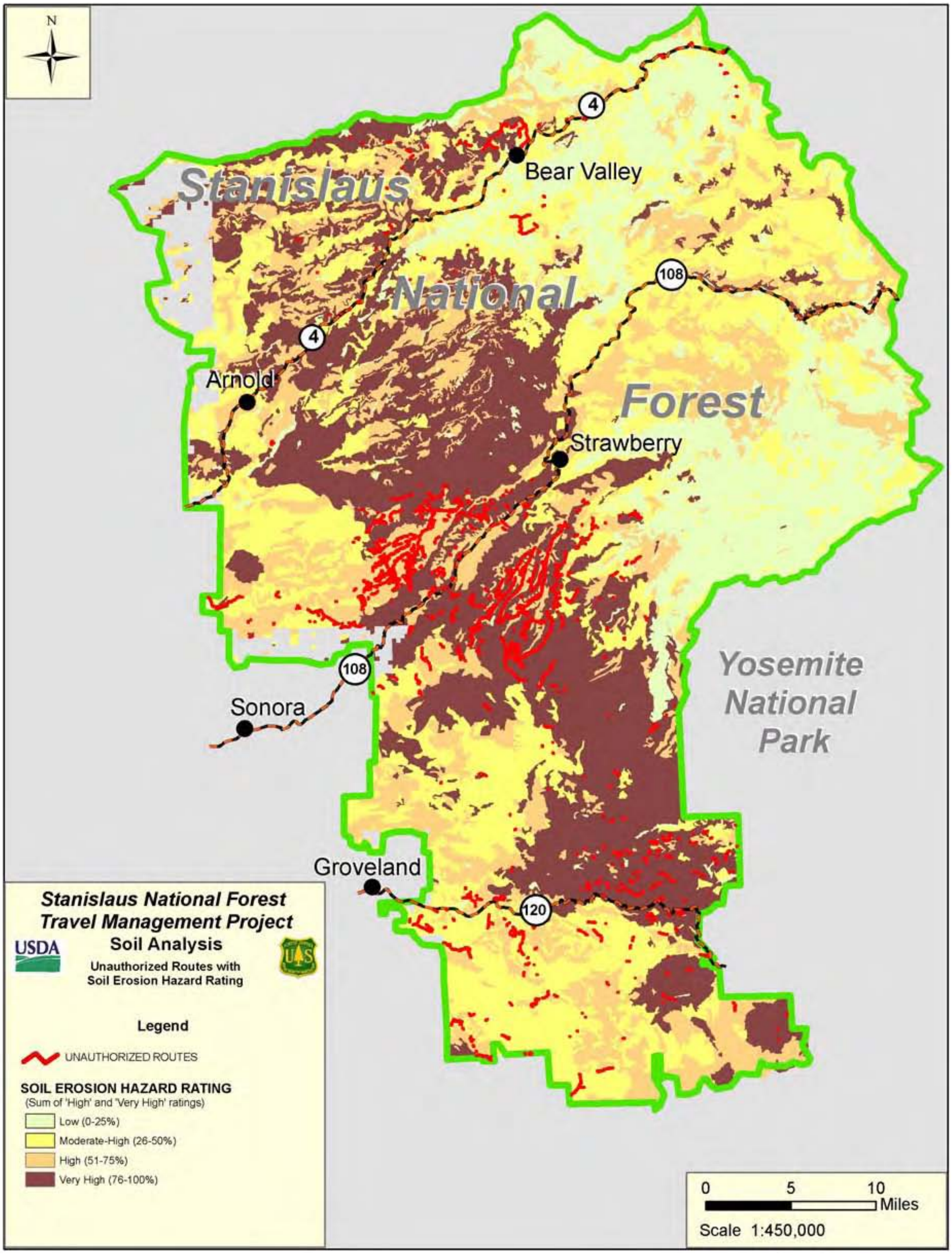
Table 3.08-3 summarizes miles of route or “footprint” occurring on soils that are sensitive to mechanical rutting and erosion. Alternative 1 proposes 157 miles of additions to the NFTS to NFTS; of which 55 miles are prone to failure of drainage structures and loss of water control. Alternative 1 will open 68 miles of NFTS routes that are presently closed to the public; of which 29 miles have a high rutting and erosion potential. The alternative proposes to close 92 miles of unauthorized routes, of which 31 miles are considered as sensitive to gully erosion as passive recovery slowly stabilizes the closed routes.

The “net footprint” (see bottom of Table 3.08-3) considered the collective result of closing or opening routes looking at a time frame of 1 year and 10 years into the future. Some routes will continue to be sensitive to a loss of road hydrologic function by virtue of soil type, gradient, and amount of use. No proliferation of routes is assumed for Alternatives 1, 3, 4, and 5. Passive recovery is assumed to be gradual over 10 years. Erosion control on closed NFTS routes is assumed to be effective in year 1. The net footprint of routes on sensitive soils is estimated to be 84 miles after 10 years for Alternative 1.

Cumulative Effects

Soil cumulative effects parallel the water cumulative effects. The common ground is the Equivalent Roaded Acre (ERA) concept. All ground disturbances in the watershed is given a coefficient value. Roads, mechanical thinning operations, prescribed fire, wildfire, etc. are accounted for relative to past, present and expected future management activity levels. The USDA Forest Service Region 5 methodology is used to determine the overall disturbed footprint. The disturbed footprint is a semi-quantitative measure of acres of detrimental soil disturbance and hence an approximation of change in Soil Quality as defined by the R5 Soil Quality Standards (USDA 1995c).

Figure 3.08-2 Soil Analysis: Unauthorized Routes with Soil Erosion Hazard Rating



The CWE analysis considered the 88 HUC 7 watersheds on the forest that contain one or more proposed additions to the NFTS. Of these, the largest concentration of use occurs in the 10 watersheds that coincide with the three principal off-highway vehicle activity areas on the forest.

These are the watersheds for which detailed CWE analysis was conducted. The total ERA values in the 10 concentrated watersheds are summarized as follows:

The total ERA ranges from 2.75% to 8.10%. The additions to the NFTS account for less than 0.20% ERA in all of the watersheds, a very small fraction of the total ERA value.

The highest ERA was determined in Lyons Reservoir-Lower South Fork watershed. The ERA was 8.01%. This level of compaction and detrimental disturbance is substantially below the Stanislaus Forest Plan S&G to avoid compacting more than 15% of a treatment area (USDA 2005a).

The remaining watersheds outnumber the concentrated use watersheds but have substantially less motorized travel and generally less other use. For example, fifty eight of these dispersed use watersheds have less than 1 mile of route addition proposed, usually in scattered segments, in watersheds each averaging about 6,000 acres in size. The past, present and expected future management activity level (Appendix C) is not anticipated to exceed, and is likely less than, that in the concentrated use watersheds based upon review of the list of activities in the Cumulative Effects Analysis list (project record).

Alternative 2 (No Action)

Direct and Indirect Effects

Cross Country Travel: Cross-Country travel is allowed in Alternative 2. Continued use will occur on 252 miles of unauthorized routes.

MEHR: GIS was used to overlay existing unauthorized routes with classes of erosion hazard. Figure 3.08-2 displays the maximum soil erosion hazard rating (MEHR). Approximately 80% of the routes cross high or very high MEHR soils.

Routes occur on 204 miles of high MEHR soils. Proliferation is expected to add 22 miles onto similar high MEHR soils over 10 years. Assuming no maintenance and continued cross-country travel, a high erosion hazard condition could occur on 247 miles of unauthorized routes (Table 3.08-2).

Soil Productivity: The 252 miles of unauthorized routes plus 2.2 miles of assumed route proliferation annually represent a loss of soil productivity under Alternative 2. The 252 miles include some access routes to undeveloped campsites, but the bulk of the miles are ATV and motorcycle width trails (<50 inches wide). This is a loss of soil productivity on 158 acres, most of which has already occurred. About 101 miles are susceptible to rutting and gully erosion (Table 3.08-3), and the assumption is that these routes will continue to degrade without proper maintenance.

Additions to the NFTS: no additions to the NFTS.

Changes to the Existing NFTS: no changes to the vehicle class or season of use.

Cumulative Effects

Soil cumulative effects parallel the water cumulative effects determined during the CWE analysis. The CWE analysis considered the 88 HUC 7 watersheds on the forest that contain one or more unauthorized routes. Of these, the largest concentration of use occurs in the 10 watersheds that coincide with the three principal off-highway vehicle activity areas on the forest. These are the watersheds for which detailed CWE analysis was conducted. The total ERA values in the 10 concentrated watersheds are summarized by alternative as follows:

The total ERA ranges from 2.91% to 8.40%. Route proliferation raises the ERA in the alternatives less than 0.10%.

The highest ERA was determined in Lyons Reservoir-Lower South Fork watershed. The ERA was 8.40%. This level of compaction and detrimental disturbance is substantially below the Stanislaus

Forest Plan standard and guideline to avoid compacting more than 15% of a treatment area (USDA 2005).

The remaining watersheds outnumber the concentrated use watersheds but have substantially less motorized travel and generally less other use. For example, fifty eight of these dispersed use watersheds have less than 1 mile of route addition proposed, usually in scattered segments, in watersheds each averaging about 6,000 acres in size. The past, present and expected future management activity level is not anticipated to exceed, and is likely less than, that in the concentrated use watersheds based upon review of the list of activities in the Cumulative Effects Analysis list.

Alternative 3 (Cross Country Prohibited)

Direct and Indirect Effects

Cross Country Travel: Motorized vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. Alternative 3 will not add 252 miles of unauthorized routes. The time frame of 10 years allows for most of the routes to grow vegetation and stabilize to background erosion rates. Recovery will be slower where soils are less productive (shallow, rocky soils) or where much of the original soil profile is lost to mechanical erosion.

Additions to the NFTS: No unauthorized routes are added to the NFTS.

Changes to the Existing NFTS: No changes are made to the NFTS or existing seasonal closures.

Cumulative Effects

Soil cumulative effects parallel the water cumulative effects determined during the CWE analysis. The largest concentration of use occurs in the 10 watersheds that coincide with the three principal off-highway vehicle activity areas on the forest. These are the watersheds for which detailed CWE analysis was conducted. The total ERA values in the 10 concentrated watersheds are summarized by alternative as follows:

The total ERA ranges from 2.59% to 7.93% with no additions to the NFTS.

The highest ERA was determined in Lyons Reservoir-Lower South Fork watershed. The ERA was 7.93%. This level of compaction and detrimental disturbance is substantially below the Stanislaus Forest Plan standard and guideline to avoid compacting more than 15% of a treatment area (USDA 2005).

The remaining watersheds outnumber the concentrated use watersheds but have substantially less motorized travel and generally less other use. For example, fifty eight of these dispersed use watersheds have less than 1 mile of route addition proposed, usually in scattered segments, in watersheds each averaging about 6,000 acres in size. The past, present and expected future management activity level is not anticipated to exceed, and is likely less than, that in the concentrated use watersheds based upon review of the list of activities in the Cumulative Effects Analysis list.

Alternative 4 (Recreation)

Direct and Indirect Effects

Cross Country Travel: Cross-Country travel is prohibited in Alternative 4. Unauthorized routes are converted to system routes or closed. Proliferation of unauthorized routes is assumed zero or minor. Use will be discontinued on 65 miles of unauthorized routes. The routes will be closed to use and allowed to passively recover. Passive recovery and re-vegetation is expected within a 10 year period. Disturbed areas on shallow soils, particularly above 8,000 feet elevation (cold temperature), will recover more slowly. These changes will have a positive effect on soil conditions as compared to the No-action Alternative.

Additions to the NFTS: Alternative 4 will add 181.7 miles of unauthorized roads and trails to the present NFTS. These already exist on the ground. Indicators for effects analysis are MEHR and Hydrologic Function Class, HFC

MEHR: About 151 miles of additions to the NFTS occur on high MEHR soils. This suggests that “off trail” accelerated erosion is more likely to occur where concentrated flow of water is directed off the trail. Mitigation will lower the actual EHR to low or moderate. Definitions of maintenance and mitigation treatments are described and the route cards specify site specific treatments.

About 31 miles of additions to the NFTS have steep gradients (Table 3.08-4). This implies higher maintenance needs and costs for some segments. This does not imply that the routes should not be added to the system, only that the routes are prone to tread loss and need mitigated.

Soil condition is expected to improve compared to Alternative 2 because 181.7 miles of unauthorized routes will now be subject to mitigation and brought up to standards before the routes are added to the NFTS.

Changes to the Existing NFTS: Change would occur on a total of 531 miles of NFTS roads. All existing seasonal closures are replaced by winter closures of all routes based on elevation and wet weather closures on native surfaced routes. The alternative opens 102 miles of roads and closes 11 miles. Other changes in vehicle class (259 miles) includes converting 100 miles of road to trail, converting 2.5 miles of closed road to open to administrative use only, and minor changes to vehicle class.

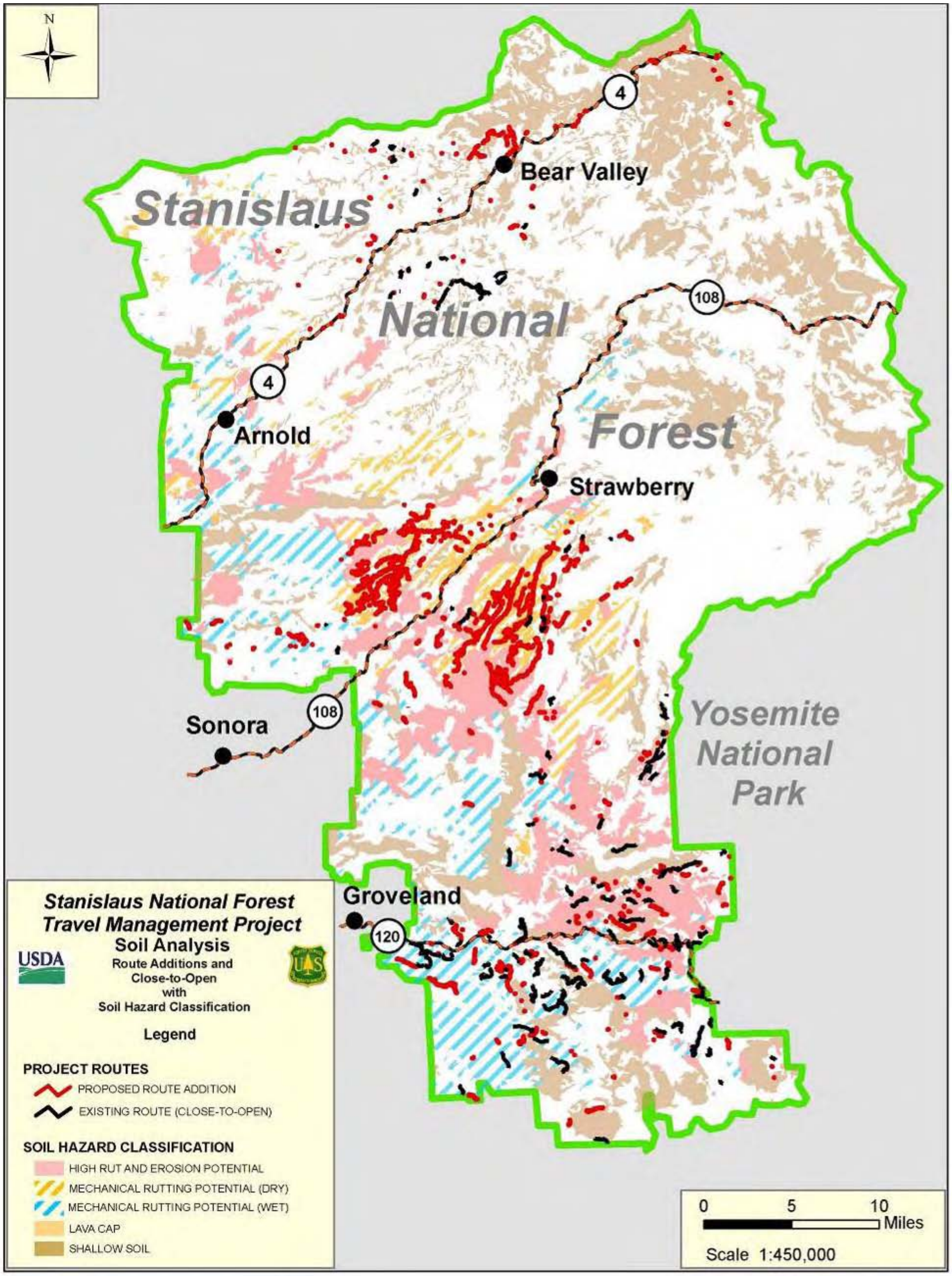
Opening the 102 miles of closed roads is the larger change relative to soil effects. The HFC shows that 45 miles of route segments are prone to loss of hydrologic function and water control. The season of use requirements in zone 2 and 3 along with required maintenance and mitigation are expected to mitigate both on/off trail loss of water control concerns. Appendix I lists mitigation measures by route.

Minor changes in vehicle class on 259 miles of existing NFTS routes will have minimal effect relative to soil erosion, because these roads where constructed to traditional road standards of compaction and drainage control. The effect would be limited in scope, with winter and wet weather requirements.

Soil Effects: Soil effects are based on a GIS analysis of routes and HFC. The Hydrologic Function Class sorts route segments that are more prone to loss of water control and eventual loss of facility (the trail itself). *The rating is simply a soil hazard classification or method to predict weak areas in the trail system that rut and erode easily and may require a higher level of mitigation.*

Table 3.08-3 summarizes miles of route or “footprint” occurring on soils that are sensitive to mechanical rutting and erosion. Alternative 4 proposes 181.7 miles of additions to the NFTS; of which 68 miles are prone to failure of drainage structures and loss of water control. Alternative 4 will open 102 miles of NFTS routes that are presently closed to the public; of which 45 miles have a high rutting and erosion potential. The alternative proposes to close 65 miles of unauthorized routes, of which 22 miles are considered as sensitive to gully erosion as passive recovery slowly stabilizes the closed routes. Alternative 4 adds the maximum miles of authorized routes, and the maximum miles of routes subject to rutting and erosion or loss of hydrologic function. Figure 3.08-3 illustrates the concept.

Figure 3.08-3 Soil Analysis: Route Additions and Close-to-Open with Soil Hazard Classification



The "net footprint" (see bottom of Table 3.08-3) considered the collective result of closing or opening routes looking at a time frame of 1 year and 10 years into the future. Some routes will continue to be sensitive to a loss of road hydrologic function by virtue of soil type, gradient, and amount of use. No proliferation of routes is assumed for Alternatives 1, 3, 4, and 5. Passive recovery is assumed to be gradual over 10 years. Erosion control on closed NFTS routes is assumed to be effective in year 1. The net footprint of routes on sensitive soils is estimated at 113 miles after 10 years for Alternative 4.

Cumulative Effects

Soil cumulative effects parallel the water cumulative effects determined during the CWE analysis. The largest concentration of use occurs in the 10 watersheds that coincide with the three principal off-highway vehicle activity areas on the forest. These are the watersheds for which detailed CWE analysis was conducted. The total ERA values in the 10 concentrated watersheds are summarized by alternative as follows:

The total ERA ranges from 2.77% to 8.13%. The additions to the NFTS account for less than 0.31% ERA in these watersheds, a very small fraction of the total ERA value.

The highest ERA was determined in Lyons Reservoir-Lower South Fork watershed. The ERA was 8.13%. This level of compaction and detrimental disturbance is substantially below the Stanislaus Forest Plan S&G to avoid compacting more than 15% of a treatment area (USDA 2005a).

The remaining watersheds outnumber the concentrated use watersheds but have substantially less motorized travel and generally less other use. For example, fifty eight of these dispersed use watersheds have less than 1 mile of route addition proposed, usually in scattered segments, in watersheds each averaging about 6,000 acres in size. The past, present and expected future management activity level is not anticipated to exceed, and is likely less than, that in the concentrated use watersheds based upon review of the list of activities in the Cumulative Effects Analysis list.

Alternative 5 (Resources)

Direct and Indirect Effects

Cross Country Travel: Cross-Country travel is prohibited in Alternative 5. Unauthorized routes are converted to system routes or closed. Proliferation of unauthorized routes is assumed zero or minor. Current use will be discontinued on 220 miles of unauthorized routes. The routes will not be added to the NFTS and allowed to passively recover. Passive recovery and re-vegetation is expected within a 10 year period. Disturbed areas on shallow soils, particularly above 8,000 feet elevation (cold temperature), will recover more slowly. These changes will have a positive effect on soil conditions as compared to the No-action Alternative.

Additions to the NFTS: Alternative 5 will add 32 miles of unauthorized roads and trails to the present NFTS. These already exist on the ground. Indicators for effects analysis are MEHR and Hydrologic Function Class, HFC

MEHR: About 24 miles of additions to the NFTS occur on high MEHR soils. This suggests that “off trail” accelerated erosion is more likely to occur where concentrated flow of water is directed off the trail. Mitigation will lower the actual EHR to low or moderate. Definitions of maintenance and mitigation treatments are described and the route cards specify site specific treatments.

HFC: Soils that rut and erode easily are prone to loss of hydrologic function. The hydrologic function class sorts route segments that are more prone to loss of water control and eventual loss of facility (the trail itself). About 8.6 miles of additions to the NFTS occur on soils with this concern. This implies higher maintenance needs and costs for some segments. This does not imply that the routes should not be added to the system, only that the routes are prone to tread loss and need mitigation.

Soil condition is expected to improve compared to the no- action Alternative because 187 miles of unauthorized routes will now be subject to mitigation and brought up to standards before the routes are added to the NFTS.

Changes to the Existing NFTS: Change would occur on a total of 531 miles of NFTS roads. All existing seasonal closures are replaced by winter closures of all routes based on elevation and wet weather closures on native surfaced routes. The alternative opens 12 miles of roads and closes 60 miles. Other changes in vehicle class (459 miles) includes converting 22 miles of road to trail, converting 5.4 miles of closed road to open to administrative use only, and minor changes to vehicle class. Opening the 12 miles of closed roads is the larger change relative to soil effects because the native surface road will be exposed to higher traffic use and soil loss (as compared to a closed road, put to bed and partially re-vegetated). The HFC shows that 1.8 miles of route segments are prone to loss of hydrologic function and water control. The season of use requirements in zone 2 and 3 along with required maintenance and mitigation are expected to mitigate both on/off trail loss of water control concerns. Appendix I lists mitigation measures by route.

Minor changes in vehicle class on 459 miles of existing NFTS routes will have minimal effect relative to soil erosion, because these roads where constructed to traditional road standards of compaction and drainage control. The effect would be limited in scope, with winter and wet weather requirements.

Soil Effects: The net footprint of routes on sensitive soils is estimated to be 11 miles after 10 years for Alternative 5.

Cumulative Effects

Soil cumulative effects parallel the water cumulative effects determined during the CWE analysis. The largest concentration of use occurs in the 10 watersheds that coincide with the three principal off-highway vehicle activity areas on the forest. These are the watersheds for which detailed CWE analysis was conducted. The total ERA values in the 10 concentrated watersheds are summarized by alternative as follows:

The total ERA ranges from 2.59% to 8.01%. The additions to the NFTS account for 0.04% of the ERA in these watersheds, a very small fraction of the total ERA value.

The highest ERA was determined in Lyons Reservoir-Lower South Fork watershed. The ERA was 8.01%. This level of compaction and detrimental disturbance is substantially below the Stanislaus Forest Plan standard and guideline to avoid compacting more than 15% of a treatment area (USDA 2005).

The remaining watersheds outnumber the concentrated use watersheds but have substantially less motorized travel and generally less other use. For example, fifty eight of these dispersed use watersheds have less than 1 mile of route addition proposed, usually in scattered segments, in watersheds each averaging about 6,000 acres in size. The past, present and expected future management activity level is not anticipated to exceed, and is likely less than, that in the concentrated use watersheds based upon review of the list of activities in the Cumulative Effects Analysis list.

Summary of Effects Analysis across All Alternatives

The following shows: (1) the miles of routes by action; (2) the miles of routes displayed by the indicator MEHR; and (3) the miles of routes displayed by the indicator HFC. The intent is to present a summary of data used to evaluate the alternatives, so the reader can quickly compare the alternatives. A brief discussion of soil productivity and season of use requirements is given to provide background for the effects analysis.

Soil Productivity

The erosion that may occur from the authorized trail or road surfaces is a concern regarding loss or degradation of the facility, but not a particular concern for the soil resource, because the route surface is a dedicated use and no longer dedicated to growing vegetation. An unauthorized route that is converted to a system route has already incurred a significant reduction in soil productivity from topsoil displacement, compaction and erosion. The closure of an unauthorized route is a long term improvement to soil productivity as it becomes naturally re-vegetated and stabilized. However, the original productivity, before disturbance, may not be recovered entirely.

Routes by Actions

Table 3.08-1 sorts the routes analyzed by three actions: (1) Adding Facilities (those routes that are proposed additions to the NFTS); (2) Unauthorized Use (trails that are not part of the NFTS; and (3) Changes to the Existing NFTS (mostly changes in vehicle class). Collectively, the routes establish a footprint to compare direct and indirect effects. Table 3.08-2 uses the MEHR to display miles of high erosion potential by alternative. Table 3.08-3 uses the indicator Hydrologic Function Class to display miles where road hydrologic function may be a concern.

Table 3.08-1 Routes by Action

Route Type	Miles of Route by Action				
	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
Adding Facilities					
Additions to NFTS	157.4	0	0	181.7	32
Unauthorized Use					
Open Unauthorized	0	221	0	0	0
Closed Unauthorized (passive recovery)	92	0	252	65	220
Access to campsites		31			
Proliferation (10yrs)	0	22	0	0	0
Changes to Existing NFTS					
Roads Closed to Open	68	0	0	102	12
Roads Open to Closed	51.4	0	0	13	64.5
Other Changes in Vehicle class [1]	509	0	0	258	459

[1] Includes conversion from road to trail status, conversion to administrative use only, changes in type of vehicle.

Routes by MEHR

Table 3.08-2 is the product of a soil erosion assessment using the indicator MEHR. The MEHR values were taken from the Stanislaus Order 3 Soil Survey Report (USDA 1995b). The table displays miles of motorized route found on high and very high MEHR soils by alternative. The MEHR is the benchmark indicator used to rank soils by low, moderate, high, and very high erosion hazard. It is designed to appraise the relative risk of accelerated sheet and rill erosion. Although the MEHR is a good indicator of relative risk it will over estimate the actual erosion hazard.

The table is simplified in one respect: (1) Motorized routes where the only change is from one vehicle use to another vehicle use is excluded from this table. “Other Changes in Vehicle Class” is not considered part of the “net footprint” described below. Minor changes in vehicle class are not expected to result in a significant change in soil erosion or hydrologic function on most soils, assuming proper maintenance.

NFTS roads previously closed and now proposed opened under Alternatives 1, 4 and 5 have some additional considerations. The roads are engineered roads and the assumption is that they are compacted, have functioning drainage structures, and are not built on steep or very steep grades. This is not to say that NFTS roads contribute less sediment on a per mile basis than motorcycle and ATV routes. These roads need to be considered as part of the net foot print because an increase in on-off road erosion is expected to increase somewhat over the non-use condition.

Three of the five alternatives add unauthorized routes to the NFTS. The routes not added to the NFTS will passively re-vegetate. The time frame of 10 years allows for most of the routes to grow vegetation and stabilize to background erosion rates. Shallow soils such as lava caps and shallow soils at higher elevations above 8,000 feet will recover slowly and possibly to a lesser degree. The closed and re-vegetated routes are considered “out of play” after 10 years (not part of the Net Footprint).

Table 3.08-2 Routes by Action and MEHR

Route Type	Miles of high and very high MEHR				
	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
Adding Facilities					
Proposed Additions to NFTS	128	0	0	151	24
Unauthorized Use					
Open Unauthorized	0	204	0	0	0
Closed Unauthorized (passive recovery) [1]	75	0	204	53	180
Access to campsites		25			
Proliferation (10yrs)	0	18	0	0	0
Changes to Existing NFTS					
Road Closed to Open	60		0	82	2
Road Open to Closed	37	0	0	9	48
Other Changes in Vehicle Class [1]	Not Included [1]				
Net Footprint [2] (1yr)	226	231	204	277	158
Net Footprint [2] (10yr)	188	247	0	233	26

[1] Minor changes in vehicle class are not expected to result in a change in soil erosion or hydrologic function.
[2] Net Footprint is the net change of unauthorized use, changes in use, and adding facilities. The time frame is 10 years and 1 year. Assumes that closure of existing NFTS and unauthorized routes is a net benefit relative to soil erosion. The benefit is greater after 10 years of passive vegetative recovery.

Routes by HFC

The indicator, HFC is a soil hazard interpretation that predicts where roads and trails may be prone to failure of drainage structures and loss of water control without proper maintenance or mitigation. In extreme cases a loss of the facility is possible. Table 3.08-3 displays miles of routes with a higher potential for rutting and erosion based on the hazard interpretation, HFC.

Table 3.08-3 Routes with High Rutting and Erosion Potential (HFC)

Route Type	Miles of high rutting and erosion potential				
	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
Adding Facilities					
Proposed Additions to NFTS	54.7	0	0	67.9	8.6
Unauthorized Use					
Open Unauthorized	0	81	0	0	0
Closed Unauthorized (passive recovery) [1]	31	0	81	22	75
Access to campsites		11			
Proliferation (10yrs)	0	9	0	0	0
Changes to Existing NFTS					
Closed to Open	28.9	0	0	45	2.9
Open to Closed	16	0	0	3.7	20
Other Changes in Vehicle Class	Not Included [1]				
Net Footprint [2] (1yr)	99	92	81	131	66
Net Footprint [2] (10yr)	84	101	0[3]	113	11

[1] Minor changes in vehicle class are not expected to result in a change in soil erosion or hydrologic function.
[2] Net Footprint is the net change of unauthorized use, changes in use, and adding facilities. The time frame is 10 years and 1 year. Assumes that closure of existing NFTS and unauthorized routes is a net benefit relative to soil erosion. The benefit is greater after 10 years of passive vegetative recovery.
[3] Zero is equivalent to the existing NFTS.

Comparison of Alternatives

Initially the differences between the alternatives are not great. The net footprint (net impact) using a one year time frame is somewhat similar, with Alternative 5 ranking the best (most protective) relative to the soil resource and Alternative 4 the worst. The net footprint using a 10 year time frame shows a similar ranking, but Alternative 3 and Alternative 5 now have a much lower net impact. Alternative 3 and 5 are essentially back to the existing NFTS (maximum miles of closure and passive recovery). Note that over the longer time frame, Alternative 1 is a lower impact than Alternative 2 and 4 although the differences are not great.

Additions to the NFTS

Table 3.08-4 shows a comparison of the two indicators and gradient class by alternative for proposed additions to NFTS. The factor or indicator displays different ways of looking at routes and soil concerns related to the routes. The focus here is on additions to the NFTS because they represent the bulk of non-engineered facilities being added to the existing NFTS system.

Table 3.08-4 Additions to the NFTS: MEHR, Hydrologic Function Class and Gradient Class

Factor or Indicator	Route Addition Miles				
	ALT 1	ALT 2[1]	ALT 3[1]	ALT 4	ALT 5
MEHR-high and very high	128.2	0	0	151.0	24.0
HFC	54.7	0	0	68.0	8.6
Gradients-steep and very steep	26.1	0	0	31.4	5.9
Additions Forest-wide	160	0	0	187	32

[1]Alt 2 and Alt 3 have no additions to the NFTS proposed

Gradient class was not a formal indicator to weigh alternatives by, but it proved especially useful for 1) sorting routes to look at in the field; and 2) applying mitigation in a uniform manner.

Table 3.08-5 Summary of Effects: Soil Resource

Indicators	Ranking of Alternative for each Indicator [1]				
	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
Miles of unauthorized routes displayed by miles in each of the R5 HER ratings.	3	1	5	2	4
Miles of authorized roads and trails displayed by miles in each of the R5 HER ratings.	3	1	5	2	4
Average	**3**	**1**	**5**	**2**	**4**

[1] A score of 5 indicates the alternative is the least impact for this resource; a score of 1 indicates the alternative is the most impact.

Compared with the existing condition, represented by Alternative 2 (no action), all other alternatives result in a reduction of direct, indirect and cumulative soil effects. Table 3.08-5 gives a ranking of alternatives comparing authorized and unauthorized routes. A ranking of 5 is best (most protective) for the soil resource and 1 is the least. The ranking is based on the miles of analysis routes on high and very high MEHR soils shown in Table 3.08-2

Compliance with the Forest Plan and Other Direction

Alternatives 1, 3, 4 and 5 comply with applicable S&Gs (USDA 2005a). If any of those alternatives are implemented, or a combination thereof, applicable soil standards and guidelines would be followed. Alternative 2 would not comply with the intent of the plan standards because unregulated cross country motorized travel would continue to occur.

3.09 VISUAL RESOURCES

This section examines the extent to which alternatives respond to visual resources management direction established in the Forest Plan and the TM Rule. The Forest Plan visual resources direction was established under the implementing regulations of the National Forest Management Act (NFMA).

In the development of the Stanislaus National Forest's Land and Resource Management 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 forest land areas. The VQOs establish minimum acceptable thresholds for landscape alterations from an otherwise natural-appearing forest landscape. For example, areas with a Retention VQO are expected to retain a natural appearance; areas with a Partial Retention VQO may have some alterations, but they remain subordinate to the characteristic landscape. Areas with a Modification or Maximum Modification VQO can have alterations that do not look natural appearing.

New roads and trails create linear alterations in landscapes that can be reduced through good design and construction techniques. Unmitigated, they can present uncharacteristic line qualities in forest landscapes, especially when the surface color contrasts with adjacent natural vegetation as from a distance in an open landscape. Forested landscapes with a dense canopy have the capability of masking these linear alterations. The proliferation of unauthorized routes, particularly in sparsely vegetated landscapes, can also adversely affect the Forest's visual resources.

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

Direction relevant to the Proposed Action as it affects visual resources includes the following:

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 Travel Management (TM) Rule does not cite aesthetics specifically, but in the designation of trails or areas, the Responsible Official must consider effects on forest resources, with the objective of minimizing effects of motor vehicle use.

Forest Plan

The Forest Plan contains forest-wide management direction in the form of Visual Quality Objectives and specific management area direction for visual resources. The visual standards and guidelines in the Forest Plan applicable to motorized travel management include the following:

Visual Quality Objectives (VQO)

Agriculture Handbook Number 462 (USDA Forest Service, 1974) provides a description of the VQOs used for the visual management of lands administered by the Stanislaus National Forest.

> **Preservation** – Only allows for ecological changes and all other management activities, except for very low visual impact recreation facilities, are prohibited.

Retention – Provides for management activities that are not visually evident and landscape character appears unaltered with only minimal deviations. Activities may only repeat form, line, color, and texture of the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, pattern, etc. should not be evident.

Partial Retention – Provides for management activities that remain visually subordinate to the landscape and landscape character may appear slightly altered. Activities may repeat form, line, color, and texture of the characteristic landscape but changes in their qualities of size, amount, intensity, direction, pattern, etc. should 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.

Modification – Management activities may visually dominate the characteristic landscape. Activities such as roads should borrow naturally established form, line, color, and texture so completely and at such scale that its visual characteristics are compatible with the natural surroundings.

The Forest Plan allocations are primarily done within 12 management areas. Table 3.09-1 lists each management area along with the Visual Quality Objectives (see Appendix C, Forest Plan Direction).

Table 3.09-1 Management Area VQOs

#	Management Area	Visual Quality Objective
1	Wilderness and Proposed Wilderness	Preservation
2	Wild and Scenic Rivers and Proposed Wild and Scenic Rivers	Retention
3	Near Natural	Retention
4	Wildlife	Retention
5	Special Interest Areas	Retention
6	Research Natural Areas	Preservation
7	Experimental Forest	Varies, based on inventory
8	Scenic Corridor[1]	Retention or Partial Retention[2]
9	General Forest	Modification, but may be seen at distances greater than 5 miles
10	Developed Recreation Sites	Partial Retention
11	Winter Sports Sites	Modification
12	Developed Non-Recreation	Modification

[1] Created to manage scenery in response to VQOs; this includes most areas seen from all important roads, trails, and vistas.

[2] Based upon sensitivity level, variety class, and distance at which the area is seen. Most sensitivity level 1 roads and trails and some sensitivity level 2 roads are included in the Scenic Corridors. These include highways, roads, and trails leading directly to major areas of interest such as Yosemite National Park, major recreation areas such as Pinecrest Lake, Wilderness areas, developed recreation sites, concentrated recreation use areas (not developed) and other popular destinations.

Effects Analysis Methodology

Roads and trails can create a change in the natural-appearing landscape as measured in form, line, color, texture, and pattern. The visual effects of roads and trails can be described from different points of view: (1) the view of the surrounding landscape as seen by travelers on the route (the route is the view origin.); and, (2) the view of the route by forest visitors (riders, hikers, campers, skiers, etc.) looking from other locations at the route.

The type of visual experience differs whether the landscape is viewed from a motorized, non-motorized mode of travel (walking, hiking, skiing), or from a fixed viewpoint such as a scenic overlook. The speed of the traveler, duration of the view, distance to area seen, vegetative screening, contrast between the adjacent natural landscape and a disturbance, and lighting are some of the factors that may influence the experience.

The proposed alternatives have the potential to affect both the visual resource, as well as the forest visitor's opportunity to view the resource. The degree of deviation from the natural-appearing landscape determines wheth0er a route is in compliance with the Visual Quality Objective. The VQOs establish minimum acceptable thresholds for landscape alterations from an otherwise natural-appearing forest landscape. Site specific variables such as distance, duration (number of locations seen from) soil color, slope/aspect, landform alteration, vegetation and other factors can influence the visibility of an alteration. These factors are known as visual absorption capability (VAC). They were considered in this analysis but not formally applied.

Assumptions Specific to Visual Resources

1. Based upon the review of the Forest Plan, the basic measurement indicator for the visual resources is compliance with the Retention and Partial Retention Visual Quality Objectives.
2. The Preservation VQO is not addressed as it occurs only in Wilderness and Research Natural Areas. Motorized access is not authorized in either management area.
3. The Modification VQO is not addressed, since this VQO allows for obvious alterations, such as roads and trails that may not appear natural.
4. The prohibition of cross-country motorized vehicles should have a positive effect on the Forest's visual resources. This assumes that nature will take its course, healing disturbances. Vehicular barriers, gates, fencing, and signs installed along road edges usually are a more severe visual impact than the route itself no longer being in use by motor vehicles. This analysis does not address closure, confinement, and other implementation structures that may be installed in the future.
5. All areas with a Semi-Primitive Recreation management prescription meet the direction for visual resources to meet or exceed the Partial Retention VQO.
6. For classification, analysis, and inventory of the visual resource landscape, viewing is identified by the distance zones of foreground (300 feet to 1/2 mile), middle ground (1/2 to 4 miles), and background (4- 10 miles).
7. Wheeled Over Snow (WOS) use does not affect visual resources since any impact is short lived on existing NFTS routes that are open to public motorized use during the normal summer driving season.

Data Sources

1. The Forest Plan data set was used to identify route segments within areas with visual quality objectives of Partial Retention or Retention.
2. The 2007 Forest's National Visitor Use Monitoring (NVUM) report determined that 76 percent of those who visited the Forest participated in viewing natural features (scenery) on National Forest System (NFS) lands. This is more than any other activity. Forty-four % identified scenery as the primary reason for coming to the Forest. This is a substantial increase from the same survey four years earlier and an indication of the growing support for scenery.

Visual Resources Indicators

1. The extent to which the proposed NFTS falls within the Retention and Partial Retention VQOs, this is measured by the number of miles traversing landscapes that are to remain natural to near-natural appearing in character.
2. Number of key view sheds that are or have the potential to be affected by motor vehicle travel.

Visual Resource Methodology by Action

1. ***Direct and indirect effects of the prohibition of cross country motorized vehicle travel.***

The prohibition of cross-country motorized vehicles would have a positive effect on the Forest's visual resources because it would remove the chance of continued route proliferation and the possible impact to visual resources.

Methodology: GIS analysis of added routes in relation to location within Retention and Partial Retention VQO

Rationale: The closure of routes, as compared with the No Action Alternative, would lead to a general trend of improving visual resources in areas identified with a Retention and Partial Retention VQO.

2. ***Direct and indirect effects of adding facilities to the NFTS including identifying seasons of use and vehicle class.***

Short-term timeframe: 1 year

Long-term timeframe: 20 years.

Spatial boundary: The "viewshed" is the unit of spatial analysis when considering effects associated with changes in the NFTS or season of use.

Indicator: The extent to which the proposed NFTS falls within the Retention and Partial Retention VQOs (number of miles traversing landscapes that are to remain natural to near-natural appearing in character).

Methodology: GIS analysis of added routes in relation to Retention and Partial Retention VQOs.

Rationale: Compliance with the Retention and Partial Retention VQOs.

3. ***Direct and indirect effects of changes to the existing NFTS including identifying seasons of use and vehicle class.***

No change in effect for visual resources.

4. ***Cumulative Effects***

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

Long-term timeframe: 20 years.

Spatial boundary: The "viewshed" is the unit of spatial analysis for determining cumulative effects.

Indicator: Number of key viewsheds that are or have the potential to be affected by motor vehicle travel.

Methodology: Identify key forest viewsheds (scenic byway corridors, etc). These viewsheds are sometimes identified in the Forest Plan. Identify whether any of these key viewsheds are or have the potential to be affected by motor vehicle travel.

Rationale: Compliance with the Retention and Partial Retention VQOs.

Affected Environment

The diverse character and high quality of the Stanislaus National Forest's scenic resources is reflected in the latest NVUM findings. Viewing natural features (scenery) was the most popular activity identified by visitors. Scenery was given both the highest importance and satisfaction rating (90%-very satisfied).

Located between Tahoe and Yosemite on the western slope of the Sierra Nevada mountain range, the Forest has a variety of settings. Ancient volcanic flows covered the granite and metamorphic rock before the Sierra Nevada was uplifted almost. Glaciers polished plateaus and carved canyons, leaving resistant volcanic formations to stand above the valleys and canyons in the high country. At mid elevations, the gentle tilt of the western slope has the soil and moisture to support a productive mixed conifer forest, capable of growing large trees in dense stands. The lower elevations are a composite of oak woodlands, brush fields, and conifer stands.

Significant human impacts to scenery began in the Gold Rush era and were concentrated in the mother lode foothill region, to the west of the Forest boundary. Several mining era projects of varying success attempted to harness the water and its power within the Forest. Beginning about 160 years ago, major water/hydroelectric projects transformed the free-flowing rivers of the Forest in some locations. Along with the water diversions, dams, and reservoirs came railroads, power lines, and roads. At the same time, logging of the Forests gained momentum. Railroad and road development supported intensive and extensive timber harvest over much of the Forest. Wildfires and fire suppression activities have also left their mark. The railroads are gone, converted to roads. The roads and skid trails created by the above activities are the focus of this analysis.

Scenery and Key Viewsheds

The significant and extensive impacts from all the above activities are not very apparent today, since nature has been busy hiding them. The landscapes of the Forest generally have a great ability to absorb impacts and recover quickly, primarily due to vegetative growth. Three state highways traverse the Forest (4-Ebbetts Pass, 108-Sonora Pass, and 120-Tioga Pass). Highway 4 is a National Scenic Byway for the entire length of the Forest. Highway 120 is a National Scenic Byway within Yosemite National Park. All three routes have spectacular views of the Sierra Nevada Mountains including the high country. The Forest highways and county roads interconnect these Tran-sierra highways. From these routes, lower standard roads and trails access most of the Forest. Views from these routes and views of them from other routes are possible at thousands of locations.

The more open landscapes of the high country and foothills are less forgiving due to soil and climate factors.

Environmental Consequences

Effects for All Alternatives

All alternatives have the potential to affect the existing landscape in varying ways and this also varies from one location of the Forest to another. All alternatives would retain more than 790 miles of existing system routes in the Retention VQO and 380 miles in the Partial Retention VQO. Alternative 4 would have the highest number of NFTS miles of roads within visually sensitive lands, but Alternative 2 with cross country travel would have the greatest potential to impact the visual resources. Alternative 5 has the least impact of all alternatives but only by a narrow margin. Table 3.09-2 illustrates the minor differences between alternatives by looking at total mileages.

Table 3.09-2 Visual Quality Objectives: NFTS

Visual Quality Objective	**Alternative** (miles)				
	1	**2**	**3**	**4**	**5**
Retention - Scenic Corridor	179.96	172.04	171.88	181.22	173.05
Retention - Other Resources (setting)	649.83	621.07	614.69	657.93	618.03
subtotal	829.79	793.11	786.57	839.15	791.08
Partial Retention - Scenic Corridor	352.51	336.09	332.41	355.25	336.91
Partial Retention - Other Resources (setting)	49.31	48.26	47.60	49.23	47.72
subtotal	401.82	384.35	380.01	404.48	384.63
total	**1231.61**	**1177.46**	**1166.58**	**1243.63**	**1175.71**

Alternatives 2 and 3 characterize the existing situation in different ways. The primary difference is Alternative 2 (No Action) continues cross country travel and therefore use on all unauthorized routes. Table 3.09-3 displays the differences by category.

Table 3.09-3 Visual Quality Objectives: NFTS and Unauthorized Routes (Baseline)

Visual Quality Objective	ALT 2 NFTS and UNT	UNT[1]	ALT 3 NFTS[2]	% of NFTS
Retention - Scenic Corridor	184.66	12.62	171.88	5.54
Retention - Other	674.62	53.55	614.69	19.79
Total Retention	859.28	66.17	786.57	25.33
Partial Retention - Scenic Corridor	369.18	33.09	332.41	10.70
Partial Retention - Other	49.97	2.36	47.60	1.53
Total Partial Retention	419.15	35.45	380.01	12.24

[1] Unauthorized roads and trails
[2] In addition to unauthorized routes, Alt.3 excludes miles of roads over private land lacking ROW or having restrictions. Also excludes all NFTS roads with "no access".

When looking at additions to the system in Table 3.09-4, there is a greater variation between alternatives, but the additions range between 0 and 6.2% of the total miles.

Table 3.09-4 Visual Quality Objectives: Additions to the NFTS

Visual Quality Objective	**Alternative** (miles)				
	1	2	3	4	5
Retention - Scenic Corridor	8.08	0.00	0.00	9.34	1.17
Retention - Other Resources (setting)	35.14	0.00	0.00	43.24	3.34
subtotal	43.22	0.00	0.00	52.58	5.51
Partial Retention - Scenic Corridor	20.10	0.00	0.00	22.84	4.50
Partial Retention - Other Resources (setting)	1.71	0.00	0.00	1.63	0.12
subtotal	21.81	0.00	0.00	24.47	4.62
total	**65.03**	**0.00**	**0.00**	**77.05**	**10.13**

Table 3.09-5 Visual Quality Objectives: Changes to the Existing NFTS

Visual Quality Objective	**Alternative** (miles)				
	1	2	3	4	5
Retention - Scenic Corridor	53.00	0.00	0.00	31.63	44.37
Retention - Other Resources (setting)	143.57	0.00	0.00	83.58	119.33
subtotal	196.57	0.00	0.00	115.21	163.70
Partial Retention - Scenic Corridor	107.72	0.00	0.00	55.32	97.27
Partial Retention - Other Resources (setting)	12.34	0.00	0.00	3.16	10.60
subtotal	120.06	0.00	0.00	58.48	107.87
total	**316.63**	**0.00**	**0.00**	**173.69**	**271.57**

Table 3.09-5 illustrates the total miles of changes to routes proposed. Although Alternative 1 has the most miles, no conclusion can be made from this information. Changes can be either beneficial, detrimental, or neither.

The presence of roads within Retention or Partial Retention areas provides viewing opportunities for primarily motorized users. The majority of these routes were not identified as important (sensitivity level 1 or 2). Limitations placed on some of these roads would be beneficial to the scenery. While fewer people may experience the views, the views would be of a greater quality because of less dust, noise, and fewer impacts on other resources, such as soil (erosion).

A wide variety of uses occurs on the forest, much of it recreational. Recreational use is expected to increase 43% during the next 20 years. Sightseeing and driving for pleasure are examples of activities that directly use roads as part of the recreational experience. The character of and access to scenic views, will directly depend on the road system for many people. Predicted increases in general recreational use will provide scenery benefits to more people. Alteration of road systems can disrupt long-established access and use patterns. As described in the Recreation Resource section, all alternatives (except alternative 2) will close the majority of dispersed recreation access routes to motorized use. This would result in parking immediately adjacent to or on the NFTS roads and a less natural appearance generally for those traveling along the road.

Alternative 1 (Proposed Action)

DIRECT AND INDIRECT EFFECTS

This alternative is positioned between alternatives 4 and 5 emphasizing a balance between motorized recreation and ecological values. The elimination of cross country travel will have a positive effect on the overall scenery of the Forest over time.

Increased parking and proliferation of campsites along NFTS roads will make scenery appear less natural and more congested. Currently these vehicles and campsites are out of view, but in this alternative most will be scattered along roads, in plain view, due to the elimination of motorized access. Many of the new parking areas are likely to be adapted for camping by displaced motorized campers. The pioneering of campsites along the immediate edge of the roads will also degrade the currently natural appearing landscapes at those locations. When occupied, they will be obvious to motorists traveling by.

CUMULATIVE EFFECTS

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). Given the terrain and vegetation cover of the STF, adding established roads or trails to the NFTS within the Retention or Partial Retention categories would not have an adverse affect on the scenic values of the Forest. The routes currently exist and no new visual impact will result from this action. Past activities have altered the natural landscape character, creating the existing condition of the landscape. The most obvious and significant effects on scenic resources are from landform alterations, constructed facilities, and vegetation manipulation. The activities that contributed include mining, utilities, timber management, recreation facility development, fire management (suppression, prescribed burning and fuel reduction) and livestock grazing. Many of the impacts from these past activities were severe but now hidden by vegetative growth. Future projects that remove this vegetation can expose these unnatural appearing features to view and increase opportunities for unauthorized motorized use.

Alternative 2 (No Action)

DIRECT AND INDIRECT EFFECTS

Alternative 2 would continue to allow cross country travel which will result in visible impacts to the scenery at many locations, including Scenic Corridors. This alternative is the only alternative that would not close motorized access to dispersed recreation sites. Existing roads will not see an increase in parking and development of adjacent campsites as in the other alternatives.

CUMULATIVE EFFECTS

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). Continued proliferation of routes would occur at about 2.25 miles a year, resulting in a loss of natural character and a potential inconsistency with VQOs. There would be little or no natural recovery from unauthorized routes. Past activities have altered the natural landscape character, creating the existing condition of the landscape. The most obvious and significant effects on scenic resources are from landform alterations, constructed facilities, and vegetation manipulation. The activities that contributed include mining, utilities, timber management, recreation facility development, fire management (suppression, prescribed burning and fuel reduction) and livestock grazing. Many of the impacts from these past activities were severe but now hidden by vegetative growth. Future projects that remove this vegetation can expose these unnatural appearing features to view and increase opportunities for unauthorized motorized use.

Alternative 3 (Cross Country Prohibited)

DIRECT AND INDIRECT EFFECTS

The elimination of cross country travel and motorized use on all unauthorized routes will have a positive effect on the overall scenery of the Forest, but would prevent motorized touring and enjoyment of the scenery at many locations.

This alternative would close all motorized access routes for dispersed recreation resulting in maximum parking along roads and proliferation of dispersed camp sites adjacent to them. Currently these vehicles and campsites are out of view, but in this alternative most will be scattered along roads, in plain view. Many of the new parking areas are likely to be adapted for camping by displaced motorized campers. The pioneering of campsites along the immediate edge of the roads will also degrade the currently natural appearing landscapes at those locations. When occupied, they will be obvious to motorists.

With no additions to the NFTS, existing use will concentrate in fewer areas, resulting in some loss of visual quality at those locations. This will not have a significant impact on lands within the Scenic Corridor Management Area (key viewsheds). VQOs would be met. Land disturbance from use on unauthorized routes will naturally recover over time, improving scenery (greater than all other alternatives).

CUMULATIVE EFFECTS

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). Past activities have altered the natural landscape character, creating the existing condition of the landscape. The most obvious and significant effects on scenic resources are from landform alterations, constructed facilities, and vegetation manipulation. The activities that contributed include mining, utilities, timber management, recreation facility development, fire management (suppression, prescribed burning and fuel reduction) and livestock grazing. Many of the impacts from these past activities were severe but now hidden by vegetative growth. Future projects that remove this vegetation can expose these unnatural appearing features to view and increase opportunities for unauthorized motorized use.

Alternative 4 (Recreation)

DIRECT AND INDIRECT EFFECTS

The elimination of cross country travel and motorized use on all unauthorized routes will have a positive effect on the overall scenery of the Forest. This alternative emphasizes motorized loop driving, riding, and touring opportunities. Motorized viewing opportunities are maximized at the expense of some non-motorized potential. There are fewer restrictions placed on the type of vehicle than alternatives one and four. This alternative closes motorized access to an estimated 70% of the existing dispersed recreation opportunities, fewer than either Alternatives 1 or 5. Fewer campers and campsites will be displaced to immediate roadsides. Currently these vehicles and campsites are out of view, but in this alternative most will be scattered along roads, in plain view. Many of the new parking areas are likely to be adapted for camping by displaced motorized campers. The pioneering of campsites along the immediate edge of the roads will also degrade the currently natural appearing landscapes at those locations. When occupied, they will be obvious to motorists.

This alternative has the longer season of use, beginning earlier and ending later than Alternatives 1 or 3. Weather permitting; scenery can be enjoyed earlier and later in the season. With the greatest amount of additions to the NFTS, existing use will spread across more areas of the Forest, but visual impacts will be less concentrated. This will not have a significant impact on lands within the Scenic Corridor Management Area (key viewsheds). VQOs would be met. Land disturbance from OHVs on unauthorized routes will naturally recover over time, improving scenery (more than Alternative 2, less than other alternatives)

CUMULATIVE EFFECTS

Same as Alternative 1.

Alternative 5 (Resources)

DIRECT AND INDIRECT EFFECTS

Emphasis is placed on natural resource and habitat values, which are essential to the scenic management system's underlying ecological aesthetic. Under the scenic management system, activities that improve forest health also improve forest aesthetics in order to reach the long-term desired condition stated in the Forest Plan. Since alternative 5 best protects natural resources, it would thus best protect scenic resources, although fewer people would have access to the scenery. The road and trail systems are not designed for optimal touring by recreationists and some types of use would be restricted, preventing loop tours. The season of use is the most restrictive of all alternatives Tours in early spring (wildflowers) and in the fall (peak fall color) would be affected at some locations. Parking along roads and proliferation of campsites along NFTS roads will make roads appear less natural and more congested due to the loss of most existing motorized access routes. Currently these vehicles and campsites are out of view, but in this alternative most will be scattered along roads, in plain view. Many of the new parking areas are likely to be adapted for camping by displaced motorized campers. The pioneering of campsites along the immediate edge of the roads will also degrade the currently natural appearing landscapes at those locations. When occupied, they will be obvious to motorists.

CUMULATIVE EFFECTS

Same as Alternative 1.

Summary of Effects Analysis across All Alternatives

Roads and trails can create a change in the natural-appearing landscape as measured in form, line, color, texture, and pattern. Authorized and unauthorized roads are generally not apparent in the middle or distance views of the forest.

Travel on roads and trails often provide the opportunity for viewing scenery. Most travel routes appear slightly altered due to grading and absence of vegetation on the travel way. This is true even of hiking trails, to a lesser extent. The road and trail facilities, although noticeable at times, generally remain visually subordinate to the landscape character being viewed.

Steep terrain, dense vegetation, boulders, and fencing along roads have helped prevent the development of unauthorized routes. Fires and thinning projects have opened up the view and often the access into areas. The removal of screening can expose existing features that were not apparent originally, including roads and trails. This is not a part of this analysis, but an issue that must be addressed and taken into consideration in future projects.

Changes or additions to the NFTS are consistent with Visual Quality Objectives. Elimination of cross country travel will have a modestly beneficial effect. Decommissioning of roads, closure of roads, conversion of roads to trails, and elimination of motorized access on existing routes are generally beneficial to scenery, but have the potential to reduce enjoyment of the scenery by those who would rely on motorized travel over unauthorized routes.

Table 3.09-6 Summary of Effects to Visual Resources

Indicators – Visual Resources	Rankings of Alternatives for Each Indicator[1]				
	1	**2**	**3**	**4**	**5**
Disturbance/Integrity: Compliance with the Retention and Partial Retention VQOs	4	2	4	4	4
Key Viewsheds Affected by Proposed NFTS	4	2	4	4	4
total	**8**	**4**	**8**	**8**	**8**
Average for Visual Resources	4	2	4	4	4

[1] A score of 5 indicates the alternative has the least impact on this resource; a score of 1 indicates the alternative has the most. There are differences between alternatives that the numbers above do not reflect due to offsetting factors. See project record for more information.

Compliance with the Forest Plan and Other Direction

Alternatives 1,3, 4 and 5 currently meet the objectives and standards and guidelines of the Forest Plan for visual resources. Alternative 2 is likely to allow impacts within the scenic corridor that would not conform to the Forest Plan.

3.10 WATER RESOURCES

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

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

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

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

Non-point source pollution on National Forests is managed through the Regional Water Quality Management Plan (USDA, Pacific Southwest Region, 2000), which relies on implementation of prescribed best management practices (BMPs). The Water Quality Management Plan includes one BMP for off-highway vehicle (OHV) use (4-7) and 28 BMPs related to road construction and maintenance (2-1 to 2-28) (See Appendix G). All NFTS 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.

The California Water Code consists of a comprehensive body of law that incorporates all state laws related to water, including water rights, water developments, and water quality. The laws related to water quality (sections 13000 to 13485) apply to waters on the National Forests and are directed at protecting the beneficial uses of water. Of particular relevance for the Proposed Action is section 13369, which deals with 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 U.S. Environmental Protection Agency to enforce the Clean Water Act in California.

The Sierra Nevada Forest Plan Amendment (SNFPA): The Record of Decision (ROD) for the 2004 SNFPA includes standards and guidelines that apply to the 11 Sierra Nevada Forests for construction and relocation of roads, and for management of riparian conservation areas (RCAs). These standards and guidelines require the Forest Service to avoid road construction, reconstruction, and relocation in meadows and wetlands (SNFPA S&G 70). Reconstructing unauthorized routes to bring them to NFTS standards in meadows or wetlands should therefore be avoided. Only routes that already meet NFTS standards in meadows and wetlands should be proposed for addition to the NFTS. SNFPA S&G 92 requires that the Forest Service evaluate new management activities within RCAs and critical aquatic refuges (CARS) during environmental analysis to determine consistency with riparian conservation objectives (RCOs) at the project level and the Aquatic Management Strategy (AMS) goals for the landscape. Adding an unauthorized route to the NFTS is a new management activity and must comply with S&G 92. SNFPA S&G 100 requires the Forest Service to maintain and restore the hydrologic connectivity of streams, meadows, and wetlands by identifying roads and trails that intercept, divert, or disrupt flows paths and implementing corrective actions. SNFPA S&G 102 requires that the Forest Service determine if stream characteristics are within the range of natural variability prior to taking actions that could adversely affect streams.

Effects Analysis Methodology

Proposed additions to the NFTS as well as cross country travel prohibition and change in vehicle class were reviewed in all applicable watersheds within the Forest boundary to determine effects on water resources. This consisted of GIS analysis as well as a review of the Forest trail condition surveys (project record) to determine which routes were in hydrologically sensitive areas (HSA). Hydrologically sensitive areas are synonymous with Riparian Conservation Areas (RCA) in the Forest Plan Direction (USDA 2005a). The focus of these sensitive areas, which includes streams and wetlands such as meadows, springs and seeps, and attendant near-surface ground water resources, was to determine which segments of routes with erosional features could adversely affect water quality. These areas, known as hydrologically connected segments (HCS), are locations near water within hydrologically sensitive areas where drainage off a route is likely to enter a watercourse. The GIS analysis showed that 25 HUC Level 7 watersheds with routes proposed for addition to the NFTS had routes that were in hydrologically sensitive areas as shown in Table 3.10-6. Once the GIS analysis was complete, all HSA routes in the 25 watersheds were field surveyed to determine the level of concern regarding the water resource. Field evaluation was conducted following the hydrologically connected segment inventory protocol used on the Stanislaus National Forest (Frazier 2006a). Data were collected on all routes identified as hydrologically connected (results are shown in Table 3.10-6). The field evaluations were analyzed to determine hydrologically connected segments of routes that would be acceptable with routine maintenance or mitigation, or routes that should not be recommended for addition to the NFTS because of a watershed resource concern that was not practical to mitigate (see tables 3.10-9 and 3.10-10). Data from all the hydrologically connected segments was analyzed by watershed to inform the effects analysis.

Beneficial uses of water and water quality objectives in the California Water Quality Control Plan (Basin Plan) of the Central Valley Regional Water Quality Control Board (CVRWQCB 1998) were utilized as a regulatory benchmark regarding the existing condition and to assess the effects of the proposed action and its alternatives. The principal water quality parameter considered in the water resources analysis was sediment, since this is the primary pollutant from motorized travel. Petrochemical residue (e.g., oil and grease) was also considered since motor vehicles can deposit such pollutants. Water temperature was also evaluated since motorized travel routes can create openings along streams that may be a factor in elevating stream temperature.

Many of the watersheds with water resource concerns in this analysis have had recent stream condition surveys using the Stanislaus National Forest StreamScape Inventory protocol (Frazier 2006b). This information was used to evaluate existing water quality and stream condition to determine the effects of the three actions. In addition, other available recent stream and water quality information was used, including data from Pacific Gas and Electric Company (Pacific Gas and Electric Company 2002) and the Clavey River Watershed Assessment (CREP 2008). Other information sources included sampling condition of some streams and wet areas (e.g., springs) during field evaluation of routes with watershed resource concerns and/or watershed staff observations in these areas in recent years, both to fill data gaps. The time frame for analysis of direct and indirect effects is from one to 20 years.

Assumptions Specific to Water Resources

Four assumptions are specific to the water resources analysis:

1. Route Proliferation: Routes will continue to increase without prohibition of cross country motorized travel. This applies only to Alternative 2 (No Action) since cross country travel would continue. The rate of proliferation is estimated to be 2.25 miles per year across the Forest based on utilizing the same proliferation rate that has occurred during the past 20 years (see project record). For purposes of the water resources analysis the route proliferation in Alternative 2 was assumed to occur in the concentrated use watersheds (Table 3.10-2) since these are expected to continue to be the locations of demand for off-highway motorized travel.
2. New Construction: While no new route construction occurs in the proposed action or alternatives, about five miles are expected to be built in the next 10 years. These are primarily segments that would connect existing routes to enhance motorized travel opportunities. These routes exist in, and the effects are accounted for, in the CWE analysis of concentrated use watersheds.
3. Passive Recovery: Existing routes not added to the NFTS are assumed to passively recover; that is, heal over in time as forest litter (e.g., pine needles, twigs, branches) and vegetation re-occupies the route surface. The rate of recovery will vary by location, type of route (i.e., motorcycle or ATV trail, road), and by soil type and route gradient. The range of time is expected to be from about two to ten years; trails in forested areas that were closed were observed to accumulate an acceptable amount of ground cover within two years while trail segments in forest openings may take up to a decade to recover.
4. Wheeled Over Snow (WOS) use does not affect water resources since the use is on existing NFTS routes that are open to public motorized use during the normal summer driving season.

Data Sources

Refer to the introduction to the Effects Analysis Methodology section above.

Water Resources Indicators

Three water resource indicators were used to analyze effects of the alternatives considered:

1. Unauthorized routes in hydrologically sensitive areas, with miles as the measure
2. Unauthorized routes with documented erosional features affecting water quality (hydrologically connected segments), with miles as the measure
3. Equivalent Roaded Acres (ERA), with % ERA per HUC Level 7 watershed as the measure

Indicators 1 and 2 were most applicable to analyzing direct and indirect effects of the proposed action and alternatives. Indicator 3 was used in the analysis of cumulative watershed effects.

Water Resources Methodology by Action

1. Direct and indirect effects of the prohibition of cross country motorized vehicle travel

This action affects the amount of hydrologically sensitive area disturbed and potential stream sedimentation or impact to other wet areas. That is, the more miles of unauthorized routes currently existing in the Forest that are prohibited from being used, the less impact on the water resource. The effects vary by alternative since the number of miles of routes proposed for addition in each alternative is different and they all vary from the existing condition. The analysis of the intensity of effects includes mitigation measures with been prescribed to lessen impacts.

2. Direct and indirect effects of adding facilities to the NFTS including identifying seasons of use and vehicle class

This action also affects the amount of hydrologically sensitive area disturbed, in the reciprocal from prohibition of cross country travel. The more unauthorized routes that are added to the NFTS in hydrologically sensitive areas, the more retention of potential stream sedimentation and disturbance to other wet areas. The effects vary by alternative since the number of miles of routes proposed for addition to the NFTS in each alternative is different and they all vary from the existing condition. The analysis of the intensity of effects includes mitigation measures that were prescribed to lessen impacts (Appendix I shows protections for streams, meadows, springs, etc.)

3. Direct and indirect effects of changes to the existing NFTS including identifying seasons of use and vehicle class

This action may affect hydrologically sensitive areas by changing the status of currently open and closed routes and changing the vehicle use type. Opening closed NFTS routes which have hydrologically sensitive segments to motorized travel may increase stream sedimentation while closing open routes may reduce the effect. Changing the type of vehicle use on routes with hydrologically sensitive segments may have an effect that could increase or decrease impacts. The effects vary by alternative as with the previous two actions. In both cases the proposed changes occur on a small percentage of the NFTS routes presently available for motorized travel.

4. Cumulative Effects

Cumulative watershed effects (CWE) were evaluated using the USDA Forest Service Region 5 methodology (USDA 1988) and the Stanislaus National Forest CWE model (USDA 2003a). Details are available in the project record. The data source for consideration of past, present and reasonably foreseeable future action is the list of activities in the Cumulative Watershed Effects Analysis (Appendix B).

CWE were considered for all alternatives for HUC Level 7 watersheds that had routes proposed for addition to the NFTS as well as prohibition of cross-country travel. These watersheds were categorized as either concentrated or dispersed use. Concentrated use watersheds refer to those that encompass the three concentration areas of off-highway motorized travel on the Forest. Detailed CWE analysis was conducted on these watersheds. The dispersed use watersheds usually have a lesser amount of mileage of routes per watershed and/or less management activity disturbance, and thus a lower risk of cumulative effects. The time frame for analysis of cumulative watershed effects used in the CWE model is 20 years.

Affected Environment

Watershed Setting

The three actions described above (cross-country travel prohibition, additions to the NFTS and changes to the existing NFTS) are applicable to roaded watersheds throughout the Forest, with some exceptions. Watersheds in Wilderness and certain other areas are excluded. Additions to the NFTS are proposed on the Calaveras, Groveland and Mi-Wok Ranger Districts. Changes to the existing NFTS are proposed on the Summit Ranger District and the others.

Watersheds on the Stanislaus National Forest are delineated into a series of subdivisions based on a national hierarchical classification system (FGDC 2004). These watersheds cover the entire Forest – roaded, unroaded and wilderness areas. They are nested in five of the eight tiers in the classification system; these five range from very large (greater than 250,000 acres each) to very small (less than 2,000 acres each).

The watershed classification system uses the title Hydrologic Unit Code (HUC) for all tiers (see Table 3.10-1). The tiers are numbered in order from one to eight in descending size classes. Each HUC level code is a two digit number that ties to a watershed size and name. For example, HUC Level 1 is a two digit code whereas as HUC Level 5 is a 10 digit code. Table 3.10-1 also shows an example of how the nesting system applies to the Stanislaus National Forest.

Table 3.10-1 Hydrologic Unit Code System (HUC)

HUC Level	Name	Size (acres)	Examples Related to Stanislaus NF
1	Region	100,000,000 (average)	NA
2	Sub-region	10,000,000 (average)	NA
3	Basin	7,000,000 (average)	San Joaquin River
4	Sub-basin	450,000 (average)	Stanislaus River
5	Watershed	~40,000-250,000	South Fork Stanislaus River
6	Sub-watershed	~10,000-40-000	Lower South Fork Stanislaus River
7	Drainage	~2,000-10,000	Deer Creek
8	Sub-drainage	~Less than 2,000	Upper Deer Creek

Note: Names and sizes for HUC 7 and 8 watersheds are draft but are used for reference in this report.

The Stanislaus National Forest consists of HUC level watersheds four through eight. (The term watershed is used generically even though each HUC level has a unique name). The HUC Level 4 watersheds on the Forest are the headwaters of large rivers that continue downstream of the Forest (e.g., Stanislaus River). Some of the HUC Level 5 watersheds extend somewhat downstream from the Forest and some are entirely within the Forest boundary. With rare exceptions, boundaries of HUC Levels 6 through 8 are entirely on the Forest.

Scope of the Water Resources Analysis

The Water resources analysis primarily focused on HUC Level 7 watersheds, though context to HUC Level 5 watersheds is provided as needed. These two tiers are often termed "classic" watersheds where the naming convention provides a relatively clear understanding of size and location. (The intermediate class, HUC 6, sometimes provides less spatial and naming clarity, and is not used in this report). The rationale for the focus on HUC 7's was that they provide the best size class for estimating direct, indirect and cumulative effects of management activity relative to the water resource. Potential effects are often underestimated if only larger watersheds are considered and can be overestimated in smaller watersheds.

The principal scope for the analysis of watershed effects in this project was all HUC Level 7 watersheds with additions to the NFTS on National Forest land within the Forest boundary. This action is expected to have the highest risk of effects since it determines permanent additions to the NFTS and allows passive recovery of existing unauthorized routes. Watersheds without additions to the NFTS but changes to the NFTS were considered as well and are discussed as needed in the analysis.

The analysis was initiated at the largest scale of the HUC Level 7 watersheds on the Forest and focused down to the principal watersheds, in the following sequence:

- 188 HUC Level 7 watersheds exist on the Stanislaus National Forest,
- Of these 188, 97 have one or more unauthorized routes available for motorized travel,
- Of these 97, 88 have one or more unauthorized routes proposed for addition to the NFTS,
- Of these 88, 25 have one or more unauthorized routes proposed for addition to the NFTS within hydrologically sensitive areas. (Many proposed routes in the 88 watersheds run along ridges, on upper slopes or are dead-end segments off NFTS routes that are not near water). These 25 watersheds are the principal focus for analysis of direct and indirect effects,
- Of these 25, 10 watersheds encompass three areas of concentrated motorized travel on the Forest. These 10 watersheds are the principal focus of the CWE analysis.

The three concentrated use areas are the Deer Creek, Hull Creek and Moore Creek areas as shown in Table 3.10-2. The four watersheds in the Deer Creek area are contiguous as are the five watersheds in the Hull Creek areaThese 10 concentrated use watersheds account for 75% of the routes in hydrologically sensitive areas with the other 15 watersheds accounting for the remainder (see Figure 3.10-1).

Table 3.10-2 Principal Areas of Concentrated Vehicle Use on Unauthorized Routes

Area Name	Ranger District and General Location	Watershed Name	
		HUC 5	HUC 7
Deer Creek	Mi-Wok – 5 miles north of Twain Harte	South Fork Stanislaus River	Deer Creek
			Lyons Reservoir-South Fork Stanislaus River
			Fraser Flat-South Fork Stanislaus River
		Lower Middle Fork Stanislaus River	Upper Rose Creek
Hull Creek	Mi-Wok – 8 miles east of Twain Harte	Clavey River	Hull Creek
			Main Stem West Clavey River
			Trout Creek
			Two Mile Creek
		North Fork Tuolumne River	Wrights Creek
Moore Creek	Groveland – 8 miles east of Groveland	North Fork Merced River	Moore Creek

Motorized Routes within Watersheds

HUC Level 4 and HUC Level 5 Watersheds

Approximately 180 miles, out of 252 miles of unauthorized routes, are proposed for addition to the NFTS. These 252 miles comprise the existing condition of unauthorized motorized travel on the Forest. This is about 11% of the 2,260 miles of NFTS routes presently available for motorized travel forestwide.

These 252 miles lie within all four HUC Level 4 watersheds on the Forest and are distributed among 11 of the Forest's 22 HUC Level 5 watersheds. No routes are proposed for addition on the Summit Ranger District.

At present, cross country motorized travel is not prohibited and only limited seasonal use restrictions exist (see Table 2.02-7). The period of motorized travel usually occurs in relation to weather conditions. Lower elevation sites, such as the Deer and Moore Creek concentrated use areas, are used mostly in fall, winter and spring since summers are generally too hot and dusty. Mid elevation sites, such as the Hull Creek concentrated use area, are often used spring through fall since summer temperatures are not too hot. Higher elevation areas are usually not accessible in winter due to snow.

Of the 2,260 miles of NFTS routes open for motorized travel, changes are proposed on about 620 miles. These changes consist mostly of altering the vehicle class that may use an existing route. A lesser amount of this route mileage is a mix of opening closed routes and closing open routes. These changes occur in most all HUC Level 5 watersheds since they include routes on the Summit Ranger District.

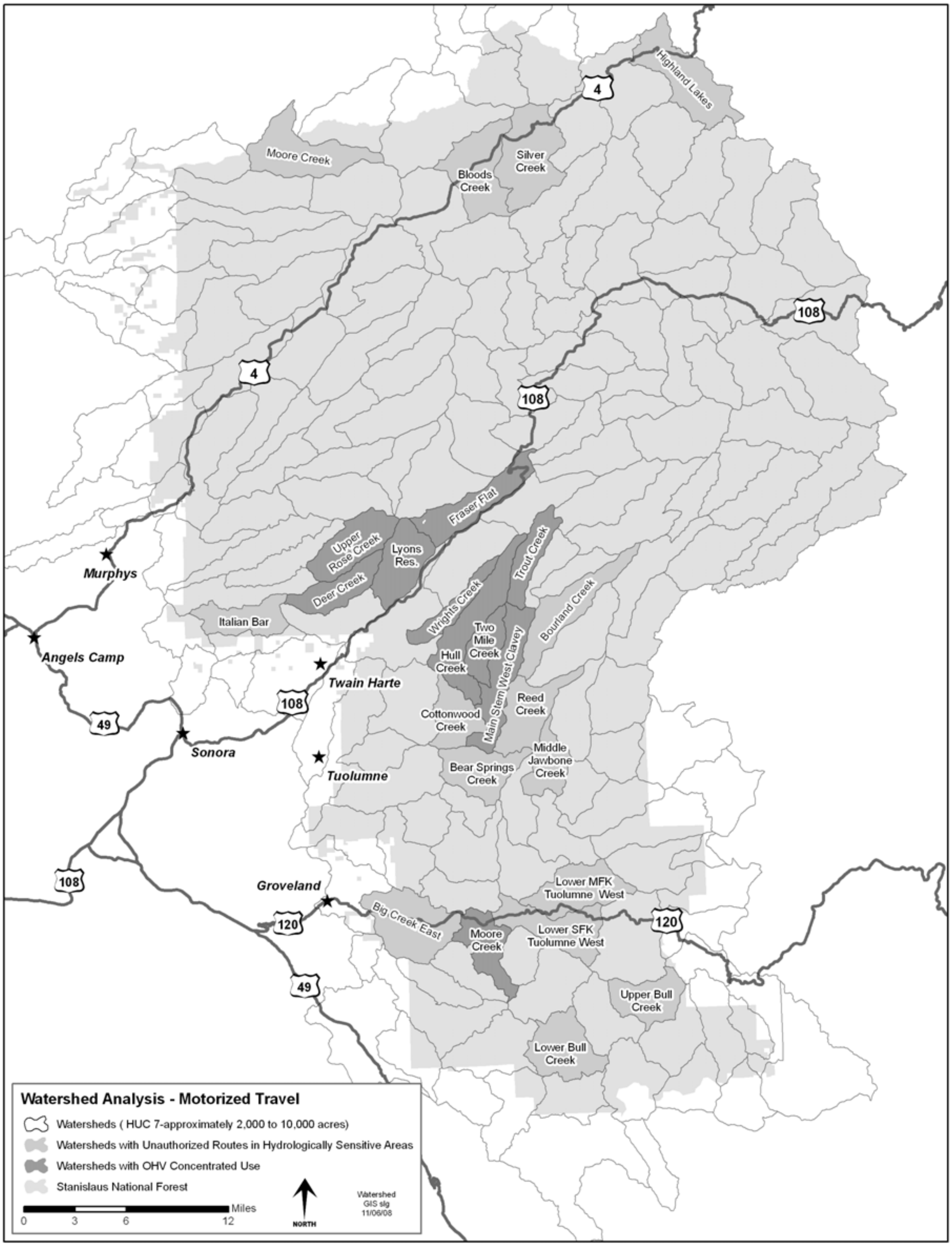


Figure 3.10-1 Distribution of Off-Highway Motorized Travel in HUC Level 7 Watersheds

HUC Level 7 Watersheds

Routes are proposed for addition to the NFTS in 88 of the Forest’s HUC Level 7 watersheds. Routes within hydrologically sensitive areas (HSA) occur in 25 of these watersheds. Many of the proposed routes in the 88 watersheds run along ridges, on upper slopes without stream courses, or are away from water as “hill climbs” or dead-end segments off NFTS routes. Mid and lower slope routes most often cross or closely run along streams for short distances. These are considered hydrologically connected segments (HCS), a subset of routes in hydrologically sensitive areas. Hydrologically connected segments are those route portions that drain water and sediment directly to a watercourse rather than drain off onto the forest floor where sediment does not reach water. Some of these hydrologically connected segments occur on dispersed campsite access routes, usually going a short distance off NFTS routes. Hydrologically connected segments average about 11% of the length of routes in hydrologically sensitive areas. About 70% of the hydrologically connected segments occur on ephemeral and intermittent streams with the remainder on small perennial streams.

Across the 25 HUC Level 7 watersheds, 75 routes and 41.02 miles are proposed for addition to the NFTS in hydrologically sensitive areas, as shown in Table 3.10-3. The range is 1-15 routes per watershed which average about 6,000 acres, with an average of 3 per watershed. Route density is very low, an average of 0.18 miles per square mile with a range 0.01 to 0.96.

Table 3.10-3 Additions to the NFTS: Hydrologically Sensitive Areas (Watersheds)

HUC 4	HUC 5	HUC 7	Ranger District	Routes in Hydrologically Sensitive Areas	
				Number	Miles
Mokelumne River	Lower North Fork Mokelumne River	Moore Creek-North Fork Mokelumne River	Calaveras	1	0.31
	Upper North Fork Mokelumne River	Highland Lakes-Headwaters Upper NFK Mokelumne River	Calaveras	1	0.10
Stanislaus River	North Fork Stanislaus River	Bloods Creek-Upper North Fork Stanislaus River	Calaveras	2	2.13
		Silver Creek-Upper North Fork Stanislaus River	Calaveras	2	0.29
	Lower Middle Fork Stanislaus River	Upper Rose Creek	Mi-Wok	3	3.36
	South Fork Stanislaus River	Fraser Flat-Lower South Fork Stanislaus River	Mi-Wok	2	0.45
		Lyons Reservoir- Lower South Fork Stanislaus River	Mi-Wok	4	2.59
		Italian Bar-Lower South Fork Stanislaus River	Mi-Wok	3	0.29
		Deer Cr	Mi-Wok	15	8.24
Tuolumne River	North Fork Tuolumne River	Wrights Creek	Mi-Wok	5	1.04
	Clavey River	Hull Creek	Mi-Wok	6	2.26
		Trout Creek	Mi-Wok	5	3.25
		Two Mile Creek	Mi-Wok	3	3.72
		Cottonwood Creek	Mi-Wok	2	0.45
		Main Stem West Clavey River	Mi-Wok	1	3.65
		Bourland Creek	Mi-Wok	2	0.07
		Reed Creek	Groveland	2	0.42
		Bear Springs-Lower Clavey River	Groveland	1	0.13
	Middle Fork Tuolumne River	Lower Middle Fork Tuolumne River West	Groveland	1	0.31
	South Fork Tuolumne River	Lower South Fork Tuolumne River West	Groveland	1	0.94
	Tuolumne River- Big Creek	Big Creek East	Groveland	4	3.01
		Middle Jawbone Creek	Groveland	1	0.07
Merced River	North Fork Merced River	Moore Creek-Upper North Fork Merced River	Groveland	8	3.86
		Lower Bull Creek	Groveland	1	0.05
		Upper Bull Creek	Groveland	1	0.03
			total	**75**	**41.02**

No hydrologically sensitive area information exists for the 72 miles of existing unauthorized routes that are not proposed for addition since they will not be maintained. However, they are accounted for in the cumulative watershed effects analysis since they represent an existing watershed disturbance.

Of the 178 hydrologically connected route segments inventoried for this analysis, 93% (165) are less than 0.10 miles (about 500 feet) in length, and most are less than half that length. Route gradient of these segments is dominantly gentle to moderate – 128 segments are less than 10%, with 90 of those segments less than 5%Thirty four segments are between 10-15% with the remainder mostly 15-20%.

Most of the segments were found to be in acceptable condition (routine maintenance will minimize stream sedimentation) but 23 are proposed for site specific mitigation to minimize sedimentation. Mitigation typically includes installation of drain dips and/or trail hardening to prevent or minimize mechanical erosion caused by motorized vehicles. Mitigation also includes wet season closure zones intended to minimize trail damage and stream sedimentation that can occur from wet weather use. Nine routes are not recommended for addition to the NFTS because the water resource problem cannot be practicably mitigated.

Route gradients that are steepest usually occur outside hydrologically connected sites, and are typically greatest on “hill climb” sections of routes. Gradient is an important corollary with poorer condition of routes as noted in the Soil Resource Report.

While sedimentation does occur from the hydrologically connected segments of unauthorized routes in hydrologically sensitive areas, it should be considered in context with the existing NFTS. The 252 miles of unauthorized routes are generally much narrower than NFTS routes, and only about 10% of the NFTS mileage on the Forest. Motorcycle routes are about 3 feet wide, ATV routes are about 5 feet wide, and other unauthorized routes that accommodate high clearance vehicles are typically 10-12 feet wide. Most of the 2,260 miles of NFTS roads are 15-25 feet wide or wider, and though some are gravel or paved a very high percentage remain native surfaced like unauthorized routes. While unit-area erosion and sedimentation in hydrologically connected segments can be higher on OHV routes than on Forest roads (Welsh 2008), OHV routes are likely to be a smaller overall sediment producer in roaded watersheds since total surface area of roads is usually greater. This is the case in the Stanislaus National Forest motorized travel management analysis area where NFTS road density (miles per square mile) exceeds that of unauthorized routes, often substantially.

Water Resources Condition

Water Quality Management Framework

Water quality on the Forest is principally managed through the Water Quality Control Plan (Basin Plan) of the California Regional Water Quality Control Board, Central Valley Region (CVRWQCB 1998). This plan establishes Beneficial Uses of Water and describes Water Quality Objectives for meeting beneficial uses.

Beneficial Uses of Water

All four of the HUC Level 5 watersheds on the Forest (Mokelumne, Stanislaus, Tuolumne and Merced Rivers) have established beneficial uses of water applicable to the additions to the NFTS and changes in vehicle class in this analysis. These uses are municipal and domestic supply, contact and non-contact recreation, warm and cold water freshwater habitat, and wildlife habitat.

Of the municipal and domestic supply beneficial uses, one of the most important regarding effects of motorized travel management occurs in the South Fork of the Stanislaus River. Lyons Reservoir serves as the collection and distribution point that serves water to as much as 80% of the population of Tuolumne County. Water is diverted from Lyons Reservoir into a broad distribution system that has numerous water treatment plants downstream of the Forest prior to consumptive use. Other large reservoirs downstream of the Forest (New Melones on the Stanislaus River and New Don Pedro on the Tuolumne River) store water for some municipal and domestic use in the San Joaquin Valley.

Beneficial uses relevant to humans and aquatic wildlife within the Forest are contact and non-contact recreation (e.g., swimming, angling), freshwater habitat (cold and warm water fisheries), and wildlife (amphibian and aquatic reptile species). All of the streams in the watersheds where routes are proposed for addition to the NFTS have these beneficial uses.

Water Quality Objectives

Water quality objectives are limits of constituents in water that are intended to provide reasonable protection of beneficial uses of water. The Basin Plan contains objectives for numerous water quality constituents, or parameters. The water quality parameter most likely to be affected by the proposed action is sediment, as a result of erosion that occurs on unauthorized routes near water. The measure of the water quality objective for this pollutant is that sediment "…shall not be altered so as to cause nuisance or adversely affect beneficial uses." The focus of sediment evaluation in this project is streambed sediment in pools – natural areas of deposition in streams. Pool tail surface fine sediment and pool bed sediment are relevant to erosion from roads and trails.

Water temperature is another parameter considered relevant to this project. It can be elevated by openings along streams, including those created by roads and trails. The measure of this water quality objective is that water temperature "…shall not be altered unless it…does not adversely affect beneficial uses, and…at no time or place be increased more than 5 degrees F above natural receiving water temperature."

Petrochemical products in water (e.g., oil or grease) are also considered relevant to this project since they have the potential to cause nuisance or adversely affect beneficial uses. These pollutants can be produced as a byproduct of motorized vehicle use.

Water Quality Condition

HUC Level 4 Watersheds

These are the four major rivers on the Stanislaus National Forest. The two principal rivers, the Stanislaus and the Tuolumne, occupy much more land on the Forest than the Mokelumne on the north and the Merced on the south. They also contain most of the routes proposed for addition to the NFTS as well as changes in vehicle use on the existing NFTS.

All four of these large watersheds are managed for beneficial water resources, primarily off the Forest. All have very large reservoirs in the Sierra foothills downstream of the Forest and infrastructure that produces hydroelectric power, supplies water for irrigation, domestic, municipal and other uses, and provides recreational opportunities.

Water quality meets beneficial uses of water at this large watershed scale. No impaired waters exist on the Forest. The Environmental Protection Agency lists such waters as a requirement of Section 303d of the Federal Clean Water Act. None of the four major rivers on the Stanislaus National Forest are listed.

HUC Level 5 Watersheds

The 11 principal HUC Level 5 watersheds in this analysis will be described in groups with similar geographic and/or motorized travel characteristics. HUC Level 7 watersheds within each HUC Level 5 group will be discussed as applicable.

South Fork Stanislaus River and Lower Middle Fork Stanislaus River

These contiguous watersheds both drain into the 2.4 million acre foot New Melones Reservoir immediately downstream of the Forest. The South Fork headwaters originate in the Emigrant Wilderness at about 9,600 feet. The Lower Middle Fork watershed begins at the confluence of the Clark and Upper Middle Forks of the Stanislaus River; its uppermost elevation is slightly above 9,000 feet. Both watersheds are dominated by mixed conifer forests although the upper portions reach into the true fir zone and the lowest elevations include a pine-oak mix. The South Fork is the principal recreation watershed on the Stanislaus National Forest. It includes Pinecrest Lake and the communities of Pinecrest and Strawberry, and access to the nearby Dodge Ridge Ski Area. It also includes Lyons Reservoir which, along with Pinecrest Lake, provides fishing and other recreational activities. These watersheds also have the most off-highway vehicle recreation on the Forest. Herring Creek, a South Fork tributary above Strawberry, has several authorized trails, and the Deer Creek concentrated use area has most of its unauthorized trails in the South Fork with some others in the Upper Rose Creek HUC Level 7 watershed within the Lower Middle Fork. The Deer Creek concentrated use area contains 24 of the 75 segments with routes in hydrologically sensitive areas considered in this analysis.

The South Fork water resource is regulated by the Spring Gap-Stanislaus hydroelectric project operated by Pacific Gas and Electric Company. It consists of dams on Pinecrest Lake and Lyons Reservoir and a diversion from the South Fork to the Middle Fork Stanislaus River for hydropower production near Spring Gap. Lyons Reservoir serves as the point of diversion for the Tuolumne Main Canal which distributes municipal and domestic water to about 80% of the population of Tuolumne County. Along the canal a small diversion provides water for hydro power at the Phoenix powerhouse.

The Lower Middle Fork water resource is also regulated for hydropower and other uses downstream of the Forest. This river holds Donnells and Beardsley Reservoirs as well as hydropower plants near each. These are both operated by the Oakdale and South San Joaquin Irrigation Districts. These facilities along with Tulloch Reservoir downstream of the Forest are known as the Tri-Dam Project.

Water Quality is very good in the South Fork of the Stanislaus River as documented in recent studies by PG&E (Pacific Gas and Electric Company 2002).

For the South Fork between Pinecrest Lake and Lyons Reservoir, PG&E conducted water sampling of numerous water quality parameters in 2000 and 2001 as required for relicensing of the Spring Gap-Stanislaus hydroelectric project (FERC No. 2130). This water quality information is applicable to the Fraser Flat and Lyons Reservoir HUC Level 7 watersheds that lie between Pinecrest Lake and Lyons Reservoir.

Overall water quality is consistent with the water quality objectives of the Basin Plan of the Central Valley Regional Water Quality Control Board (Pacific Gas and Electric, 2002). More specifically, suspended sediment levels were found to be very low as were total settleable solids, indicating little deposition of streambed sediment. Pinecrest Lake likely traps some of the settleable material that may otherwise move downstream. Forest watershed staff observations concur with this as minimal streambed sedimentation appears present. In addition, PG&E sampled benthic macroinvertebrate (BMI) communities as an indicator of water quality and habitat condition. The sampling from the project reaches indicates favorable water quality as demonstrated by a community of taxa that are intolerant to water degradation, including sedimentation.

Water temperature in the South Fork is not elevated above normal. It may be somewhat below normal at times during summer months since water released from Pinecrest Lake from near the bottom of the dam is cooler than surface water. No oil or grease was detected in the South Fork during PG&E's studies.

Two other HUC Level 7 watersheds have routes proposed for addition to the NFTS in the South Fork, both downstream of Lyons Reservoir. Deer Creek, the main watershed in the Deer Creek concentrated use area for off-highway motorized travel, is an unregulated tributary of the South Fork. It is a small perennial stream although a mid-watershed segment, running through a low gradient alluvial valley, often goes dry by late summer. Though no quantitative water quality data for Deer Creek exists, Forest watershed staff have observed the creek in 2007 and 2008 in relation to sediment deposition in stream pools. Deposition is relatively low even with the watershed being a principal off-highway vehicle riding area. It is estimated that pool sedimentation is less than 20%.

The other HUC Level 7 watershed in the South Fork with routes proposed is a segment of the main channel called Italian Bar. Little quantitative data are available for this watershed although data from a field survey in 2001 to conduct benthic macroinvertebrate sampling described some applicable conditions of the river. It noted that streambed sediment was minor. Also, data recorded during the streambed particle count showed no fine sediment (< 2 mm) at any of the 100 sample points, and the dominant particle size classes were boulder and cobble with lesser amounts of gravel.

The portion of the Lower Middle Fork of the Stanislaus applicable to this project is Upper Rose Creek. This small perennial tributary drains into New Melones Reservoir from headwaters near Crandall Peak at about 5,400 feet. Though no recent quantitative water quality data are available, staff observations and benthic macroinvertebrate data from 1996-1998 provide an indication of stream health. About two miles downstream of the 1992 Ruby fire, samples were taken for three years and showed metric ranking scores suitable for recommending it as a reference site, meaning conditions were suitable as a benchmark for comparison with other streams (Pacific Gas and Electric, 2002). Even only a few years after the upstream fire, the Rose Creek benthic community was in very good condition. Recent watershed staff observations indicate that portions of Upper Rose Creek in the Ruby fire area have more streambed sediment than desired but that the trout population appears to be stable indicating that it is not adversely affecting this beneficial use of water.

Clavey River and North Fork Tuolumne River

These contiguous watersheds are major tributaries of the main Tuolumne River, the largest watershed in the San Joaquin river system. The Clavey and North Fork are both free-flowing rivers. The Clavey and North Fork headwaters are slightly above 9,000 and 8,000 feet respectively. Both watersheds are heavily forested, with true fir at the higher elevations, mixed conifer in mid elevations and a pine-oak mix in the lowest portions of the watersheds. The North Fork contains developed recreation at the upper elevations (Dodge Ridge Ski Area and part of Pinecrest), and organization camps and off-highway vehicle use at mid elevations. In the low to mid-elevations of the North Fork thousands of acres of timber plantations occupy the landscape as a result of reforestation following the 150,000 acre Stanislaus Complex Fire of 1987.

The Clavey River is unique in the Sierra Nevada. It is one of the longest free flowing rivers remaining in the mountain range with 47 miles of undammed waters. It is a proposed Wild and Scenic River based on numerous outstandingly remarkable values including a unique native assemblage of fish (USDA 1991c). It is also designated as a Critical Aquatic Refuge (CAR) in the Forest Plan Direction (USDA 2005a). At 100,000 acres, the Clavey River is the largest CAR in the Pacific Southwest Region of the Forest Service. The river was designated California’s first Wild Trout Stream in 1971 (USDA 1985). Recreational activity in the Clavey River watershed consists mostly of dispersed uses; other than the Dodge Ridge Ski Area only one developed campground is in the watershed. Dispersed camping, hiking in the upper part of the watershed in the Emigrant Wilderness and hunting in the fall are principal activities. The most widespread recreation activity is off-highway motorized travel in the mid elevation portion of the watershed. Four of the five HUC Level 7 watersheds comprising the Hull Creek concentrated use area are within the Clavey River. The Hull Creek concentrated use area contains 20 of the 75 segments with routes in hydrologically sensitive areas considered in this analysis.

Water quality in the Clavey River and North Fork Tuolumne River is excellent based on recent detailed surveys as part of a watershed assessment conducted for the Clavey River (CREP 2008) and stream surveys in most of the North Fork Tuolumne River. This includes Wrights Creek, one of the HUC Level 7 watersheds in the North Fork that is part of and contiguous with the Hull Creek concentrated use area for off-highway motorized travel.

In the Clavey River, stream surveys were conducted on all HUC Level 7 watersheds using the Stanislaus National Forest StreamScape Inventory (SSI) protocol (Frazier et al 2006b). SSI consists of measuring 19 physical and biological attributes continuously along each stream surveyed. In addition, benthic macroinvertebrates were sampled at 14 sites in the Clavey River as an indicator of water quality and aquatic habitat condition. Results are summarized in Table 3.10-4 for the HUC Level 7 watersheds in which routes are proposed in the Clavey River watershed as well as Wrights Creek in the North Fork Tuolumne River.

In the Clavey Watershed Assessment (CREP 2008) the desired condition (DC) measures for the sediment attributes are 20 and 10% respectively. For benthic macroinvertebrates the DC measure is > 0.9. The Clavey WA does not contain water temperature or oil and grease desired conditions; however, these parameters can be related to their respective water quality objective in the Basin Plan.

Sediment attributes all exceed desired condition except for Cottonwood Creek, which is slightly higher but limiting to the trout fishery. Overall, very little streambed sediment exists in these HUC Level and watersheds. BMI data were evaluated using the River Invertebrate Prediction and Classification System (RIVPACS) (Hawkins et al 2000). All streams (including Cottonwood Creek) exceed the BMI desired condition measure in the Clavey River Watershed Assessment. Numeric values very close to 1 indicate reference condition. No impairment of water quality is evident.

Water temperature is within the range of variability for these watersheds. BMI data indicates this as does the presence of viable populations of fish and other aquatic species. Water temperature does not appear elevated above normal range in these streams.

No oil or grease or other petrochemical products were detected during stream surveys. The survey protocol includes making observations for such pollutants.

Table 3.10-4 Water Quality Summary for the Clavey and North Fork Tuolumne Rivers

HUC 7 Watershed	Pool Tail Surface Fine Sediment (%)	Pool Bed Surface Fine Sediment (% of pool length)	Benthic Macroinvertebrates (Observed v. Expected Taxa)	Water Temperature (Degrees C)	Oil and Grease
Wrights Creek	8	1	NA	12	Not Detected
Two Mile Creek	8	1	0.991	NA	Not Detected
Trout Creek	14	6	1.102	17	Not Detected
Hull Creek	15	5	1.106	16	Not Detected
Main Stem West Clavey River	NA	NA	0.927	NA	NA
Reed Creek	1	8	1.021	14	Not Detected
Bourland Creek	2	7	1.166	17	Not Detected
Cottonwood Creek	32	36	1.166	12	Not Detected
Bear Springs Creek-Lower Clavey River	NA	NA	0.932	NA	NA

Notes: NA means data not available. For the Main Stem and Bear Springs watersheds only BMI data were collected. Temperature data for Two Mile Creek is not available due to thermograph malfunction.

North Fork Merced River

The North Fork is a free flowing tributary of the Merced River that runs along the southern boundary of the Forest. The North Fork headwaters is at about 6,000 feet on Pilot Ridge and drops rapidly to elevations of 3,000 feet or lower before running off the Forest and into the main Merced River. Vegetation consists of mixed conifer, pine-oak and chaparral. Much of the area is in timber plantations following reforestation after the Stanislaus Complex Fire in 1987. The North Fork consists of five HUC Level 7 tributaries that all join just above Forest road 2S05, at which point they begin to carve into the landscape and form a deep canyon as it heads south toward the Merced River.

The five tributaries are mapped as perennial streams. However, upper portions are often dry by fall, and in very dry years most sections of these streams may be nearly dry. At this relatively low elevation fully perennial streams are not common.

The North Fork has limited recreation activity. Camping and off-highway motorized travel, the main activities, occur from fall through spring as this area is accessible year round. Hot summers at the 3,000 foot elevation limit use. Most of the OHV use is in the Moore Creek HUC Level 7 watershed, the center of the Moore Creek concentrated use area previously described. Several contiguous HUC Level 5 watersheds have similar activity but to a lesser degree. The Moore Creek concentrated use area contains 8 of the 75 segments with routes in hydrologically sensitive areas considered in this analysis.

Water Quality in the North Fork appears good based on staff observations and some stream surveys in the area. Estimates of pool tail and pool bed sediment percentages in 2008 at several sample sites in Moore Creek plus Deer Lick Creek, Jordan Creek and the Headwaters of the North Fork were all less than 10 %. While the latter three HUC Level 7 watersheds have no routes proposed for addition they still provide an insight regarding water quality in the Moore Creek area. No stream temperature or oil and grease data are available.

Two short hydrologically connected routes proposed for addition to the NFTS occur in Bull Creek, one in lower and one in upper Bull Creek. Staff observations were made in Bull Creek reaches near these routes and stream condition appears acceptable to support beneficial uses.

Middle and South Fork Tuolumne River and Tuolumne River-Big Creek

These three contiguous watersheds represent a southern group of dispersed off-highway motorized travel activity. The Middle and South Fork are free flowing tributaries of the main Tuolumne River, and both originate in Yosemite National Park east of the Forest. The Tuolumne River-Big Creek watershed incorporates the entire main channel of the Tuolumne River on the Forest as well as its Big Creek tributary that begins near Buck Meadows and enters the river downstream of Pine Mountain Lake near the town of Groveland. Most of the land in these watersheds is below 5,000 feet. Mixed conifer forests are common with pine-oak and some chaparral in the lower portions. Oak grasslands occupy some of the lowest elevations in the Tuolumne River Canyon.

Recreational activity in these watersheds is mostly dispersed camping and off-highway motorized travel. Use is more scattered and less intense than in the nearby Moore Creek area.

Water Quality in these watersheds is very good based on recent stream surveys in the Middle and South Forks of the Tuolumne River and staff observations at several sites in Big Creek. The streams shown in Table 3.10-5 were surveyed in 2006, 2007 and 2008 respectively. One hydrologically connected route is proposed in each of the Middle and South Fork West HUC Level 7 watersheds, and four routes proposed for the Big Creek East HUC Level 7. One hydrologically connected route is proposed for addition to the NFTS in Middle Jawbone Creek HUC Level 7 watershed. Staff observations indicate suitable stream condition on the Jawbone Creek tributary where this very short route exists.

Table 3.10-5 Water Quality Summary for the Middle and South Fork Tuolumne Rivers

HUC 7 Watershed	Pool Tail Surface Fine Sediment (%)	Pool Bed Surface Fine Sediment (% of pool length)	Benthic Macroinvertebrates (Observed v. Expected Taxa)	Water Temperature (Degrees C)	Oil and Grease
Lower Middle Fork Tuolumne River West	8	9	NA	8	Not Detected
Lower South Fork Tuolumne River West	1	3	NA	18	Not Detected
Big Creek East	<10 (est.)	<10 (est.)	NA	NA	Not Detected

Notes: BMI data were not collected. Water temperature for the Lower Middle Fork is low because SSI was conducted in the fall. Pool sediment was estimated at sample points along Big Creek.

Streambed sediment is very low in these streams. Water temperature is within the range of variability and does not appear to be elevated above normal.

No oil or grease or other petrochemical products were detected during stream surveys. The survey protocol includes making observations for such pollutants.

Lower and Upper North Fork Mokelumne River and North Fork Stanislaus River

These three HUC Level 5 watersheds are along the state highway 4 corridor near the northern edge of the Forest. All range from mid to high elevation on the Forest with mixed conifer and true fir vegetation types. Portions of the Mokelumne River watersheds extend north to the Eldorado National Forest.

Recreational use in these watersheds includes developed and dispersed camping in summer and winter sports activities since the higher elevations have downhill and cross country ski areas. Lake Alpine in the Silver Creek HUC Level 7 watershed is the hub of summer developed recreation use along upper Highway 4. Motorized off-highway travel is mostly a summer activity in these three HUC Level 5 watersheds and is relatively low intensity and well dispersed. These HUC Level 5 watersheds contain only 5 routes proposed for addition to the NFTS in hydrologically sensitive areas.

Observations by Forest watershed staff over the past several years indicate water quality is very good. Minimal instream sediment exists, water temperature is suitable for beneficial uses and no apparent petrochemical issues are present. Only five routes are scattered among the four HUC Level 7 watersheds here, and little intensive forest management that would potentially contribute to water quality problems. Riparian vegetation along Moore, Silver and Bloods creeks as well as the headwaters of the North Fork Mokelumne River is abundant and the streams are stable at the HUC Level 7 scale.

Environmental Consequences

Direct and Indirect Effects of All Alternatives

The following two tables display data that will be used to describe direct and indirect effects of all alternatives.

Table 3.10-6 shows proposed additions to the NFTS in hydrologically sensitive areas (HSA) as well as the hydrologically connected segments (HCS) for the action alternatives.

Table 3.10-6 Additions to the NFTS: Hydrologically Sensitive Areas (action alternatives)

Watershed Name		Additions in HSA and length of HCS within HSA (miles)						
HUC 5	**HUC 7** (Ranger District)	**# of routes**	**Alternatives**					
			1		**4**		**5**	
			HSA	**HCS**	**HSA**	**HCS**	**HSA**	**HCS**
Upper North Fork Mokelumne River	Moore Creek-North Fork Mokelumne River (Calaveras)	1	0.31	0.30	0.31	0.30	0	0
Upper North Fork Mokelumne River	Highland Lakes-Headwaters Upper North Fork Mokelumne River (Calaveras)	1	0.10	0.01	0.10	0.01	0.10	0.01
North Fork Stanislaus River	Bloods Creek-Upper North Fork Stanislaus River (Calaveras)	1	2.13	0.31	2.13	0.31	0	0
	Silver Creek-Upper North Fork Stanislaus River (Calaveras)	2	0.29	0.09	0.29	0.09	0.29	0.09
Lower Middle Fork Stanislaus River	Upper Rose Creek (Mi-Wok)	3	3.36	0.21	3.36	0.21	2.05	0.01
South Fork Stanislaus River	Fraser Flat-Lower South Fork Stanislaus River (Mi-Wok)	2	0.45	0.45	0.45	0.45	0	0
	Lyons Reservoir- Lower South Fork Stanislaus River (Mi-Wok)	4	.21	0.24	2.59	0.45	2.06	0.04
	Deer Creek (Mi-Wok)	15	7.87	0.38	8.24	0.43	1.47	0.04
	Italian Bar-Lower South Fork Stanislaus River (Mi-Wok)	3	0.29	0.16	0.29	0.16	0	0
North Fork Tuolumne River	Wrights Creek Mi-Wok)	5	1.04	0.25	1.04	0.25	0.87	0.22
Clavey River	Hull Creek Mi-Wok)	6	1.77	0.17	2.26	0.59	0.08	0.01
	Trout Creek (Mi-Wok)	5	2.72	0.25	3.25	0.29	0	0
	Two Mile Creek (Mi-Wok)	3	2.93	0.11	3.72	0.46	0	0
	Main Stem West Clavey River (Mi-Wok)	1	2.82	0.13	3.65	0.13	0	0
	Cottonwood Creek (Mi-Wok)	2	0.45	0.26	0.45	0.26	0	0
	Bourland Creek Mi-Wok)	2	0.07	0.07	0.07	0.07	0	0
	Reed Creek (Groveland)	2	0.42	0.36	0.42	0.36	0	0
	Bear Springs-Lower Clavey River (Groveland)	1	0.13	0.12	0.13	0.12	0	0
Middle Fork Tuolumne River	Lower Middle Fork Tuolumne River West (Groveland)	1	0	0	0.31	0.10	0	0
South Fork Tuolumne River	Lower South Fork Tuolumne River West (Groveland)	1	0.94	0.02	0.94	0.02	0	0
Tuolumne River- Big Creek	Big Creek East (Groveland)	4	3.01	0.27	3.01	0.27	0	0
	Middle Jawbone Creek (Groveland)	1	0.07	0.04	0.07	0.04	0	0
North Fork Merced River	Moore Creek-Upper North Fork Merced River (Groveland)	8	3.86	0.41	3.86	0.41	1.00	0.12
	Lower Bull Creek (Groveland)	1	0.05	0.02	0.05	0.02	0	0
	Upper Bull Creek (Groveland)	1	0.03	0.02	0.03	0.02	0	0
	total	**75**	**37.32**	**4.65**	**41.02**	**5.82**	**7.93**	**0.55**

Table 3.10-7 shows that the routes proposed in hydrologically sensitive areas (HSA) are a small percentage of the total additions to the NFTS proposed at the Forest scale. For example, Alternative 1 adds about 157 miles to the NFTS, of which about 37 miles, or 24%, are in HSA. Hydrologically connected segments are a much smaller percentage of forestwide additions to the NFTS in Alternative 1 – about 3%. Alternatives 2 and 3 do not include additions to the NFTS.

Table 3.10-7 Additions to the NFTS and Existing Condition

Existing Condition	Alternatives (miles)				
	1	2	3	4	5
251.80	157.39	0.00	0.00	181.72	31.51

Finally, for context among the alternatives, 24 of the 25 HUC Level 7 watersheds with routes in hydrologically sensitive areas occur in Alternative 1, all 25 are in Alternative 4 and eight are in Alternative 5.

Cumulative Effects of All Alternatives

The CWE analysis considered the 88 HUC 7 watersheds on the Forest that contain one or more proposed additions to the NFTS. Of these, the largest concentration of use occurs in the 10 watersheds that coincide with the three principal off-highway vehicle activity areas on the Forest. These concentrated use watersheds are the locations in which detailed CWE analysis was conducted. The summary of cumulative watershed effects is shown in Table 3.10-8, and more detailed information is in the project record. The table shows the equivalent roaded acres (ERA) for each watershed, the portion of the ERA contributed by the additions to the NFTS and the threshold of concern (TOC) for each watershed.

The 78 remaining “dispersed area” watersheds have a low amount of existing ERA and a very low route contribution to ERA. Detailed CWE calculations were not performed on these watersheds based on professional knowledge of cumulative disturbances in each and correlated with recent CWE analysis conducted in some of them for other projects. The ERA in 68 of these watersheds is estimated to be less than 50% of the TOC, some as low as 25%. Ten of these watersheds are estimated to be between 50-75% of the TOC. None of the dispersed area watersheds would approach the TOC even if all routes proposed for addition to the NFTS were selected. The proposed addition route mileage is low enough in each watershed that the disturbed acreage would increase no more than about 10 acres, or 0.15% ERA, in watersheds that average approximately 6,000 acres in size.

Table 3.10-8 Summary of Cumulative Watershed Effects

Watershed Name		ERA Category	ERA (%)					
			Alternative					TOC (%)
HUC 5	HUC 7		1	2	3	4	5	
South Fork Stanislaus River	Deer Creek	HUC 7 Watershed	3.30	3.87	2.80	3.35	2.86	12-14
		Route Additions	0.12	0.56	0	0.14	0.01	
	Fraser Flat-Lower South Fork Stanislaus	HUC 7 Watershed	5.50	5.70	5.34	5.57	5.45	12-14
		Route Additions	0.06	0.18	0	0.10	0.03	
	Lyons Reservoir-Lower South Fork Stanislaus	HUC 7 Watershed	8.10	8.40	7.93	8.13	8.01	12-14
		Route Additions	0.05	0.25	0	0.06	0.02	
Lower Middle Fork Stanislaus River	Upper Rose Creek	HUC 7 Watershed	3.72	3.99	3.30	3.73	3.46	12-14
		Route Additions	0.11	0.37	0	0.10	0.04	
North Fork Tuolumne River	Wrights Creek	HUC 7 Watershed	3.78	3.98	3.36	3.78	3.41	12-14
		Route Additions	0.14	0.35	0	0.14	0.02	
Clavey River	Hull Creek	HUC 7 Watershed	6.11	6.35	5.80	6.17	5.83	12-14
		Route Additions	0.14	0.29	0	0.16	0.02	
	Main Stem West Clavey River	HUC 7 Watershed	2.75	2.91	2.59	2.77	2.59	12-14
		Route Additions	0.05	0.18	0	0.06	0	
	Trout Creek	HUC 7 Watershed	5.27	5.46	4.90	5.30	4.91	12-14
		Route Additions	0.16	0.31	0	0.17	0	
	Two Mile Creek	HUC 7 Watershed	4.42	4.92	3.96	4.68	3.97	12-14
		Route Additions	0.20	0.51	0	0.31	0	
North Fork Merced River	Moore Creek	HUC 7 Watershed	3.67	3.80	3.45	3.68	3.45	14-16
		Route Additions	0.09	0.20	0	0.10	0	

Notes: (1) HUC 7 ERA is for the maximum CWE year from 2010-2019; year varies by watershed: (2) no route additions occur in Alternative 2; however, for comparison with the other alternatives, values are shown that represent the existing condition of unauthorized routes combined with all other activities occurring or expected to occur in the watershed in the reasonably foreseeable future; and (3) route additions means the portion of the HUC 7 watershed ERA contributed by proposed route additions to the NFTS.

The two items are of most importance in this CWE analysis are (1) the total ERA which considers the effects of past, present and reasonably foreseeable future activities in the watershed and (2) the portion of the total ERA contributed by the proposed additions to the NFTS. The total ERA represents the cumulative disturbances in the watershed for comparison with the threshold of concern (TOC) to determine the risk of CWE. The ERA contributed by the additions to the NFTS is important because it shows its context with the total ERA for the watershed. These values can then be compared between alternatives and with the overall ERA values for the watershed.

Summary findings common to all alternatives in the 10 concentrated use watersheds are (1) the total ERA is well below the TOC, including the additions to the NFTS, (2) additions to the NFTS are a very small fraction of the total ERA, and (3) the ERA created by additions to the NFTS is less in the action alternatives (1, 4 and 5) than the existing watershed footprint (Alternative 2), thus reducing disturbance and the risk of cumulative effects.

Alternative 1 (Proposed Action)

DIRECT AND INDIRECT EFFECTS

The proposed action reduces direct and indirect effects compared with both the existing condition and Alternative 4, the alternative with the most mileage proposed for addition to the NFTS. Existing condition consists of unauthorized routes proposed for addition to the NFTS as well as unauthorized routes that exist but are not proposed for addition.

The length of routes that occur in hydrologically sensitive areas (e.g., Riparian Conservation Areas) decreases from 41.02 to 37.32 miles, or 10% as shown in Table 3.10-6. The erosional features that affect water quality along those routes – hydrologically connected segments – are reduced by 20%, from 5.82 to 4.65 miles. As a result, the route footprint, or disturbed watershed area, becomes less over time as the existing route mileage in hydrologically sensitive areas passively recovers (e.g., ground cover re-occupies the route – plant growth, pine needles, etc.). Existing stream sedimentation from the HCS sites is thus reduced as well.

Most watersheds have very little route mileage in hydrologically sensitive areas, and based on field surveys a very small portion of that is hydrologically connected; that is, 11.3% of the length of routes in the hydrologically sensitive areas are hydrologically connected. While the overall amount of hydrologically connected segments in the alternative is several miles, it is small in each of the HUC 7 watersheds.

Water quality effects from existing stream sedimentation will decrease over time since the routes not added to the NFTS will passively recover. The magnitude of this effect is expected to be minor since at present very little stream sedimentation exist. Based on detailed stream surveys and/or staff observations of the streams in these watersheds, pool sedimentation is very low, and where data exist from benthic macroinvertebrate sampling stream health is excellent.

Water temperature and petrochemical effects of vehicle use are negligible. Existing water temperature data in numerous streams in the project area indicate this parameter is suitable for all instream beneficial uses. No petrochemical effects were noted during recent stream surveys or observations. No oil or grease has been detected in any stream.

1. Cross Country Travel

This action will result in a minor reduction in stream sedimentation. Fewer miles of routes mean less potential stream sedimentation. Route reduction may, however, increase traffic on the routes added to the NFTS. However, this is expected to be a neutral effect since sedimentation will be reduced on trails not added as they heal over, and mitigation measures described below will reduce sedimentation from routes added to the NFTS.

2. Additions to the NFTS

Stream sedimentation will continue to be produced from the hydrologically connected segments of routes. However, the existing amount of sedimentation will be reduced on routes added to the NFTS by implementation of site-specific and area-wide maintenance and mitigation measures, as shown in Table 3.10-9. For maintenance, upkeep of existing features to minimize sedimentation (e.g., water bars, hardened crossings) will be performed as needed. For mitigation, drainage control features and trail hardening will be installed where needed to minimize stream sedimentation, and hardening or boardwalks will be installed in other wet areas (i.e., seeps and springs) to protect them from damage. In addition, seasonal closures will be implemented which will further reduce sedimentation presently caused by wet season use. The combination of mitigation and reduced sedimentation from elimination of a portion of existing unauthorized trails is expected to result in decreased water quality effects from motorized travel.

Table 3.10-9 Maintenance and Mitigation in Hydrologically Connected Segments

Activity	Number of routes		
	Alt. 1	Alt. 4	Alt. 5
Routine maintenance	46	52	10
Mitigation measures	20	23	5
Total number of routes	66	75	15

Some proposed routes are not recommended for addition to the NFTS (Table 3.10-10) since water quality effects cannot practicably be mitigated and inclusion would likely not be in compliance with water quality best management practices. These routes, if selected for addition to the NFTS, would result in continued sedimentation at present rates. While sedimentation from these routes is believed to be individually unacceptable, the effect at the stream reach scale would not be expected to impair water quality.

Table 3.10-10 Routes Not Recommended for Addition to the NFTS

Route	RD	MI	SYS	Alternative				
				1	2	3	4	5
16EV191	CAL	0.13	UNT	ATV			ATV	ATV
17EV192	GR	0.63	UNT	ALL			ALL	
1S1728	GR	0.47	UNT	SLO			SLO	
1S17M	GR	1.13	UNT	ATV			ATV	
1S1822C	GR	0.31	UNT				ALL	
2N1820	GR	0.34	UNT	ALL			ALL	
2S1804	GR	0.94	UNT	ATV			ATV	
16E182A	MW	0.19	UNT	ALL			ALL	
17EV297	MW	0.49	UNT				ATV	
18EV100	MW	0.08	UNT	ALL			ALL	
FR98704	MW	0.15	UNT	SLO			ALL	
total (miles)				**4.06**	**0.00**	**0.00**	**4.86**	**0.13**

3. Changes to the Existing NFTS

Route closure or opening may have a minor effect on stream sedimentation but will be less in relation to additions to NFTS. Closed NFTS routes that are proposed to be opened are roads that were engineered to control drainage and erosion and are thus designed to minimize stream sedimentation. They are expected to receive maintenance when opened and will be subject to seasonal closure. Closure of NFTS roads will result in no maintenance but are expected to be “put to bed” before closure, meaning that erosion control measures would be taken to keep them from long term damage with the expectation they may be re-opened in the future. Changing the type of vehicle use is not expected to result in a noticeable impact on water quality since any impacts related to a vehicle type would be mitigated by drainage features and wet season closure.

CUMULATIVE WATERSHED EFFECTS

For this alternative, ERA values in the 10 concentrated use watersheds shown in Table 3.10-8 are based on consideration of the past, present and reasonably foreseeable future activities in the Cumulative Watershed Effects Analysis (project record). The activities that usually contribute most to ERA values are vegetation management and the NFTS. In addition, approximately 5 miles of motorized routes are expected to be constructed in the future to complete the motorized route system on the Forest. These routes are expected be constructed in six of the concentrated use watersheds within the next 10 years. Although they are not part of the proposed action, they were accounted for in the CWE analysis as a future activity. Another item accounted for is passive recovery of routes not added to the NFTS in the alternative. Passive recovery represents a slight reduction in the risk of cumulative effects over time since the route footprint decreases as the abandoned routes heal over.

The total ERA in the 10 concentrated use watersheds ranges from 2.75% to 8.10% of the total watershed area in these watersheds, which is 20% to 58 % of the TOC and thus represents a low risk of CWE. The additions to the NFTS account for less than 0.20% ERA in all of the watersheds, a very small fraction of the total ERA value. Alternative 1 results in a reduction of the watershed footprint, or disturbed area, thus reducing the risk of cumulative effects compared to the existing condition.

For each of the dispersed use watersheds, the total ERA in this alternative is estimated to be well below the TOC. The past, present and expected future management activity level is not anticipated to exceed, and is likely to be less than, that in the concentrated use watersheds based upon review of the list of activities in the Cumulative Effects Analysis list. The additions to the NFTS in these watersheds would account for even smaller fraction of the total ERA than in the concentrated use watersheds since the length of routes added is much less. The watershed footprint will be reduced compared with the existing condition, though to a smaller degree than in the concentrated use watersheds because the route addition mileage is much less.

Changes to the existing NFTS represent a neutral cumulative effect at the watershed scale since no change exist in the watershed disturbance acreage of these routes. In addition, the prohibition of cross country motorized travel on routes inventoried but not added to the NFTS in this alternative will reduce route proliferation.

Alternative 2 (No Action)

DIRECT AND INDIRECT EFFECTS

This alternative represents the existing condition of watershed disturbance. This footprint on the watersheds consists of all the inventoried unauthorized routes, approximately 252 miles. This alternative would result in perpetuation of the existing footprint.

1. Cross Country Travel

Without prohibition of cross country travel it is expected that route proliferation would occur over time, at a forestwide rate of 2.25 miles per year. For purposes of this analysis, it is expected that most if not all of the proliferation would occur in the concentrated use watersheds since these are the most popular areas for off highway motorized travel.

Unauthorized routes would continue to be used and increase as a result of this alternative. Thus, no reduction of stream sedimentation occurs as in the other alternatives. It would be expected to increase slightly over time as the unauthorized route system expands and likely includes additional hydrologically sensitive areas.

Even at the existing condition, based on stream inventories and observations, it appears that stream sedimentation from these routes is not degrading water quality at the HUC 7 level, and minimally if at all at the reach scale (i.e., downstream a certain distance from route crossings). The alternative is, however, likely not in compliance with water quality best management practices insofar as the routes are not preventing or minimizing stream sedimentation to the extent practicable. Perpetuating cross country motorized travel does not meet the intent of the BMPs.

2. Additions to the NFTS

This alternative does not make any additions to the NFTS and thus no direct and indirect effects on the water resource.

3. Changes to the Existing NFTS

This alternative does not change the existing NFTS and thus no direct and indirect effects on the water resource.

CUMULATIVE WATERSHED EFFECTS

For Alternative 2, ERA values in the 10 concentrated use watersheds shown in Table 3.10-8 are based on the past, present and reasonably foreseeable future activities in the Cumulative Watershed Effects Analysis (project record). The activities that usually contribute most to ERA values are vegetation management and the NFTS. Although no routes will be added to the NFTS in Alternative 2, for purposes of evaluating CWE this alternative serves as the baseline, or existing condition, of the footprint of unauthorized routes. Footprint is the watershed disturbance acreage these routes represent. Forestwide, the footprint includes approximately 252 miles of unauthorized routes and trails that were inventoried for this project. This is approximately 72 miles greater than Alternative 4, the alternative with the most mileage of routes proposed for addition to the NFTS among the action alternatives. Alternative 2 also includes about 2.25 miles per year of expected route proliferation since this alternative would not prohibit motorized cross country travel. For purposes of the CWE analysis it is assumed that route proliferation will occur within the concentrated use watersheds and the mileage will occur evenly distributed among these watersheds. This alternative does not include new future route construction.

The total ERA in Alternative 2 ranges from 2.91% to 8.40% in the 10 concentrated use watersheds. This is 21% to 60 % of the TOC and thus represents a low risk of CWE. Alternative 2 does not reduce the watershed footprint, and given that route proliferation is anticipated, this alternative will slightly increase the risk of cumulative effects. The increase, however, will not cause the watershed ERAs to approach the threshold of concern since route proliferation raises the ERA in the alternatives less than 0.10%.

For each of the dispersed use watersheds, the total ERA in this alternative is estimated to be well below the TOC. The past, present and expected future management activity level is not anticipated to exceed, and is likely to be less than, that in the concentrated use watersheds based upon review of the list of activities in the Cumulative Effects Analysis list.

Alternative 3 (Cross Country Prohibited)

DIRECT AND INDIRECT EFFECTS

This alternative would allow all unauthorized routes described in Alternative 2 to immediately begin the passive recovery process. The short term watershed effect would be that no mitigation would occur on existing routes. Stream sedimentation at rates similar to present could be expected to occur for two to three years as routes naturally revegetate and become covered with forest floor litter (e.g., leaves, pine needles). Sedimentation would likely decrease at an accelerated rate after three years and not be noticeable after about 10 years. Observations of unauthorized motorized trails on the Forest that were closed to use indicate that passive recovery occurs rapidly where trails occur in forested areas; tree leaves and needles provide 50% or greater cover on trails within two to three years. Routes that traverse open areas such as lava caps with shallow soils and herbaceous cover take longer to passively recover, and some may need active restoration since some of the growing medium may were reduced by motorized vehicle use. While this effect may be severe at the site scale, these areas represent a very small percentage of route miles and are often on ridges or upper slopes and thus not in hydrologically sensitive areas. Another small fraction of the unauthorized route footprint, even less than the lava caps, lie in wet areas such as meadows, springs and seeps. These spots have the capability to revegetate quickly after disturbance ceases since they have productive soil and a good source of subsurface moisture.

This alternative represents the greatest reduction in stream sedimentation of all the alternatives since use on all existing routes – those proposed for addition to the NFTS as well as routes not proposed for addition - is prohibited. Overall, positive effects of this alternative on the water resource are anticipated to be relatively the highest – slightly more than alternative 5, comparatively much more than alternatives 1 and 4 and especially more than Alternative 2. However, as existing sedimentation does not appear to be adversely affecting water quality and stream condition, the reduction over time resulting from this alternative is not significantly greater than the other alternatives.

1. Cross Country Travel

Same as Alternative 1.

2. Additions to the NFTS

This alternative does not make any additions to the NFTS and thus no direct and indirect effects on the water resource.

3. Changes to the Existing NFTS

This alternative does not change the existing NFTS and thus no direct and indirect effects on the water resource.

CUMULATIVE WATERSHED EFFECTS

For Alternative 3, ERA values in the 10 concentrated use watersheds shown in Table 3.10-8 are based on consideration of the past, present and reasonably foreseeable future activities in the Cumulative Watershed Effects Analysis (project record). The activities that usually contribute most to ERA values are vegetation management and the NFTS. None of the 5 miles of future motorized routes that are expected to be constructed to complete the motorized route system occur in this alternative. Route proliferation is not expected to occur since no motorized travel will be permitted off existing NFTS routes. Passive recovery of all 252 miles of unauthorized routes is accounted for in this alternative since none are added to the NFTS. This represents a reduction in the risk of cumulative effects over time since the route footprint decreases as the abandoned routes heal over.

The total ERA in the 10 concentrated use watersheds ranges from 2.59% to 7.93% in these watersheds, which is 18% to 56% of the TOC and thus represents a low risk of CWE. Since no additions to the NFTS are in Alternative 3 the only contribution to ERA are existing NFTS routes and other management activities in the watersheds. Alternative 3 prohibits cross country travel and thus eliminates the entire watershed footprint of unauthorized routes over time due to passive recovery. Thus, Alternative 3 reduces the risk of cumulative watershed effects relatively high compared to the existing condition and the other alternatives. However, the reduction is not a significant factor in the overall ERA.

For each of the dispersed use watersheds, the total ERA in this alternative is estimated to be well below the TOC. The past, present and expected future management activity level is not anticipated to exceed, and is likely to be less than, that in the concentrated use watersheds based upon review of the list of activities in the Cumulative Effects Analysis list. The watershed footprint will be reduced compared with the existing condition to a greater extent than any of the other alternatives.

Alternative 4 (Recreation)

DIRECT AND INDIRECT EFFECTS

The types of effects are the same as the proposed action (Alternative 1) – a reduction in routes, hydrologically connected segments, disturbed area and sedimentation compared with the existing condition in the watersheds; changes to existing NFTS routes; and prohibition of cross country travel. However, the magnitude of effects is slightly different since more routes are proposed for addition to the NFTS in Alternative 4. This alternative represents the greatest mileage of routes added to the NFTS among the alternatives, and conversely the least mileage of routes on which cross country travel would be prohibited and would thus be allowed to passively recover.

1. Cross Country Travel

Same as Alternative 1.

2. Additions to the NFTS

As shown in Table 3.10-6, route mileage in hydrologically sensitive areas in Alternative 4 is 3.70 more than Alternative 1, or an increase of about 10%. The increase in hydrologically connected segments is about 25% compared with Alternative 1. As a result, sedimentation would be expected to be somewhat more than in Alternative 1 though still less in the short term than the existing condition. Thus, stream sedimentation would likely be somewhat more than Alternative 1 but less than present. This again represents a reduction of effects compared to the existing situation. Effects of this alternative on the water resource are anticipated to be negligible since existing sedimentation does not appear to be adversely affecting water quality and stream condition.

Some proposed routes are not recommended for addition to the NFTS (Table 3.10-9) since water quality effects cannot practicably be mitigated and inclusion would likely not be in compliance with water quality best management practices. These routes, if selected for addition to the NFTS, would result in continued sedimentation at present rates. While sedimentation from these routes is believed to be individually unacceptable, the effect at the stream reach scale would not be expected to impair water quality.

3. Changes to the Existing NFTS

Same as Alternative 1.

CUMULATIVE WATERSHED EFFECTS

For Alternative 4, ERA values in the 10 concentrated use watersheds shown in Table 3.10-8 are based on the past, present and reasonably foreseeable future activities in the Cumulative Watershed Effects Analysis (project record). The activities that usually contribute most to ERA values are vegetation management and the NFTS. In addition, approximately 5 miles of motorized routes are expected to be constructed in the future to complete the motorized route system on the Forest. These routes are expected be constructed in six of the concentrated use watersheds within the next 10 years. They were accounted for in the CWE analysis as a future activity; they are not part of this project. Another item accounted for is passive recovery of existing routes not added to the NFTS in this alternative. This represents a slight reduction in the risk of cumulative effects over time since the route footprint decreases as the abandoned routes heal over.

The total ERA in the 10 concentrated use watersheds ranges from 2.77% to 8.13% in these watersheds, which is 20% to 58% of the TOC and thus represents a low risk of CWE. The additions to the NFTS account for less than 0.31% ERA in these watersheds, a very small fraction of the total ERA value. Overall, Alternative 4 results in a reduction of the watershed footprint, or disturbed area, thus reducing the risk of cumulative effects compared to the existing condition.

For each of the dispersed use watersheds, the total ERA in this alternative is estimated to be well below the TOC. The past, present and expected future management activity level is not anticipated to exceed, and is likely to be less than, that in the concentrated use watersheds based upon review of the list of activities in the Cumulative Effects Analysis list. The additions to the NFTS in these watersheds would account for even smaller fraction of the total ERA since the length of routes added is much less than in the concentrated use watersheds. The watershed footprint will be reduced compared with the existing condition, though to a smaller degree than in the concentrated use watersheds because the route addition mileage is much less.

Changes to the NFTS represent a neutral cumulative effect at the watershed scale since no change occurs in the watershed disturbance acreage of these routes. In addition, the prohibition of cross country motorized travel on routes inventoried but not added to the NFTS in this alternative will prevent route proliferation.

Alternative 5 (Resources)

DIRECT AND INDIRECT EFFECTS

The types of effects are the same as Alternative 1(Proposed Action): a reduction in routes, hydrologically connected segments, disturbed area and sedimentation compared with the existing condition in the watersheds; changes to existing NFTS routes; and prohibition of cross country travel. However, the magnitude of effects is noticeably different since substantially less route mileage is proposed in this alternative. This alternative represents the least mileage of routes added to the NFTS among the alternatives, and conversely the most mileage of routes on which cross country travel would be prohibited and would thus be allowed to passively recover. This alternative has noticeably fewer changes to the NFTS than alternatives 1 and 4.

1. Cross Country Travel

Same as Alternative 1.

2. Additions to the NFTS

As shown in Table 3.10-6, route mileage in hydrologically sensitive areas in Alternative 5 is 29.39 less than Alternative 1, or a decrease of about 78%. The decrease in hydrologically connected segments is about 88% compared with Alternative 1. As a result, sedimentation would be expected to be less than in Alternative 1 though still slightly more in the short term than the existing condition since some rather than no miles will be added to the NFTS. Thus, stream sedimentation would be proportionally highly reduced compared to Alternatives 1 and 4 but slightly more than present. This represents the greatest reduction in sedimentation among the action alternatives. However, the amount of reduction in this alternative must be considered in context with the sediment reduction effects of the mitigation measures in Alternatives 1 and 4; those would notably reduce sediment even though more length of hydrologically connected segments would remain. Overall, effects of this alternative on the water resource are anticipated to be negligible insofar as existing sedimentation does not appear to be adversely affecting water quality and stream condition.

One proposed route is not recommended for addition to the NFTS (Table 3.10-9) since water quality effects cannot practicably be mitigated and inclusion would likely not be in compliance with water quality best management practices. This route, if selected for addition to the NFTS, would result in continued sedimentation at present rates. While sedimentation from this route is believed to be individually unacceptable, the effect at the stream reach scale would not be expected to impair water quality.

3. Changes to the Existing NFTS

Same as Alternative 1.

CUMULATIVE WATERSHED EFFECTS

For Alternative 5, ERA values in the 10 concentrated use watersheds shown in Table 3.10-8 are based on the past, present and reasonably foreseeable future activities in the Cumulative Watershed Effects Analysis (project record). The activities that usually contribute most to ERA values are vegetation management and the NFTS. None of the 5 miles of future motorized routes that are expected to be constructed to complete the motorized route system occur in this alternative. In addition, the CWE analysis has accounted for passive recovery of routes not added to the NFTS. This represents a slight reduction in the risk of cumulative effects over time since the route footprint decreases as the abandoned routes heal over.

The total ERA in the 10 concentrated use watersheds ranges from 2.59% to 8.01% in these watersheds, which is 18% to 57 % of the TOC and thus represents a low risk of CWE. The additions to the NFTS account for 0.04% of the ERA in these watersheds, a very small fraction of the total ERA value. Many of the watersheds with routes in hydrologically sensitive areas have no additions to the NFTS in this alternative. Among the action alternatives this one results in the most reduction of the watershed footprint, thus providing the largest relative reduction in the risk of cumulative effects compared to the existing condition. However, since the route footprint is a small fraction of overall ERA the absolute change is minor.

For each of the dispersed use watersheds, the total ERA in this alternative is estimated to be well below the TOC. The past, present and expected future management activity level is not anticipated to exceed, and is likely to be less than, that in the concentrated use watersheds based upon review of the list of activities in the Cumulative Effects Analysis list. The additions to the NFTS in these watersheds would account for an even smaller fraction of the total ERA since the length of routes added is much less than in the concentrated use watersheds. The watershed footprint will be reduced compared to the existing condition, though to a smaller degree than in the concentrated use watersheds because the route addition mileage is much less.

Changes to the NFTS represent a neutral cumulative effect at the watershed scale since no change occurs in the watershed disturbance acreage of these routes. In addition, the prohibition of cross country motorized travel on routes inventoried but not added to the NFTS in this alternative will prevent route proliferation.

Summary of Effects Analysis across All Alternatives

Compared with the existing condition, represented by Alternative 2 (No Action), all other alternatives result in a reduction of direct, indirect and cumulative watershed effects. The existing condition consists of the footprint of the unauthorized routes proposed for addition to the NFTS as well as unauthorized routes that exist but are not proposed for addition.

The rank of decreasing watershed effects from the existing condition, from most to least, is Alternative 3, Alternative 5, Alternative 1 and Alternative 4 (see Table 3.10-11). While the range in reduction of effects among these four alternatives is relatively large based on the mileage measures in the water resource indicators, the decrease in the effect on water quality is minor. Water quality is good to excellent at present, and the difference in the expected reduced stream sedimentation is not likely to be of a magnitude that is measurable. Other watershed disturbances, such as vegetation management, wildfires and NFTS roads have a much greater influence on water quality than the present unauthorized route network.

All alternatives meet beneficial uses of water. Sediment, water temperature and oil and grease are consistent with water quality objectives. Alternative 2, assuming the amount of future route proliferation, would likely slightly increase sedimentation but not adversely affect beneficial uses. Cumulative watershed effects analysis shows that proliferation is a negligible part of equivalent roaded acreage in the watersheds analyzed. Stream survey information shows that stream sediment is very low at present and the expected proliferation is small enough to expect that sedimentation would remain similar to the present condition.

Table 3.10-11 Summary of Effects on Water Resources

Indicators – Water Resources	Rankings of Alternatives for Each Indicator[1]				
	1	2	3	4	5
Miles of unauthorized routes in hydrologically sensitive areas	3	1	5	2	4
Miles of unauthorized routes with documented erosional features affecting water quality (hydrologically connected segments)	3	1	5	2	2
Equivalent roaded acres	3	1	5	2	4
Average for water resources	**3**	**1**	**5**	**2**	**4**

[1] A score of 5 indicates the alternative has the least impact on this resource; a score of 1 indicates the alternative has the most.

Compliance with the Forest Plan and Other Direction

Forest Plan

All alternatives comply with applicable standards and guidelines (S&Gs) as displayed in the RCO Analysis in the project record (USDA 2005a). No new routes are proposed in RCAs, and existing routes in RCAs that are proposed for addition to the NFTS have maintenance or mitigation requirements where applicable to insure consistency with S&Gs.

Beneficial Uses of Water

All alternatives are expected to result in maintenance of the applicable beneficial uses of water in the Water Quality Control Plan (Basin Plan) for the California Central Valley Water Quality Control Board (CVRWQCB 1998). Sediment, water temperature and petrochemical products are not expected to be adversely altered. Domestic and municipal water supplies are not adversely affected by the proposed action or alternatives. Recreational contact and non-contact waters are suitable for human use. Freshwater habitat (cold and warm water fisheries) and wildlife habitat (amphibian and aquatic reptile species) are not adversely affected by the proposed action or alternatives.

Water Quality Best Management Practices (BMPs)

Alternatives 1, 4 and 5 comply with the intent and procedural requirements of BMPs (USDA 2000a). If any of those alternatives is implemented, or a combination thereof, applicable BMPs would be followed. Alternative 2 (No Action) would not comply with the intent of BMPs because unregulated cross country motorized travel would continue to occur. Applicable BMPs such as OHV planning and monitoring (4-7), Watershed Restoration (7-1), Wetland Protection (7-3) and Wet Season Closure (7-7) would not be implemented.

3.11 WILDLIFE: TERRESTRIAL AND AQUATIC SPECIES

Management of terrestrial and aquatic species and habitat, and maintenance of a diversity of animal communities, is an important part of the mission of the Forest Service (Resource Planning Act of 1974, National Forest Management Act of 1976). Management activities on National Forest System (NFS) lands are planned and implemented so that they do not jeopardize the continued existence of threatened or endangered species or lead to a trend toward listing or loss of viability of Forest Service Sensitive species. In addition, management activities are designed to maintain or improve habitat for Management Indicator Species to the degree consistent with multiple-use objectives established in each Forest LRMP. Management decisions related to 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, USDA 2000). It is Forest Service policy to minimize damage to vegetation, avoid harassment to wildlife, and avoid significant disruption of wildlife habitat while providing for motorized use on NFS lands (FSM 2353.03(2)). Therefore, management decisions related to motorized travel on NFS lands must consider effects to wildlife and their habitat.

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

Direction relevant to the proposed action as it affects terrestrial and aquatic biota includes:

Endangered Species Act (ESA): The Endangered Species Act of 1973 (16 USC 1531 et seq.) requires that any action authorized by a federal agency not 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.

Forest Service Manual and Handbooks (FSM/H 2670): Forest Service Sensitive (FSS) species are species identified by the Regional Forester for which population viability is a concern. The Forest Service develops and implements management practices to ensure that rare plants and animals do not become threatened or endangered and ensure their continued viability on National Forests. It is Forest Service policy to analyze impacts to sensitive species to ensure management activities do not create a significant trend toward federal listing or loss of viability. This assessment is documented in a Biological Evaluation (BE) and is summarized or referenced in this Chapter.

Sierra Nevada Forest Plan Amendment (SNFPA): The Record of Decision (ROD) for the 2004 SNFPA identified the following standards and guidelines applicable to motorized travel and terrestrial biota, which will be considered during the analysis process:

- Wetland and Meadow Habitat (S&G 70): see Section 3.10, Watershed Resources.
- California Spotted owl and Northern Goshawk: Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb nest sites (S&G 82).
- Fisher and Marten: Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb den sites (S&Gs 87 and 89).
- Riparian Habitat (S&G 92): See Section 3.10, Watershed Resources.

- Bog and Fen Habitat (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.
- Water Temperatures (S&G 96): Ensure that management activities do not adversely affect water temperatures necessary for local aquatic and riparian dependent species assemblages.
- Vegetative Management (S&G 114): Ensure that vegetative management activities including fuels reduction actions within RCAs and CARs enhance or maintain physical and biological characteristics associated with aquatic/riparian dependent species. As appropriate, assess and document aquatic conditions following the Regional Stream Condition Inventory protocol prior to implementing ground disturbing activities within suitable habitat for California red-legged frog, Cascades frog, Yosemite toad, foothill and mountain yellow-legged frogs, and northern leopard frog.

Applicable direction from the Stanislaus Land and Resources Management Plan (LRMP) are identified in Appenidx C and species-specific S&Gs are identified under the species specific effects analysis. Compliance with LRMP direction is discussed in the Compliance section. Furthermore, a detailed analysis of project alternatives compliance with the Riparian Conservation Objectives (RCO) is provided in the project record and is herein incorporated by reference.

Effects Analysis Methodology

The use of a variety of motorized wheeled vehicles has become an increasingly popular form of recreation on National Forest lands. As it has become more popular, vast improvements in technology have also been incorporated into the sport resulting in more powerful vehicles that are capable of cross-country travel in more areas. Large increases in the number of users and improved vehicles have resulted in the proliferation of routes throughout many National Forests, including the Stanislaus. Route proliferation and the use of motorized wheeled vehicles have a broad range of direct and indirect effects on terrestrial and aquatic wildlife. The direct and indirect effects of motorized use on wildlife can be placed in three general categories: 1) human-caused mortality, 2) changes in behavior, and 3) habitat modification (Gaines et al. 2003). These categories were further broken down into specific effects that were documented in the literature (Table 3.11-1).

Human-caused Mortality: Death or injury from a vehicle hitting or running over an animal is well documented and affects the vast majority of terrestrial species, though to varying degrees (Trombulak and Frissell 2000). In general, road mortality increases with traffic volume and speed. Road mortality on native surface forest roads is generally not significant for large mammals (USDA 1998). Small mammals and herpetofauna (reptiles and amphibians) are more vulnerable because individuals are inconspicuous and slow-moving. Amphibians may be especially vulnerable to road mortality because their life histories often involve migration between wetland and upland habitats (Trombulak and Frissel 2000, USDA 1998). Raptors may also be vulnerable to collisions on forest roads due to their foraging behaviors, however, the most substantial documented mortality has been along highways.

Changes in Behavior (displacement or avoidance, impacts on breeding behavior, and physiological impacts): Walther (1969) in Frid and Dill (2002) assumed that wildlife exhibit a predator avoidance response when they become non-lethally disturbed by humans. When a motorized vehicle or human triggers a predator avoidance response in an individual, it may directly or indirectly affect that individual's fitness. Direct effects of disturbance to an individual's fitness are commonly measured through increases in stress hormone levels. Significant increases in stress hormone levels have been found to reduce reproductive success of individuals of some species. The indirect effects of disturbance are commonly displayed through changes in an individual's time and energy budget. As a vehicle or human approaches an individual, the most obvious and common disturbance response is for that individual to avoid the threat and seek cover. After an individual exhibits the disturbance response, a period of time will elapse until that individual resumes pre-disturbance behavior. Since this change in an individual's time budget may result in less time feeding or resting (fitness-enhancing activities), the disturbance may result in changes to the individual's energy budget and potentially impact their fitness. If an individual is repeatedly disturbed in an area, they may eventually avoid the area; essentially being displaced from the habitat.

Table 3.11-1 Road and Trail Factors with Documented Effects on Wildlife Species and Group

	Road and Trail Associated Factors	Effects of the Factors	Wildlife Group Affected
Human-Caused Mortality	Collisions	Mortality or injury from a motorized vehicle running over or hitting an animal.	Wide-ranging Carnivores Late-successional Riparian Ungulates
Changes in Behavior	Displacement or Avoidance	Spatial shifts in individuals or populations of animals away from human activities on or near roads or trails.	Wide-ranging Carnivore Late-successional Riparian Ungulates
	Disturbance at a Specific Location	Displacement of individual animals from a specific location that is being used for reproduction and rearing of young.	Wide-ranging Carnivores Late-successional Riparian Ungulates
	Physiological Response	Increase in heart rate or stress hormones (which may decrease survivorship or productivity) when near a road or trail.	Ungulates Late-successional
Habitat Modification	Habitat Loss and Fragmentation	Loss and resulting fragmentation of habitat due to the establishment or use of roads or trails and associated human activities.	Wide-ranging Carnivores Late-successional Riparian Ungulates Cavity Dependent
	Edge Effects	Changes to habitat microclimates associated with the edge induced by roads or trails.	Late-successional
	Snag or Down Log Reduction	Reduction in density of large snags and downed los owing to their removal near roads to remove hazards and as fuelwood.	Cavity Dependent Late-successional Riparian
	Route for Competitors and Predators	Providing access or greater hunting success for competitors or predators than would otherwise have existed.	Wide-ranging Carnivores Late-successional Riparian Cavity Dependent
	Movement Barrier	Interference with dispersal or other movements due to either the road itself or by human activities on or near roads or trails.	Wide-ranging Carnivores Late-successional Riparian Ungulates

Gaines et al. (2003) reviewed literature on road- and trail-associated effects upon wildlife and found that alteration of use of habitats in response to roads or road networks was the most common interaction reported. Fifty to sixty percent of the 29 focal species reviewed were impacted in this manner (Gaines et al. 2003). Studies have documented shifts in an animal's home range area, shifts in foraging patterns, and disturbance of nesting or breeding behaviors caused by motorized road or trail use and its associated increased human recreation activity facilitated by motorized access (Foppen and Reijnen 1994, Johnson et al. 2000, Rost and Bailey 1979). Recreation activities (hiking, camping, fishing, shooting, etc.) that are associated with the access provided by motorized routes, result in indirect disturbance and displacement effects that often exceed the direct influence of the roads and trails. Many species avoid areas in proximity to roads or trails, or exhibit flight behavior within a certain distance of route use, though studies documenting the magnitude and duration of behavioral responses are limited. Road usage by vehicles has a significant role in determining animal’s road avoidance behavior. Black bear, for example, crossed roads with low traffic volume more frequently than roads with high traffic volume, and almost never crossed interstate highways (Brody and Pelton 1989). Perry and Overly (1977) documented displacement of deer up to 800 meters from major roads, and from 200 to 400 meters from secondary and primitive roads. Van Dyke et al. (1986) documented that mountain lions avoided improved native surface roads and surfaced roads, and selected home range areas with lower road densities than the study area average. Activities that create elevated sound levels or result in close visual proximity of human activities at sensitive locations (e.g., nest trees), have the potential to disrupt normal behavior patterns. Studies of the effects of human disturbance upon wildlife have revealed that the immediate postnatal period in mammals and the breeding period in birds are time periods when individuals are most vulnerable to disturbance.

Intrusion-induced behaviors such as nest abandonment and decreased nest attentiveness have led to reduced reproduction and survival in species that are intolerant of intrusion (Knight and Gutzwiller 1995). Foppen and Reijnen (1994), for example, found that the reproductive success of forest bird species declined in areas fragmented by roads. Anthony and Isaacs (1989) found that the mean productivity of bald eagle nests was negatively correlated with their proximity to main logging roads, and the most recently used nests were located in areas farther from all types of roads and recreational facilities when compared to older nests in the same territory. Wasser et al. (1997) found that stress hormone levels were significantly higher in male northern spotted owls (but not females) when they were located less than 0.25 miles from a major logging road compared to spotted owls in areas greater than 0.25 miles from a major logging road. Chronic high levels of stress hormones may have negative consequences on reproduction or physical condition of birds, though these effects are not well understood.

Habitat Modification (habitat loss, fragmentation, edge effects, snag and down log reduction, routes for competitors, movement barriers): Road and trail networks remove habitat but also have a broader effect than just the conversion of a small area of land to route surfaces. Andren (1994) suggested that as landscapes become fragmented, the combination of increasing isolation and decreasing patch size of suitable habitat is negatively synergistic, compounding the effects of simple habitat loss. In particular, species associated with old forest habitats may be impacted by such effects. One study determined that the total landscape area affected by roads was 2.5 to 3.5 times the actual area occupied by the road feature, assuming a 50 meter influence along the road’s edge (Reed et al. 1996). A decrease in interior forest patch size results in habitat loss and greater distance between suitable interior forest patches for sensitive species like the California spotted owl and American marten. As roads and trails break up forest patches, increased exposure may increase nest predation and parasitism rates by species such as jays or cowbirds (Miller et al. 1998), or provide increased access for generalist competitors or predators, such as coyotes (Buskirk and Ruggiero 1994).

Additional habitat modification occurs as an indirect effect of managing roads or trails for public wheeled motor vehicle use. Trees posing a potential safety hazard (“hazard trees”) are removed along roads. These trees are typically snags that are within a tree-height distance from the road.

This safety policy results in a “snag free” zone of 200 to 300 feet from a road’s edge, also affecting the recruitment of large down wood within this zone. Few hazard trees are typically removed along trails.

Major highways are known to create movement barriers for a number of wildlife species, particularly wide-ranging carnivores and ungulates, and are suspected of being a major factor in the decline of some forest carnivores, such as fisher and marten (Brody and Pelton 1989, USDA 2001a). The slower speed and lower traffic volume roads and trails that are being evaluated in the project Alternatives are less likely to create barriers to movement. However, the extent to which denser networks of roads and trails might result in barriers to movement for some wildlife species is unknown (USDA 2001a).

The project alternatives may result in the above listed effects through five types of actions:

- The prohibition of cross-country travel,
- Adding facilities (presently unauthorized roads, trails, and/or areas) to the NFTS,
- Changing the type of use on an existing NFTS route,
- Changing the season of use on the NFTS,
- Implementation of mitigation measures.

Assumptions Specific to Terrestrial and Aquatic Species

1. The Risk – Disturbance Hypothesis: Animals respond to non-lethal human disturbance similarly to how they respond to predation (Hediger 1934, cited in Walther 1969).
2. All vehicle classes result in the same amount of disturbance effects to wildlife, unless there is local information enabling a separate analysis by vehicle class.
3. Location of a trail is equal to disturbance effects from that trail (i.e., assume all trails provide the same level of disturbance), unless local data or knowledge indicate otherwise.
4. Habitat is already impacted in the short-term. In the long-term, habitat will remain the same on added trails, and will increase to at least some degree on non-added trails with ban of cross-country travel and subsequent passive restoration.
5. Without a prohibition on cross-country travel route proliferation would continue to occur. Alternative 2 would not prohibit cross-country travel; therefore, route proliferation would likely occur over the short and long-term throughout project area. Since it is largely unknown where route proliferation may occur over the long-term, it is assumed that individuals of many species may be adversely impacted by this Alternative.
6. Aquatic species spend all or significant portions of their life cycles either in or moving through riparian habitats.
7. Although hazard tree sales result in the reduction of snags along NFTS roads within the project area, snags are not actively removed along NFTS trails.

Data Sources

1. GIS layers with the following information: routes; habitats; and ‘designated’ or important wildlife areas.
2. Site-specific surveys/assessment of any local sensitive wildlife habitats with routes proposed to be added to the NFTS.

Terrestrial and Aquatic Species Methodology by Action

1. Direct and indirect effects of the prohibition of cross country motorized vehicle travel

Rationale: Studies have documented that motorized travel can affect wildlife species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulek and Frissell 2000, USDA 2000).

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Forest.

Methodology: GIS analysis of existing unauthorized routes in relation to wildlife habitat.

2. *Direct and indirect effects of adding facilities to the NFTS including identifying seasons of use and vehicle class*

Rationale: Literature indicates that placement of routes in relation to habitat can affect wildlife species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulek and Frissell 2000, USDA 2000).

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Forest.

Indicator(s): (1) Density of motorized routes; (2) Miles of motorized routes; (3) Miles of Maintenance Level 1 roads converted to trails (4) Number of sensitive sites for TES species (e.g., Protected Activity Centers, nest sites, winter roost areas) within ¼ mile of an added route or area; (5) The proportion of a species (or species group's) habitat that is affected by motorized routes.

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

3. *Direct and indirect effects of changes to the existing NFTS including identifying vehicle class*

Rationale: Literature indicates that placement of routes in relation to habitat can affect wildlife species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulek and Frissell 2000, USDA 2000). Changing the vehicle class on NFTS routes may also result in adverse impacts to wildlife. For instance, when routes that have historically been managed as Maintenance Level 1 (ML1) roads are changed to trails they then become open to public use. Opening these roads for public use would essentially result in the same direct effects to wildlife as adding a route to the system.

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Forest.

Indicator(s): (1) Miles of ML1 road converted to trail within occupied wildlife habitat; (2) Miles of ML1 road converted to trail within suitable, preferred, and emphasis wildlife habitat; (3) Miles of ML1 road converted to trail near or within sensitive sites.

Methodology: GIS analysis of converted routes in relation to habitat and important/sensitive wildlife biota areas.

4. *Direct and indirect effects of changes to the existing NFTS including identifying seasons of use*

Rationale: Limiting the seasons of use may provide beneficial effects to wildlife species and their habitat.

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Forest.

Indicator(s): (1) Amount of wildlife habitat receiving protection from seasonal closures; (2) Number/Percentage of sensitive areas receiving protection from seasonal closures.

Methodology: GIS analysis of seasonal closures in relation to wildlife habitat.

5. Direct and indirect effects of implementing the mitigation measures

Rationale: The implementation of mitigation measures may result in various types of short-term adverse effects to wildlife species.

Short-term timeframe: 1 year.

Long-term timeframe: 5 years.

Spatial boundary: Forest.

Indicator(s): (1) Number of mitigation measures proposed in occupied habitat; (2) Number of mitigation measures proposed in suitable, preferred, emphasis habitat.

Methodology: GIS analysis of proposed mitigation measures in relation to habitat and important/sensitive wildlife biota areas.

6. Cumulative Effects

Rationale: Literature indicates that placement of routes in relation to habitat can affect wildlife species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulek and Frissell 2000, USDA 2000).

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.

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

Affected Environment – General Wildlife

The Stanislaus National Forest (STF) provides habitat for numerous species of birds, mammals, amphibians, and reptiles. There are currently 6 terrestrial and aquatic wildlife species listed as Endangered or Threatened under the ESA and 21 species listed as Forest Service Sensitive (Table 3.11-2). These species and their habitats on the STF are described in detail in the Stanislaus National Forest Motorized Travel Management EIS Biological Assessment/Evaluation (BA/BE) (Pyron 2008, project record), which can be found in the project record and is herein incorporated by reference. Species-specific information is summarized below within the species specific analysis. In addition, there are 12 Management Indicator Species (MIS) on the STF (Table 3.11-2). These species and their habitats are described in detail in the Stanislaus National Forest Motorized Travel Management Project MIS Report (Pyron, January, 2009), which can be found in the project record and is herein incorporated by reference. Species-specific information is summarized below within the species specific analysis.

Some of these species are currently being affected by cross-country motorized use of the Stanislaus National Forest. Literature describing the effects of motorized roads and trails upon wildlife have often grouped or categorized species in various ways to describe these effects (Knight and Gutzwiller, ed. 1995, Gaines et al. 2003, Wisdom et al 2000). Gaines et al. (2003) categorized species into groups based upon a combination of their biology and interactions with road- and motorized trail-associated factors; the following groups are used to assess potential impacts from motorized use on the STF: (1) old forest associated (or late-successional forest associated) species; (2) ungulates; (3) riparian-associated species; and(4) aquatic species (Table 3.11-3).

The following species were considered, but will not be analyzed any further within this document because they are not known to occur within the analysis area and would not be affected by the project alternatives: the delta smelt, central valley steelhead, hardhead, California tiger salamander, and the Swainson's hawk. Endangered, and Forest Service designated "sensitive species" (TES) and STF MIS likely to be affected by motorized road or trail use, fall into these categories as shown in Table 3.11-3.

Table 3.11-2 Special Status Terrestrial and Aquatic Wildlife Species

Common Name	Scientific Name	Status
Invertebrates		
Valley Elderberry Longhorn Beetle	Desmocerus californicus dimorphus	T
Aquatic Macroinvertebrates	Numerous Species	MIS
Fish		
Delta Smelt	Hypomesus transpacificus	T
Lahontan Cutthroat Trout	Oncorhynchus clarki henshawi	T
Central Valley Steelhead	Oncorhynchus mykiss	T
Hardhead	Mylopharodon conocephalus	S
Reptiles and Amphibians		
California Red-legged Frog	Rana aurora draytonii	T
California Tiger Salamander	Ambystoma californiense	T
Relictual (Hell Hollow) Slender Salamander	Batrachoseps (diabolicus) relictus	S
Limestone Salamander	Hydromantes brunus	S
Yosemite Toad	Bufo canorus	S
Foothill Yellow-legged Frog	Rana boylii	S
Mountain (Sierra Nevada) Yellow-legged Frog	Rana (sierrae) muscosa	S
Western Pond Turtle	Clemmys marmorata	S
Pacific Tree (Chorus) Frog	Pseudacris regilla	MIS
Birds		
Bald Eagle	Haliaeetus leucocephalus	S
California Spotted Owl	Srix occidentalis occidentalis	S, MIS
Great Gray Owl	Strix nebulosa	S
Northern Goshawk	Accipiter gentilis	S
Swainson's Hawk	Buteo swainsoni	S
Peregrine Falcon	Falco peregrinus	S
Willow Flycatcher	Epidonax traillii	S
Sooty (Blue) Grouse	Dendragapus obscurus	MIS
Mountain Quail	Oreortyx pictus	MIS
Black-backed Woodpecker	Picoides arcticus	MIS
Hairy Woodpecker	Picoides villosus	MIS
Fox Sparrow	Passerella iliaca	MIS
Yellow Warbler	Dendroica petchia	MIS
Mammals		
Mule Deer	Odocoileus hemionus	MIS
American Marten	Martes americana	S, MIS
Pacific Fisher	Martes pennanti pacifica	S
California Wolverine	Gulo gulo luteus	S
Sierra Nevada Red Fox	Vulpes vulpes necator	S
Northern Flying Squirrel	Glaucomys sabrinus	MIS
Townsend's Big-eared Bat	Corynorhinus townsendii	S
Western Red Bat	Lasiurus blossevillii	S
Pallid Bat	Antrozous pallidus	S

The project BA/BE report contains the analysis of the effects of all project alternatives (Alternatives 1, 2, 3, 4 and 5) to all TES species. Analysis of the effects of the project alternatives in these reports indicated that the following species would not be affected by the action alternatives (Alternatives 1, 4 and 5); therefore, they are not analyzed in detail in this document: valley elderberry longhorn beetle, limestone salamander, relictual (Hell Hollow) slender salamander, Lahontan cutthroat trout, Townsend's big-eared bat, western red bat, pallid bat, willow flycatcher, peregrine falcon, California wolverine, and Sierra Nevada red fox. For further disclosure of the effects of the project alternatives to the afore mentioned species refer to the project BA/BE, which can be found in the project record.

The project MIS report contains the analysis of the effects of the project alternative (Alternatives 1, 2, 3, 4, and 5) to all MIS species. Analysis of the effects of the project alternatives in this report indicated that the following MIS species habitat would be unimpacted by the action alternatives (Alternatives 1, 4, and 5) at the bioregional scale: Pacific tree frog, black-backed woodpecker, and the hairy woodpecker. Analysis of the effects of the project alternatives in this report indicated that the following MIS species habitat would be nominally impacted by the action alternatives (Alternatives 1, 4, and 5) at the bioregion scale: macroinvertebrates, fox sparrow, yellow warbler, mountain quail, sooty (blue) grouse, and northern flying squirrel. Therefore, these species will not be discussed further within this document. For further disclosure of the effects of the project alternatives to the above mentioned species refer to the project MIS report (Pyron 2009, project record).

Table 3.11-3 Wildlife group and terrestrial and aquatic species within groups

Wildlife Group	Species
Late-successional forest associated species	American marten, Pacific fisher, California spotted owl, northern goshawk
Ungulates	Mule deer
Riparian-associated species	Bald eagle, great gray owl
Aquatic-associated species	California red-legged frog, foothill yellow-legged frog, mountain yellow-legged frog, western pond turtle, Yosemite toad

Terrestrial Biota

Late-Successional Forest Species

American Marten – Affected Environment

Species and Habitat Account

The American marten is a wide-ranging member of the Mustelidae family. Marten are widely distributed throughout the coniferous habitats of North America and currently occupy much of their historic range in California (Kucera and Zielinski 1995). Incidental observations of marten have been recorded throughout the higher elevations of the STF. Marten are morphologically adapted to be mobile in deep snow, and typically inhabit higher elevations receiving snow depths greater than 23 centimeters per winter month (Krohn et al. 1997). Numerous mesocarnivore surveys have been completed on the STF with the use of baited camera stations and track plates. Results of these surveys further indicate that marten use higher elevations within the project area. Marten were not found at survey stations below 5,000 feet in elevation and the majority of them were above 7,000 feet. Although the presence of marten has been documented within the project area, there are no known den sites on STF.

Martens typically prefer late seral coniferous forests above 5,000 feet in elevation that have moderate-to-high canopy closure interspersed with riparian areas and meadows (Freel 1991, Zeiner et al. 1990). These habitats typically contain an abundance of snags and downed logs needed to provide the coarse woody debris that is necessary for effective winter foraging (Sherburne and Bissonette 1994). Important habitat attributes are: vegetative diversity, with predominately mature forest; snags; dispersal cover; and large woody debris (Allen 1987). Martens selected stands with 40 to 60 percent canopy closure for both resting and foraging and avoided stands with less than 30 percent canopy closure (Spencer et al. 1983). Martens generally avoid habitats that lack overhead cover, presumably because these areas do not provide protection from avian predators (Allen 1982, Bissonette et al 1988, Buskirk and Powell 1994, Spencer et al. 1983). Although martens tend to spend the majority of their time in mature forests, meadows are important components of foraging habitat. Spencer et al. (1983) found that marten preferred areas within 60 meters of meadows and were rarely found further than 400 meters from a meadow. For the purposes of this analysis, preferred marten habitat on the STF has been mapped as: CWHR types PPN, SMC, WFR, RFR; classes 5 and 6; canopy closures M and D (USDA 2007b).

American Marten – Environmental Consequences

Indicators

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to marten. Although thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Miles of routes added to the NFTS within preferred marten habitat.
- Miles of ML1 roads converted to trails within preferred marten habitat.
- Miles of routes added to the NFTS within meadows.
- Miles of ML1 roads converted to trails within meadows
- Existing density (mi/mi2) of NFTS routes within preferred marten habitat (outside wilderness areas).
- Density (mi/mi2) of NFTS routes within preferred marten habitat (outside wilderness areas) with proposed designated routes.
- Percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS or ML1 roads converted to trails.

Direct and Indirect Effects

General - All Alternatives

The project alternatives could result in direct and indirect effects to marten by:

- Prohibiting cross-country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on marten through: human-caused mortality, changes in behavior, and habitat modification.

Human-Caused Mortality: Opening routes to public use would improve access to marten habitat. Improving access to these habitats may result in increased instances of collisions with vehicles or incidental trapping. Marten are widely known for their vulnerability to trapping (Ruggerio et al. 1994). Since the State of California banned the use of body-gripping traps in 1998, the incidental loss of marten to trapping has been greatly reduced. Collisions with vehicles have been identified as a potentially significant source of marten mortality (Buskirk and Ruggerio 1994, Ruggerio et al. 1994). Collisions typically occur along well maintained roadways that allow high rates of travel. Routes proposed for designation within the project alternatives are native surfaced routes that allow much slower rates of travel. These types of routes result in far fewer collisions than highways or paved routes.

Changes in Behavior: Types of changes in behavior that may result from the project alternatives include: displacement or avoidance or disturbance at a specific location. The use of motorized vehicles in marten habitat may result in disturbance to martens that are foraging or denning. Robitaille and Aubrey (2000) studying marten in an area of low road density and low traffic (primarily logging roads), found that marten use of habitat within 300 and 400 meters of roads was significantly less than habitat use 700 or 800 meters distance. However, in a study conducted in northern California, Zielinski (2007) found that marten occupancy or probability of detection did not change in relation to the presence or absence of motorized routes and OHV use when the routes (plus a 50 meter buffer) did not exceed about 20 percent of a 50 square kilometer area, and traffic did not exceed one vehicle every 2 hours. The study did not, however, measure behavioral changes or changes in use patterns and the study authors caution that application of their results to other locations would apply only if OHV/OSV use at the other locations is no greater than reported in their study.

Therefore, it did not appear that within the study area OHV activity resulted in changes to the foraging behavior of martens. While there is little research disclosing the specific effects of disturbance to marten den sites, other forest carnivores have been shown to abandon the den site upon human disturbance (Copeland 1996). Wet meadows have been shown to be particularly important foraging areas for marten (USDA 2001). Routes added to the NFTS near and through meadows may increase disturbance within the meadow, thereby reducing the meadow’s value as a foraging habitat for martens.

Habitat Modification: Roads and trails modify marten habitat by directly removing it or indirectly by reducing its quality. While simple habitat loss is the most obvious, roads and trails also reduce habitat quality through fragmentation. Since marten have been found to be sensitive to changes in overhead cover, clearings associated with routes may reduce habitat quality near routes for foraging and may reduce marten movement between habitats that are separated by routes (Buskirk and Powell 1994, Hargis et al. 1999).

Hazard tree removal along NFTS roads has the potential to reduce downed logs and suitable resting and denning sites for marten. Hazard tree removal is typically conducted along Maintenance Level 2, 3, 4 and 5 roads (not Maintenance Level 1 roads or trails). The project alternatives primarily propose actions on trails and maintenance level (ML) 1 roads. Changing use, converting roads to trails, and road closures that are proposed on ML 1 and 2 roads within any of the project alternatives would result in a net reduction in miles of road on which hazard trees may be removed. These actions will provide a benefit to wildlife through snag and woody downed log retention. Therefore, the minor amounts of impact that the project alternatives may have on future hazard tree removal would be beneficial to marten habitat.

Wet meadows have been shown to be particularly important foraging areas for marten (USDA 2001). Meadow habitat quality may be affected numerous different ways by motorized travel. The most obvious way motorized vehicles may impair meadow quality is through direct mechanical damage (rutting). Since soil typically has lower bulk density and can be more easily penetrated when it is wet, mechanical damage often occurs in meadows that are naturally wet, in dry meadows after significant rainfall, or immediately following the retreat of the snow at higher elevations. When roads or trails are created in meadows they may intercept surface and subsurface flow (Kattelmann 1996). When flows are intercepted and redirected, meadow drying occurs, resulting in changes to the fauna and flora associated with it.

Changing the faunal community within meadows may impact their value as foraging areas for marten. Microtus species have been noted as being important prey items to martens at all times of the year (Zielinski et al. 1983). Winter (1982) found that Microtus were associated with moist areas that had good grass cover. Therefore, slight shifts in meadow hydrology caused by motorized travel may impact suitable habitat for mictrotines; thereby, adversely affecting the marten prey source.

Alternative 1 (Proposed Action)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred marten habitat and near meadows. This would reduce the risk of direct and indirect effects to martens from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-4). Actions proposed in this alternative would not likely result in any human-caused mortality, but would likely increase disturbance to some marten within the project area. Although there are no documented den sites within the project area, it is assumed that they occur. Since den sites are specifically selected and there are ample suitable denning locations throughout the project area, the addition of these routes would not likely result in disturbance to den sites. Increases in disturbance to foraging martens may reduce some individual's fitness, but, since only about 11% of the habitat would be subject to this increased disturbance (Table 3.11-4), these impacts would not result in any population level impacts to the marten.

Actions proposed in this alternative would result in some indirect effect through habitat modification. The addition of routes to the NFTS within preferred marten habitat and near meadows would result in minor amounts of habitat fragmentation. Since the majority of these routes are narrow native surfaced routes they will only result in minor reductions in overhead cover and would not significantly reduce marten movement between habitat patches. Field surveys were completed on all routes that were proposed to be added to the NFTS within meadows. The purpose of the field surveys was to determine whether the route would have the potential to affect hydrology within the meadow. Field surveys indicated that the routes that were proposed to be added within meadows would not significantly alter their hydrology. Although this alternative would result in some indirect effects to marten through habitat modification, these impacts are minor and would not be extensive enough to result in impacts to marten populations within the project area.

Season of Use: Marten typically inhabit higher elevations with greater amounts of snow; therefore, preferred habitat primarily falls within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Although the exact timing may vary, marten typically have their young in the spring. Therefore, these closures would reduce disturbance to denning and foraging martens. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and would protect meadows from mechanical damage.

Mitigation Measures: The types of mitigation measures that would be implemented within preferred marten habitat include: tread hardening, drain dips, fence/log/rock barriers, and hardened stream crossings. Implementation of these mitigation measures would include hand tool and machine work that would result in short-term disturbance to individual marten within the project area. This amount of disturbance would not likely reduce any individual marten's fitness and would not result in any population level impacts within the project area.

Table 3.11-4 Alternative 1 - Direct and Indirect Effects Indicators (American marten)

Indicators	
Miles of routes added to the NFTS within preferred marten habitat	27.63
Miles of ML1 roads converted to trails within preferred marten habitat	10.26
Miles of routes added to the NFTS within meadows	1.27
Miles of ML1 roads converted to trails within meadows	0.48
Existing density (mi/mi2) of routes under STF jurisdiction within preferred marten habitat	2.48
Density (mi/mi2) of routes under STF jurisdiction within preferred marten habitat with proposed designated routes (additional density)	2.6 (.12)
Percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS or ML1 roads converted to trails	11.39

Alternative 2 (No Action)

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of disturbance to marten and increased fragmentation/modification of their habitat. These effects would be similar to those discussed within Alternative 4 for the short-term, but would be exacerbated over the long-term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although any seasonal closures implemented within this alternative would reduce potential disturbance to marten, these seasonal closures would not adequately protect all meadows from mechanical damage that may occur since cross-country travel would be allowed. Therefore, it may be assumed that hydrology within some meadows may be affected and that it may result in impacts to marten prey base.

Mitigation Measures: There would not be any mitigation measures implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred marten habitat and near meadows. This would reduce the risk of direct and indirect effects to marten from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to marten.

Mitigation Measures: There would not be any mitigation measures implemented as part of this alternative.

Alternative 4 (Recreation)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred marten habitat and near meadows. This would reduce the risk of direct and indirect effects to martens from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-5). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the number of routes added to the system or converted to a trail within preferred marten habitat and within meadows, there would be a slight increase in the direct and indirect effects to marten within the project area. Although these increases would result in more individuals being impacted, these increases, which would impact a total of about 13% of preferred marten habitat (Table 3.11-5), would not likely be significant enough to result in impacts to marten populations within the project area.

Season of Use: Marten typically inhabit higher elevations with greater amounts of snow; therefore, preferred habitat primarily falls within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Although the exact timing may vary, marten typically have their young in the spring. Therefore, these closures would reduce disturbance to denning and foraging martens.

Furthermore, the closure of routes during the wet weather season reduces soil perturbation and would protect meadows from mechanical damage.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-5 Alternative 4 - Direct and Indirect Effects Indicators (American marten)

Indicators	
Miles of routes added to the NFTS within preferred marten habitat	33.17
Miles of ML1 roads converted to trails within preferred marten habitat	11.78
Miles of routes added to the NFTS within meadows	1.69
Miles of ML1 roads converted to trails within meadows	0.48
Existing density (mi/mi2) of routes under STF jurisdiction within preferred marten habitat	2.48
Density (mi/mi2) of routes under STF jurisdiction within preferred marten habitat with proposed designated routes (additional density)	2.63 (.15)
Percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS or ML1 roads converted to trails	12.75

Alternative 5 (Resources)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred marten habitat and near meadows. This would reduce the risk of direct and indirect effects to martens from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-6). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a significant decrease from Alternative 1 in the number of routes added to the system or converted to a trail within preferred marten habitat and within meadows, there would be a significant decrease in the direct and indirect effects to marten within the project area. Since these impacts would affect a very small percentage of marten habitat (Table 3.11-6), these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long-term.

Season of Use: Marten typically inhabit higher elevations with greater amounts of snow; therefore, preferred habitat primarily falls within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Although the exact timing may vary, marten typically have their young in the spring. Therefore, these closures would reduce disturbance to denning and foraging martens. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and would protect meadows from mechanical damage.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-6 Alternative 5 - Direct and Indirect Effects Indicators (American marten)

Indicators	
Miles of routes added to the NFTS within preferred marten habitat	2.65
Miles of ML1 roads converted to trails within preferred marten habitat	1.03
Miles of routes added to the NFTS within meadows	0.20
Miles of ML1 roads converted to trails within meadows	0
Existing density (mi/mi2) of routes under STF jurisdiction within preferred marten habitat	2.48
Density (mi/mi2) of routes under STF jurisdiction within preferred marten habitat with proposed designated routes (additional density)	2.49 (.01)
Percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS or ML1 roads converted to trails	1.6%

CUMULATIVE EFFECTS

In 2001 and 2004, the Forest Service amended 11 Sierra Nevada Forest Plans to better address the needs of old forest-associated species (USDA 2001 and 2004). In this assessment, the following key risk factors were identified for marten in the Sierra Nevada: (1) habitat alteration, particularly the removal of overhead cover, large diameter trees, or coarse woody material; (2) livestock grazing and other activities that might reduce the availability of prey in meadows; and (3) the use of roads and associated human access. Appendix B provides a list and description of past, present, and reasonably foreseeable vegetation and fuels management projects on NFS lands and private lands within the STF boundary. Some, but not all, of these activities have contributed to effects on marten and have the potential to impact marten in the near future.

On the STF, several activities have influenced these risk factors for marten. Past timber harvest and more recent fuels reduction treatments have reduced important habitat components in marten habitats. Between 2000 and 2008, vegetation/fuels thinning treatments on NFS lands have occurred within less than 5% of marten habitat. These vegetation treatments have reduced habitat quality for marten by reducing canopy cover, structural complexity, and coarse woody material within treated units. At the larger landscape scale, these treatments may affect the size and connectivity of patches of high quality habitat. Vegetation/fuels reduction projects will continue to be one of the primary activities affecting marten habitat on the STF (Appendix B). These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Some, but not all of the projects will affect marten habitat. Over time, fuels treatments are expected to alter 20 to 30 percent of the landscape, with a resulting expectation that the amount of habitat removed by stand replacing wildfires will be reduced in response to these treatments (USDA 2004).

The California Department of Forestry and Fire Protection currently lists approximately 2,365 acres of private land within the STF administrative boundary for which timber harvest plans have been submitted. The portion of these projects occurring within the marten's range has not been determined. Timber harvest on private lands is generally more intensive and does not typically provide suitable habitat for marten.

Livestock grazing occurs on 35 active grazing allotments on the STF, totaling approximately 792,042 acres of NFS and private lands. In some meadows, livestock grazing has reduced the suitability of meadow vegetation for microtine rodents and other marten prey (USDA 2001). On the STF, the impacts of livestock grazing on meadows has been steadily decreasing as fewer allotments are grazed and as forage utilization levels are being reduced by stricter standards established by the Sierra Nevada Forest Plan Amendment. These past and present effects contribute to the effects of the project Alternatives upon meadow habitat and condition.

Recreation use has increased and is expected to continue to increase on the STF (see 3.04, Recreation), resulting in greater likelihood and magnitude of human disturbance to wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation, based upon State figures for OHV sales (see 3.04, Recreation). The project alternatives would contribute to these past and current conditions with added displacement from noise and human activity, and fragmentation of habitat. Because Alternative 2 does not prohibit cross-country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon marten. The action alternatives do not result in a loss of habitat (no route construction), but noise and traffic disturbance would influence habitat use and availability where marten may be present. This influence, combined with fuels treatments and increasing recreation activity, could affect marten and their habitat on the STF. In the future, there is approximately 5 miles of new trail construction that is proposed to be added to the NFTS as well as numerous short route segments for dispersed camping access. These trails are proposed to provide "connector routes" between existing NFTS routes and motorized access to historical dispersed camping opportunities.

Unauthorized motorized routes that are prohibited to motorized use may receive non-motorized use (hiking, mountain bicycling, equestrian). It is generally considered that non-motorized use would result in fewer disturbances to marten. The extent and magnitude of non-motorized use is unknown. However, it is expected that over time, unauthorized routes that are prohibited to motorized use will eventually become revegetated and recover either through active or passive restoration means.

Direct and indirect effects of the project alternatives, as described previously, cumulatively contribute to each of the risk factors identified for marten. Because Alternative 2 does not prohibit cross-country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon marten. Alternative 3 would prohibit cross-country travel and would not add any routes to the NFTS, therefore the effects of this alternative would be beneficial. Alternatives 1, 4 and 5 contribute cumulatively to the disturbance and habitat alteration from fuels treatments and habitat alteration from livestock grazing in meadows. Alternatives 4, 1, and 5 would result in progressively lower risk to martens due to the amount of motorized routes being added to the system. These alternatives do not result in a loss of habitat (no route construction), but may influence marten habitat. This influence, combined with fuels treatment and livestock grazing effects upon marten habitat, would likely impact individuals throughout the project area. Inventoried Roadless Areas and adjacent wilderness areas may become increasingly important as the cumulative effect of fuels treatment activities expand within other portions of marten habitat. Considering the proportion of marten habitat influenced by motorized routes and projections for future increases in recreation uses and OHV activity, the alternatives could result in cumulative impacts when combined with other factors affecting marten habitat (Zielinski et al. 2008). Although the action alternatives may result in cumulative impacts, they are very minor in comparison to existing road densities and other potentially significant impacts (fire, fuels/vegetation treatments).

Table 3.11-7 Ranking of Alternative Indicators (American marten)

Indicators	Rankings of Alternatives for Each Indicator[1]				
	1	2	3	4	5
Miles of routes added to the NFTS within preferred marten habitat	3	1	5	2	4
Miles of ML1 roads converted to trails within preferred marten habitat	3	1	5	2	4
Miles of routes added to the NFTS within meadows	3	1	5	2	4
Miles of ML1 roads converted to trails within meadows	3	1	5	3	4
Density (mi/mi2) of routes under STF jurisdiction within preferred marten habitat with proposed designated routes	3	1	5	2	4
Percentage of preferred marten habitat occurring within a 400 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	3	1	5	2	4
Average	**3**	**1**	**5**	**2.16**	**4**

[1] A score of 5 indicates the alternative has the least impact for terrestrial biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.

SUMMARY OF EFFECTS

The American marten occupies most of its historic range in the Sierra Nevada and is well distributed on the STF, though trends in populations or habitat are not well known (Kucera et al. 1995). With the exception of Alternative 3, which would have beneficial impacts to the American marten, the direct and indirect effects of the project alternatives (1, 2, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. Based on the small proportion of late seral closed canopy coniferous forest habitat that is directly, indirectly and cumulatively affected (0% to 3% of Sierra Nevada habitat) by the alternatives within a 200-meter zone of influence of proposed motorized route additions, the STF Motorized Travel Management Project will not alter existing trend in the habitat, nor will it lead to a change is the distribution of

American marten across the Sierra Nevada bioregion. For further discussion of the effects analysis and determinations, see the project MIS and BA/BE reports (Pyron 2009, see project record).

Pacific Fisher – Affected Environment

Species and Habitat Account

The fisher is a wide-ranging forest mustelid that historically occurred throughout much of the Sierra Nevada. Currently, they occupy a very small portion of their historical range in California and are isolated in two remnant populations (Zielinski et al. 1995, Zielinski et al. 2004). One of these populations is located in the southern Sierras, currently south of the STF. Numerous mesocarnivore surveys have been completed on the STF with the use of baited camera stations and track plates, but there have been no recent detections or verified sightings of fisher on the STF. Although there are currently no known populations of fisher within the project area, over the long-term they may become naturally re-established from known populations located south of the project area.

The fisher typically occupies mature forests with relatively high canopy closure, significant amounts of downed woody debris and snags, and adequate habitat connectivity. Green et al. (submitted) provide detailed discussions and an overview of the existing literature pertaining to the Pacific fisher. Suitable habitat for the fisher is located throughout the Forest, but there are no known den sites on the STF. For the purposes of this analysis, preferred fisher habitat on the STF has been mapped as: CWHR types ASP, PPN, JPN, MHC; classes 4, 5 and 6; canopy closures M and D.

Pacific Fisher – Environmental Consequences

Indicators

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to fisher. Although thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Miles of routes added to the NFTS within preferred fisher habitat.
- Miles of ML 1 roads converted to trails within preferred fisher habitat.
- Existing density (mi/mi2) of NFTS routes within preferred fisher habitat.
- Density (mi/mi2) of NFTS routes within preferred fisher habitat with proposed designated routes.

DIRECT AND INDIRECT EFFECTS

General - All Alternatives

The project alternatives could result in direct and indirect effects to fisher by:

- Prohibiting cross-country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on fisher through: human-caused mortality, changes in behavior, and habitat modification.

Human-Caused Mortality: Based upon a review of the literature, fisher were found to likely be affected by the same road and motorized trail-associated direct effects as marten. Refer to the previous discussion for marten.

Changes in Behavior: Based upon a review of the literature, fisher were found to likely be affected by the same road and motorized trail-associated direct effects as marten. Refer to the previous discussion for marten.

Habitat Modification: Roads and trails modify fisher habitat by directly removing it or indirectly by reducing its quality. While simple habitat loss is the most obvious, roads and trails also reduce habitat quality through fragmentation. Since fisher have been found to be sensitive to changes in overhead cover, clearings associated with routes may reduce habitat quality near routes for foraging and may reduce fisher movement between habitats that are separated by routes (Buskirk and Powell 1994, Hargis et al. 1999).

Hazard tree removal along NFTS roads has the potential to reduce downed logs and suitable resting and denning sites for fisher. Hazard tree removal is typically conducted along Maintenance Level 2, 3, 4 and 5 roads (not Maintenance Level 1 roads or trails). The project alternatives primarily propose actions on trails and maintenance level (ML) 1 roads. Changing use, converting roads to trails, and proposing closures that are proposed on ML 1 and 2 roads within any of the project alternatives would result in a net reduction in miles of road on which hazard trees may be removed. These actions will provide a benefit to wildlife through snag and woody downed log retention. Therefore, the minor amounts of impact that the project alternatives may have on future hazard tree removal would be beneficial to fisher habitat.

Alternative 1 (Proposed Action)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred fisher habitat. This would reduce the risk of direct and indirect effects to fisher from motorized travel over the long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-8). Actions proposed in this alternative would not likely result in any human-caused mortality, but would likely increase disturbance to some fisher within the project area over the long-term (if re-established). Since fisher are not known to currently occupy the STF, there are no documented fisher den sites within the project area. Therefore, this alternative would not have the potential to disturb fisher den sites. Potential increases in disturbance to foraging fisher may reduce some individual's fitness over the long-term (if re-established), but these impacts would not likely result in any population level impacts.

Actions proposed in this alternative would result in some indirect effects through habitat modification. The addition of routes to the NFTS within preferred fisher habitat would result in minor amounts of habitat fragmentation. Since the majority of these routes are narrow native surfaced routes they would only result in minor reductions in overhead cover and would not significantly reduce fisher movement between habitat patches.

Season of Use: Preferred fisher habitat is primarily located throughout mid-elevations within the project area. Therefore, motorized use would be seasonally restricted in approximately 50% of preferred fisher habitat. These closures would reduce disturbance to foraging fisher over the long-term (if re-established).

Mitigation Measures: The types of mitigation measures that would be implemented within preferred fisher habitat include: tread hardening, drain dips, fence/log/rock barriers, and hardened stream crossings. Implementation of these mitigation measures would include hand tool and machine work that would result in short-term disturbance to individual fisher within the project area (if re-established). This amount of disturbance would not likely reduce any individual fisher's fitness and would not result in any population level impacts within the project area.

Table 3.11-8 Alternative 1 - Direct and Indirect Effects Indicators (Pacific fisher)

Indicators	
Miles of routes added to the NFTS within preferred fisher habitat	22.13
Miles of ML1 roads converted to trails within preferred fisher habitat	6.28
Existing density (mi/mi2) of routes under STF jurisdiction within preferred fisher habitat	1.58
Density (mi/mi2) of routes under STF jurisdiction within preferred fisher habitat with proposed designated routes (additional density)	1.69 (0.11)

Alternative 2 (No Action)

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of disturbance to fisher (if re-established) and increased fragmentation/modification of their habitat. These effects would be similar to those discussed within Alternative 4 for the short-term, but would be exacerbated over the long-term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to fisher (if re-established).

Mitigation Measures: There would not be any mitigation measures implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred fisher habitat. This would reduce the risk of direct and indirect effects to fisher from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to fisher (if re-established).

Mitigation Measures: There would not be any mitigation measures implemented as part of this alternative.

Alternative 4 (Recreation)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred fisher habitat. This would reduce the risk of direct and indirect effects to fisher from motorized travel over the long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-9). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the number of routes added to the system or converted to a trail within preferred fisher habitat, there would be a slight increase in the direct (if re-established) and indirect effects to fisher within the project area. Although these increases would result in more individuals being impacted, these increases would not likely be significant enough to result in impacts to fisher populations within the project area.

Season of Use: Preferred fisher habitat is primarily located throughout mid-elevations within the project area. Therefore, motorized use would be seasonally restricted in approximately 50% of preferred fisher habitat. These closures would reduce disturbance to foraging fisher over the long-term (if re-established).

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-9 Alternative 4 - Direct and Indirect Effects Indicators (Pacific fisher)

Indicators	
Miles of routes added to the NFTS within preferred fisher habitat	25.43
Miles of ML1 roads converted to trails within fisher habitat	11.15
Existing density (mi/mi2) of routes under STF jurisdiction within preferred fisher habitat	1.58
Density (mi/mi2) of routes under STF jurisdiction within preferred fisher habitat with proposed designated routes (additional density)	1.70 (0.12)

Alternative 5 (Resources)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred fisher habitat. This would reduce the risk of direct and indirect effects to fisher from motorized travel over the long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-10). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a significant decrease from Alternative 1 in the number of routes added to the system or converted to a trail within preferred fisher habitat, there would be a significant decrease in the direct (if re-established) and indirect effects to fisher within the project area. These decreases would result in fewer individuals being impacted and less habitat being fragmented, and this alternative is unlikely to result in impacts to fisher populations within the project area.

Season of Use: Preferred fisher habitat is primarily located throughout mid-elevations within the project area. Therefore, motorized use would be seasonally restricted in approximately 50% of preferred fisher habitat. These closures would reduce disturbance to foraging fisher over the long-term (if re-established).

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-10 Alternative 5 - Direct and Indirect Effects Indicators (Pacific fisher)

Indicators	
Miles of routes added to the NFTS within preferred fisher habitat	4.27
Miles of ML1 roads converted to trails within fisher habitat	0.16
Existing density (mi/mi2) of routes under STF jurisdiction within preferred fisher habitat	1.58
Density (mi/mi2) of routes under STF jurisdiction within preferred fisher habitat with proposed designated routes (additional density)	1.60 (0.02)

CUMULATIVE EFFECTS

In 2004, the USFWS determined that listing of the West Coast population of the fisher was warranted, and identified the following primary threats from activities on NFS lands: (1) loss and fragmentation of habitat due to timber harvest and hazardous fuels reduction; (2) increased predation resulting from canopy cover reductions; (3) mortality from vehicle collisions; and (4) increased human disturbance. Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the STF and private lands within the Forest boundary.

On the STF, past timber harvest and more recent hazardous fuels reduction projects have reduced large trees, canopy cover, structural complexity, and coarse woody material within treated units. Between 2000 and 2008, vegetation/fuels thinning treatments on NFS lands have occurred within less than 4% of fisher habitat. These vegetation treatments have reduced habitat quality for fisher by reducing canopy cover, structural complexity, and coarse woody material within treated units. At the larger landscape scale, these treatments may affect the size and connectivity of patches of high quality habitat. Vegetation/fuels reduction projects will continue to be one of the primary activities affecting fisher habitat on the STF (Appendix B). These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Some, but not all of them will affect fisher habitat. Over time, fuels treatments are expected to alter 20 to 30 percent of the landscape, with a resulting expectation that the amount of habitat removed by stand replacing wildfires will be reduced in response to these treatments (USDA 2004).

Recreation use has increased and is expected to continue to increase on the STF (see Recreation section Affected Environment), resulting in greater likelihood and magnitude of human disturbance to wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation, based upon State figures for OHV sales (see Recreation section). If fisher were to recolonize or to be reintroduced on the STF, project alternatives would contribute to these past and current conditions with added displacement from noise and human activity, and fragmentation of habitat. Because Alternative 2 does not prohibit cross-country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon fisher. The action alternatives do not result in a loss of habitat (no route construction), but noise and traffic disturbance would influence habitat use and availability where fisher may be present (if re-established). In the future, there is approximately 5 miles of new trail construction that is proposed to be added to the NFTS as well as numerous short route segments for dispersed camping access. These trails are proposed to provide “connector routes” between existing NFTS routes and motorized access to historical dispersed camping opportunities.

In addressing the effects of roads upon fisher, the USFWS concluded that, road-related effects on low density carnivores like fishers “are more severe than most other wildlife species due to their large home ranges, relatively low fecundity, and low natural population density.” Alternative 3 would result in beneficial impacts to fisher (if re-established) within the project area. Since routes proposed within the action alternatives are native surfaced routes that do not generally have high rates of travel, these road-related effects are expected to be minimal. The greatest influence upon fisher habitat occurs under Alternative 2 and progressively lower levels of impact occur under Alternatives 4, 1 and 5. Thus, the combined effect of the project alternatives and current levels of hazardous fuels reduction treatments may result in adverse cumulative effects (if re-established). These effects could potentially have minor impacts on the ability or likelihood for fisher to re-occupy suitable habitat on the STF. Although the action alternatives may result in cumulative impacts, they are very minor in comparison to existing road densities and other potentially significant impacts (fire, fuels/vegetation treatments).

SUMMARY OF EFFECTS

The Pacific fisher has a limited distribution in the Sierra Nevada of California and is not known to occur within the project area. With the exception of Alternative 3, which would have beneficial impacts to suitable Pacific fisher habitat, the direct and indirect effects (if re-established) of the project alternatives (1, 2, 4 and 5) combined with the cumulative effects are not likely to result in a loss of viability for this species that has been found warranted for federal listing. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Table 3.11-11 Ranking of Alternative Indicators (Pacific fisher)

Indicators	Rankings of Alternatives for Each Indicator[1]				
	1	2	3	4	5
Miles of routes added to the NFTS within preferred fisher habitat	3	1	5	2	4
Miles of ML1 roads converted to trails within preferred fisher habitat	3	1	5	2	4
Density (mi/mi2) of routes under STF jurisdiction within preferred fisher habitat with proposed designated routes	3	1	5	2	4
Average	3	1	5	2	4

[1] A score of 5 indicates the alternative has the least impact for terrestrial biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator.. If both Alternatives were equal they were both given the same (higher of the two) ranking.

California Spotted Owl – Affected Environment

Species and Habitat Account

The California spotted owl is one of three recognized subspecies of spotted owls. They are currently found throughout most of their historic range, which primarily occurs on the west side of the Sierra Nevada Mountains of California. The STF is located in the central portion of their range, and they are dispersed throughout the Forest. Surveys for spotted owls have been conducted on the Forest for approximately 20 years. Although these surveys have not covered the Forest in its entirety, they have covered a large majority of it. Protected Activity Centers (PACs) and Home Range Core Areas (HRCAs) are comprised of the best available habitat adjacent to known spotted owl pairs or territorial singles, encompassing approximately 300 and 700 acres, respectively. Based on systematic surveys and incidental sightings, there are currently 218 documented Protected Activity Centers (PACs) on the STF. Spotted owls inhabit a wide variety of forest types generally characterized by dense forest, high canopy closure, high structural diversity, large residual trees, and downed woody debris (Call et al. 1992, Moen and Gutierrez 1997). For the purposes of this analysis, preferred California spotted owl habitat on the STF has been mapped as: CWHR types PPN, SMC, WFR, RFR; classes 5 and 6; canopy closures M and D.

California Spotted Owl – Environmental Consequences

Indicators

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the California spotted owl. Although thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Miles of routes added to the NFTS within PACs
- Miles of ML1 roads converted to trails within PACs
- Number of PACs intersected by routes added to the NFTS or ML1 roads converted to trails (Percentage of all PACs in Project Area)
- Miles of routes added to the NFTS within 400 meters of Activity Centers
- Miles of ML1 roads converted to trails within 400 meters of Activity Centers
- Number of Activity Centers occurring within 400 meters routes added to the NFTS or ML1 roads converted to trails (Percentage of all Activity Centers in Project Area)
- Number of Activity Centers occurring within 60 meters of routes added to the NFTS or ML1 roads converted to trails (Percentage of all Activity Centers in Project Area)

- Percentage of spotted owl PACs (total acres) occurring within a 400 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails
- Percentage of preferred spotted owl habitat occurring within a 400 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails

DIRECT AND INDIRECT EFFECTS

General - All Alternatives

The project alternatives could result in direct and indirect effects to the California spotted owl by:

- Prohibiting cross-country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on spotted owls through: human-caused mortality, changes in behavior, and habitat modification.

Human-Caused Mortality: Allowing cross-country travel or adding routes to the NFTS may result in collisions with spotted owls. Although it may not be as prevalent in spotted owls as some other bird species, it has been documented. The Cascade Raptor Center (2007) reported that collisions with vehicles were one of the most common problems in northern spotted owls. Collisions with vehicles typically occur along well maintained roadways that allow high rates of travel. Routes proposed for designation within the project alternatives are native surfaced routes that allow much slower rates of travel. These types of routes would result in far fewer, if any collisions.

Changes in Behavior: Types of changes in behavior that may result from the project alternatives include: displacement or avoidance, disturbance at a specific location, or physiological response. The use of motorized vehicles in spotted owl habitat may result in disturbance to owls that are roosting or foraging. The Forest Service, Region 5, has generally assumed that activities (including road and trail use) occurring farther than 0.25 miles from California spotted owl nest sites have little potential to affect owl nesting (USDA 2004). Delaney et al. (1999) found that Mexican spotted owls were found to show an alert response to chainsaws at distances less than 0.25 miles.

Available literature indicates that the likelihood of owls flushing from a nest is greater when disturbance occurs within 60 meters (Delaney et al. 1999, Swarthout and Steidl 2001). Although it is unclear whether these levels of disturbance would result in high levels of stress, Mara and Holberton (1998) found that chronic high levels of stress hormone may have negative effects on reproduction. A study by Wasser et al. (1997) found that stress hormone levels were significantly higher in male northern spotted owls (but not females) when they were located <0.41 km from a major logging road compared to spotted owls in areas >0.41 km from a major logging road. Preliminary study results on a Northern spotted owl study in northern California, indicated that spotted owls did not flush from nest or roost sites when motorcycles were greater than 105 meters away during the post-fledgling period (Delaney and Grubb 2001). In addition, Delaney and Grubb (2003) found that spotted owl responses to motorcycle noise depended upon an array of complex factors including, sound level and frequency distribution, stimulus distance 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, this study is ongoing and the impacts of motorcycle noise on spotted owls is not conclusive at this point. Without further research, this analysis will assume that effects from motorized activities within 60 meters of an activity center will result in negative effects to reproduction over the short-term. Over the long-term, spotted owls that were experiencing significant disturbance at their current nest site would likely move to another suitable nest site within the PAC.

Habitat Modification: California spotted owls may be affected by edge effects from roads when roads and trails fragment suitable habitat. Several studies indicate the California spotted owl are sensitive to changes in forest canopy closure and habitat fragmentation (Seamans 2005, Blakesley 2003) that could result from a network of roads. Roads and trails can result in a reduction in interior forest patch size which decreases the amount of habitat available and increases the distance between suitable interior forest patches for late-successional species such as the California spotted owl.

Hazard tree removal along NFTS roads has the potential to reduce canopy closure and increase habitat fragmentation for spotted owls. Hazard tree removal is typically conducted along Maintenance Level 2, 3, 4 and 5 roads (not Maintenance Level 1 roads or trails). The project alternatives primarily propose actions on trails and maintenance level (ML) 1 roads. Changing use, converting roads to trails, and proposing closures that are proposed on ML 1 and 2 roads within any of the project alternatives would result in a net reduction in miles of road on which hazard trees may be removed. These actions will provide a benefit to wildlife through snag and woody downed log retention. Therefore, the minor amounts of impact that the project alternatives may have on future hazard tree removal would be beneficial to spotted owl habitat.

Alternative 1 (Proposed Action)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near spotted owl activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to the spotted owl from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-12). Standards and guidelines in the Stanislaus National Forest LRMP direct that impacts be mitigated where there is documented evidence of disturbance to the nest site from existing road or motorized trail use. The Forest has not monitored spotted owl nest sites in proximity to roads or trails and has not documented specific instances of disturbance. Actual nest locations are often difficult to locate and may move around from year-to-year within a PAC. Therefore, actual nest locations remain unknown for many of the PACs and those nests that have been located may have moved since it was last located. Furthermore, it is not well known why owls choose certain nest sites from year-to-year but it is likely that the nest sites will continue to move within the PAC over the long-term. Therefore, activity centers may be defined as a nest site, a pair roost location, or a territorial single located within the PAC. In the absence of recent nest site locations for every PAC, the relative risk of project alternatives resulting in disturbance to nesting spotted owls is evaluated by considering: 1) the number of spotted owl activity centers occurring within 400 meters of proposed routes, 2) the number of spotted owl activity centers occurring with 400 meters of ML1 roads that are being converted to trails, 3) the miles of routes that are being added to the NFTS within PACs, and 4) the miles of ML1 roads that are being converted to trails within PACs (Table 3.11-12).

Since routes proposed within this alternative are native surface routes with slower rates of travel, they would not likely result in any human-caused mortality, but would likely increase disturbance to some roosting owls within the project area. Although actual disturbance effects will be largely influenced by site-specific factors, it is assumed that all routes within a PAC may result in disturbance to roosting owls. Therefore, this alternative would result in some level of disturbance within approximately 24% of the spotted owl PACs in the project area. As mentioned above, it is assumed that activities greater than 400 meters away have little potential to affect spotted owls. Under this alternative, approximately 15.74% of spotted owl PACs (% of total acres) and 9.83% of preferred spotted owl habitat would occur within the 400 meter “zone of influence”. Disturbance resulting from these actions is likely to result in increased flushing from roosts or perches, increased alarm responses, and increased stress hormone levels in individual spotted owls.

In the absence of further field review, it is assumed that motorized use along all routes within 400 meters of activity centers would result in some disturbance to nesting owls. Therefore, it is assumed that approximately 14% of activity centers would receive some disturbance. Without further research, this analysis will assume that effects within 60 meters of an activity center will result in negative effects to reproduction over the short-term. Therefore, this alternative would result in an increased amount of disturbance and affect reproduction at approximately 1% of the nest sites within the project area. Although these effects would impact individuals and some reproducing pairs over the short-term, they would not result in impacts to populations within the project area over the short or long-term.

Actions proposed in this alternative would result in some indirect effect through habitat modification. The addition of routes to the NFTS within preferred spotted owl habitat and within PACs would result in minor amounts of habitat fragmentation. Since the majority of these routes are narrow native surfaced routes they would only result in minor reductions in overhead cover and would not significantly reduce SPOTTED OWL movement between habitat patches.

Season of Use: Although the exact timing may vary, California spotted owls may start nesting in early March. Seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period. Since approximately 80% of the PACs would be within these Zones, these closures would reduce disturbance to those individuals during the early nesting period.

Mitigation Measures: The types of mitigation measures that would be implemented within PACs include: tread hardening, drain dips, fence/log/rock barriers, and hardened stream crossings. The types of mitigation measures that would be implanted within 400 meters of an activity center include: tread hardening, drain dips, and fence/log/rock barriers. Implementation of these mitigation measures would include hand tool and machine work that may result in short-term disturbance to individual foraging or roosting owls within the project area. To prevent potential disturbance to nesting owls, machine work on routes through PACs or within 400 meters of activity centers would not be completed until the end of the nesting season. Disturbance to foraging and roosting owls outside of the nesting season would not likely reduce any individual owl’s fitness and would not result in any population level impacts within the project area.

Table 3.11-12 Alternative 1 - Direct and Indirect Effects Indicators (California spotted owl)

Indicators	
Miles of routes added to the NFTS within PACs	20.34
Miles of ML1 roads converted to trails within PACs	4.23
Number of PACs intersected by routes added to the NFTS or ML1 roads converted to trails (Percentage of all PACs in Project Area)	53 (24%)
Miles of routes added to the NFTS within 400 meters of Activity Centers	6.67
Miles of ML1 roads converted to trails within 400 meters of Activity Centers	1.47
Number of Activity Centers occurring within 400 meters routes added to the NFTS or ML1 roads converted to trails (Percentage of all Activity Centers in Project Area)	30 (14%)
Number of Activity Centers occurring within 60 meters of routes added to the NFTS or ML1 roads converted to trails (Percentage of all Activity Centers in Project Area)	2 (1%)
Percentage of spotted owl PACs (total acres) occurring within a 400 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	16%
Percentage of preferred spotted owl habitat occurring within a 400 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	10%

Alternative 2 (No Action)

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. It is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. It is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to spotted owls. These effects would be similar to those discussed within Alternative 4 for the short-term, but would be exacerbated over the long-term by continued route proliferation.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to spotted owls.

Mitigation Measures: There would not be any mitigation measures implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near spotted owl activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to the spotted owl from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to spotted owls.

Mitigation Measures: There would not be any mitigation measures implemented as part of this alternative.

Alternative 4 (Recreation)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near spotted owl activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to the spotted owl from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-13). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. For further discussion regarding those effects please see discussion above. In the absence of further field review, it is assumed that motorized use along all routes within 400 meters of activity centers would result in some disturbance to nesting owls. Therefore, it is assumed that approximately 16% of nest sites would receive some disturbance. Without further research, this analysis will assume that effects within 60 meters of an activity center will result in negative effects to reproduction over the short-term. Therefore, this alternative would result in an increased amount of disturbance and affect reproduction at approximately 1% of the activity centers within the project area. Since there is a slight increase from Alternative 1 in the number of routes added to the system or converted to a trail within PACs, near activity centers, and within preferred habitat, there would be a slight increase in the direct and indirect effects to individual spotted owls within the project area. Although these effects would impact individuals and some reproducing pairs over the short-term, they would not result in impacts to populations within the project area over the short or long-term.

Season of Use: Although the exact timing may vary, California spotted owls may start nesting in early March. Therefore, seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period. Since approximately 80% of the PACs would be within these Zones, these closures would reduce disturbance to those individuals during the early nesting period.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-13 Alternative 4 - Direct and Indirect Effects Indicators (California spotted owl)

Indicators	
Miles of routes added to the NFTS within PACs	24.56
Miles of ML1 roads converted to trails within PACs	6.21
Number of PACs intersected by routes added to the NFTS or ML1 roads converted to trails (Percentage of all PACs in Project Area)	58 (27%)
Miles of routes added to the NFTS within 400 meters of Activity Centers	8.02
Miles of ML1 roads converted to trails within 400 meters of Activity Centers	1.81
Number of Activity Centers occurring within 400 meters of routes added to the NFTS or ML1 roads converted to trails (Percentage of all Activity Centers in Project Area)	34 (16%)
Number of Activity Centers occurring within 60 meters routes added to the NFTS or ML1 roads converted to trails (Percentage of all Activity Centers in Project Area)	3 (1%)
Percentage of spotted owl PACs (total acres) occurring within a 400 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	18%
Percentage of preferred spotted owl habitat occurring within a 400 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	11%

Alternative 5 (Resources)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near spotted owl activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to the spotted owl from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-14). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. For further discussion regarding those effects please see discussion above. In the absence of further field review, it is assumed that motorized use along all routes within 400 meters of activity centers would result in some disturbance to nesting owls. Therefore, it is assumed that approximately 2% of nest sites would receive some disturbance. Without further research, this analysis will assume that effects within 60 meters of an activity center will result in negative effects to reproduction over the short-term. This alternative would not result in increased amounts of motorized use within 60 meters of any activity centers. Since there is a decrease from Alternative 1 in the number of routes added to the system or converted to a trail within PACs, near activity centers, and within preferred habitat, there would be a decrease in the direct and indirect effects to individual spotted owls within the project area. Although these effects would impact individuals over the short-term, they would not result in impacts to populations within the project area over the short or long-term.

Season of Use: Although the exact timing may vary, California spotted owls may start nesting in early March. Therefore, seasonal closures for Zone 2 and Zone 3 (as identified for each route in

Appendix I) would overlap the beginning of the nesting period. Since approximately 80% of the PACs would be within these Zones, these closures would reduce disturbance to those individuals during the early nesting period.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-14 Alternative 5 - Direct and Indirect Effects Indicators (California spotted owl)

Indicators	
Miles of routes added to the NFTS within PACs	0.43
Miles of ML1 roads converted to trails within PACs	0.09
Number of PACs intersected by routes added to the NFTS or ML1 roads converted to trails (Percentage of all PACs in Project Area)	4 (2%)
Miles of routes added to the NFTS within 400 meters of Activity Centers	0.03
Miles of ML1 roads converted to trails within 400 meters of Activity Centers	0
Number of Activity Centers occurring within 400 meters of routes added to the NFTS or ML1 roads converted to trails (Percentage of all Activity Centers in Project Area)	1 (<1%)
Number of Activity Centers occurring within 60 meters routes added to the NFTS or ML1 roads converted to trails (Percentage of all Activity Centers in Project Area)	0 (0%)
Percentage of spotted owl PACs (total acres) occurring within a 400 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	2%
Percentage of preferred spotted owl habitat occurring within a 400 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	1%

CUMULATIVE EFFECTS

In its Notice of Finding on a petition to list the California spotted owl, the USFWS identified that loss of habitat to stand replacing fires and habitat modification for fuels reduction were the primary risk factors to California spotted owls occurring on NFS lands (USFWS 2006). Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the STF and private lands within the STF boundary. Some, but not all, of these activities will contribute to effects upon California spotted owls.

Based on GIS analysis, 14 wildfires have burned through 17 or 8% of spotted owl PACs affecting approximately 971acres or 2% of those PACs since 2000. Forest vegetation/fuels thinning projects (designed to reduce the risk of additional habitat loss to wildfires) have treated within approximately 1,410 acres or 2% of spotted owl PACs between 2000 and 2008. CDF currently lists a total of 2,365 acres of private land within the STF administrative boundary for which timber harvest plans have been submitted. Timber harvest on private lands is generally more intensive and does not typically maintain habitat suitability for spotted owls. These wildfires and fuels treatment projects have resulted in reduction in the amount and quality of spotted owl habitat on the STF.

Vegetation/fuels reduction projects will continue to be the primary activity affecting spotted owl habitat on the STF (see Appendix B). These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Although these treatments will degrade habitat, it is anticipated that over time, the amount of habitat removed in stand replacing wildfires will be reduced as a result of these treatments (USDA 2004b).

The effect of open motorized routes on spotted owl populations or habitats was not identified as a significant risk factor by either the Forest Service (USDA 2004b) or the USFWS (2006). However, given the proportion of spotted owl nest sites and habitat potentially affected, and considering the projections for future increases in recreation uses and OHV activity, Alternative 2 may, over time, contribute to cumulative effects upon spotted owl populations. Because Alternative 2 does not restrict vehicles to designated routes, there is a high degree of uncertainty about where future route proliferation in owl habitat may occur and which may have disturbance and habitat effects beyond the effects of routes open to motorized use. Alternative 2 presents the greatest risk of contributing to adverse cumulative effects upon spotted owl habitat and populations because there would not be a prohibition on cross-country travel. Alternative 3 contributes the least to cumulative effects because cross-country travel would be prohibited, open route densities in spotted owl habitat are lowest, and no motorized routes would be designated. Alternatives 4, 1, and 5 would result in progressively lower risk to spotted owls due to the amount of motorized routes being added to the system. Considering the proportion of spotted owl habitat influenced by motorized routes and projections for future increases in recreation uses and OHV activity, the alternatives may result in minor cumulative impacts when combined with other factors affecting spotted owl habitat. Although the action alternatives may result in cumulative impacts, they are very minor in comparison to existing road densities and other potentially significant impacts (fire, fuels/vegetation treatments).

Table 3.11-15 Ranking of Alternative Indicators (California spotted owl)

Indicators	Rankings by Alternatives [1]				
	1	2	3	4	5
Miles of routes added to the NFTS within PACs	3	1	5	2	4
Miles of ML1 roads converted to trails within PACs	3	1	5	2	4
Number of PAC's intersected by routes added to the NFTS or ML1 roads converted to trails	3	1	5	2	4
Miles of routes added to the NFTS within 400 meters of Activity Centers	3	1	5	3	4
Miles of ML1 roads converted to trails within 400 meters of Activity Centers	3	1	5	2	4
Number of Activity Centers occurring within 60 meters of routes added to the NFTS or ML1 roads converted to trails	3	1	5	2	4
Percentage of CSO PAC's (total acres) occurring within a 400 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	3	1	5	2	4
Percentage of preferred CSO habitat occurring within a 400 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	3	1	5	2	4
Average	**3**	**1**	**5**	**2**	**4**

[1] A score of 5 indicates the alternative has the least impact for terrestrial biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.

SUMMARY OF EFFECTS

The California spotted owl is widespread throughout the Sierra Nevada and the project area. With the exception of Alternative 3, which would have beneficial impacts to the California spotted owl, the direct and indirect effects of the project alternatives (1, 2, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. Based on the small proportion of late seral closed canopy coniferous forest habitat that is directly, indirectly and cumulatively affected (0% to 3% of Sierra Nevada habitat) by the alternatives, the STF Motorized Travel Management Project will not alter existing trend in the habitat, nor will it lead to a change is the distribution of California spotted owl across the Sierra Nevada bioregion. For further discussion of the effects analysis and determinations, see the project MIS and BA/BE reports (Pyron 2009, see project record).

Northern Goshawk – Affected Environment

Species and Habitat Account

The northern goshawk is a large raptor that is found throughout forested habitats of the western United States (Squires and Reynolds 1997). Although goshawks remain widely distributed throughout their historic range, current sampling techniques are inadequate to determine population status or trends of this species (63 FR 35183). It is estimated that there are around 600 known goshawk territories on National Forest System lands in the Sierra Nevada (USDA 2001). Surveys for goshawks have been conducted on the Forest for approximately 20 years. Although these surveys have not covered the Forest in its entirety, they have covered a large majority of it. Protected Activity Centers (PACs) are comprised of the best available habitat encompassing approximately 200 acres adjacent to goshawk detections. Based on systematic surveys and incidental sightings, there are currently 76 documented PACs on the STF.

Suitable goshawk habitat in the Sierra Nevada consists of dense, multi-layered mature forested stands with dense canopy cover for nesting, and dense to moderately open overstories, and open understories interspersed with meadows, shrub patches, riparian area, or other openings for foraging. Goshawks use nest-sites with greater canopy cover, greater basal area, greater numbers of large diameter trees, and lower shrub/understory cover relative to random sites. High canopy cover is the most consistent structural feature similar across studies of northern goshawk nesting habitat. Goshawks typically nest in stands with canopy cover between 60% and 80% (Keane 1999, Maurer 2000).

Northern Goshawk – Environmental Consequences

Indicators

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the northern goshawk. Although thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Miles of routes added to the NFTS within PACs.
- Miles of ML1 roads converted to trails within PACs.
- Number of PACs intersected by routes added to the NFTS or ML1 roads converted to trails (Percentage of all PACs in Project Area).
- Miles of routes added to the NFTS within 400 meters of Activity Centers.
- Miles of ML1 roads converted to trails within 400 meters of Activity Centers.
- Number of Activity Centers occurring within 400 meters routes added to the NFTS or ML1 roads converted to trails (Percentage of all Activity Centers in Project Area).
- Percentage of goshawk PACs (total acres) occurring within a 400 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails.

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the northern goshawk by:

- Prohibiting cross-country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on goshawks through: changes in behavior and habitat modification.

Changes in Behavior: Types of changes in behavior that may result from the project alternatives include: displacement or avoidance, disturbance at a specific location, or physiological response. Critical times for human disturbance are through the nesting and post fledging period (February 15 through September 15). Because goshawks initiate breeding when the ground is still covered with snow and roads and trails are not in use, nests are sometimes directly located along roads and trails that provide flight access. Following meltout these sites can be prime candidates for conflict as humans begin using the roads and trails (USDA 2001). Northern goshawks are aggressive nest defenders that will attack humans that venture into active nest stands. The potential for negative human interactions increases where motorized routes or dispersed campsites are in proximity to goshawk nest stands (USDA 2001).

The Forest Service, Region 5, has generally assumed that activities (including road and trail use) occurring farther than 0.25 miles from a goshawk nest site have little potential to affect goshawk nesting (USDA 2004). Grubb et al. (1998) reported that vehicle traffic from roads caused no discernable behavioral response by goshawks at distances greater than 400 meters (0.25 miles) from nests. Little information is available on disturbance distances for goshawks but, as with other raptors, the risk of flushing from the nest or even nest abandonment is likely to increase as the disturbance distance decreases.

Habitat Modification: Northern goshawks may be affected by edge effects from roads when roads and trails fragment suitable habitat. Several studies indicate that goshawks are sensitive to changes in forest canopy closure and habitat fragmentation that could result from a network of roads (Beir and Drennan 1997, Daw and DeStefano 2001). 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 goshawk.

Hazard tree removal along NFTS roads has the potential to reduce canopy closure and increase habitat fragmentation for goshawks. Hazard tree removal is typically conducted along Maintenance Level 2, 3, 4 and 5 roads (not Maintenance Level 1 roads or trails). The project alternatives primarily propose actions on trails and maintenance level (ML) 1 roads. Changing use, converting roads to trails, and proposing closures that are proposed on ML 1 and 2 roads within any of the project alternatives would result in a net reduction in miles of road on which hazard trees may be removed. These actions will provide a benefit to wildlife through snag and woody downed log retention. Therefore, the minor amounts of impact that the project alternatives may have on future hazard tree removal would be beneficial to goshawk habitat.

Alternative 1 (Proposed Action)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near goshawk activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to goshawks from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-16). Standards and guidelines in the Stanislaus National Forest LRMP direct that impacts be mitigated where there is documented evidence of disturbance to the nest site from existing road or motorized trail use. The Forest has not monitored goshawk nest sites in proximity to roads or trails and has not documented specific instances of disturbance. Actual nest locations are often difficult to locate and may move around from year-to-year within a PAC. Therefore, actual nest locations remain unknown for many of the PACs and those nests that have been located may have moved since it was last located. Furthermore, it is not well known why goshawks choose certain nest sites from year-to-year but it is likely that the nest sites will continue to move within the PAC over the long-term. Activity centers may be defined as a nest site, a pair roost location, or a territorial single located within the PAC. In the absence of recent nest site locations for every PAC, the relative risk of project alternatives resulting in disturbance to nesting goshawks is evaluated by considering: 1) the number of goshawk activity centers occurring within 400 meters of proposed routes, 2) the number of goshawk activity centers occurring with 400 meters of ML1 roads that are being converted to trails, 3) the miles of routes that are being added to the NFTS within PACs, and 4) the miles of ML1 roads that are being converted to trails within PACs (Table 3.11-16).

Since routes proposed within this alternative are native surface routes with slower rates of travel, they would not likely result in any human-caused mortality, but would likely increase disturbance to some roosting goshawks within the project area. Although actual disturbance effects will be largely influenced by site-specific factors, it is assumed that all routes within a PAC may result in disturbance to some goshawks. Therefore, this alternative would result in some level of disturbance within approximately 12% of the goshawk PACs in the project area. As mentioned above, it is assumed that activities greater than 400 meters away have little potential to affect goshawks. Under this alternative, approximately 10% of goshawk PACs (% of total acres) would occur within the 400 meter "zone of influence". Disturbance resulting from these actions is likely to result in increased flushing from roosts or perches, increased alarm responses, and increased stress hormone levels in some individual goshawks.

In the absence of further field review, it is assumed that motorized use along all routes within 400 meters of activity centers would result in some disturbance to nesting goshawks. It is assumed that approximately 9% of nest sites would receive some disturbance. Although these effects would impact individuals and some reproducing pairs over the short-term, they would not result in impacts to populations within the project area over the short or long-term.

Actions proposed in this alternative would result in some indirect effect through habitat modification. The addition of routes to the NFTS within and near PACs would result in minor amounts of habitat fragmentation. Since the majority of these routes are narrow native surfaced routes they would only result in minor reductions in overhead cover and would not significantly reduce goshawk movement between habitat patches.

Season of Use: Although the exact timing may vary, goshawks may start nesting in February. Therefore, seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period. Since approximately 96% of the goshawk PACs would be within these Zones, these closures would reduce disturbance to most goshawks during the early nesting period.

Mitigation Measures: The types of mitigation measures that would be implemented within PACs and within 400 meters of activity centers include: tread hardening, drain dips, and fence/log/rock barriers. Implementation of these mitigation measures would include hand tool and machine work that may result in short-term disturbance to individual foraging or roosting goshawks within the project area. To prevent potential disturbance to nesting goshawks, machine work on routes through PACs or within 400 meters of activity centers would not be completed until the end of the nesting season. Disturbance to foraging and roosting goshawks outside of the nesting season would not likely reduce any individual goshawk's fitness and would not result in any population level impacts within the project area.

Table 3.11-16 Alternative 1 - Direct and Indirect Effects Indicators (northern goshawk)

Indicators	
Miles of routes added to the NFTS within PACs	0.94
Miles of ML1 roads converted to trails within PACs	0.91
Number of PACs intersected by routes added to the NFTS or ML1 roads converted to trails (Percentage of all PACs in Project Area)	9 (12%)
Miles of routes added to the NFTS within 400 meters of Activity Centers	0.61
Miles of ML1 roads converted to trails within 400 meters of Activity Centers	0.99
Number of Activity Centers occurring within 400 meters of routes added to the NFTS or ML1 roads converted to trails (Percentage of all Activity Centers in Project Area)	7 (9%)
Percentage of PACs (total acres) occurring within a 400 meter "zone of influence" of routes added to the NFTS or ML1 roads converted to trails	10%

Alternative 2 (No Action)

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to goshawks. These effects would be similar to those discussed within Alternative 4 for the short-term, but would be exacerbated over the long-term by the continued proliferation of routes.

Season of Use: The seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to goshawks.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near goshawk activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to goshawks from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to goshawks.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 4 (Recreation)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near goshawk activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to goshawks from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-17). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. For further discussion regarding those effects please see discussion above. In the absence of further field review, it is assumed that motorized use along all routes within 400 meters of activity centers would result in some disturbance to nesting goshawks. Therefore, it is assumed that approximately 13% of nest sites would receive some disturbance. Since there is a slight increase from Alternative 1 in the number of routes added to the system or converted to a trail within PACs, near activity centers, and within preferred habitat, there would be a slight increase in the direct and indirect effects goshawks within the project area. Although these effects would impact individuals and some reproducing pairs over the short-term, they would not result in impacts to populations within the project area over the short or long-term.

Actions proposed in this alternative would result in some indirect effects through habitat modification. The addition of routes to the NFTS within and near goshawk PACs would result in minor amounts of habitat fragmentation. Since the majority of these routes are narrow native surfaced routes they would only result in minor reductions in overhead cover and would not significantly reduce goshawk movement between habitat patches.

Season of Use: Although the exact timing may vary, goshawks may start nesting in February. Therefore, seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period. Since approximately 96% of the goshawk PACs would be within these Zones, these closures would reduce disturbance to most goshawks during the early nesting period.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-17 Alternative 4 - Direct and Indirect Effects Indicators (northern goshawk)

Indicators	
Miles of routes added to the NFTS within PACs	1.51
Miles of ML1 roads converted to trails within PACs	2.16
Number of PACs intersected by routes added to the NFTS or ML1 roads converted to trails (Percentage of all PACs in Project Area)	13 (17%)
Miles of routes added to the NFTS within 400 meters of Activity Centers	1.49
Miles of ML1 roads converted to trails within 400 meters of Activity Centers	1.81
Number of Activity Centers occurring within 400 meters of routes added to the NFTS or ML1 roads converted to trails (Percentage of all Activity Centers in Project Area)	10 (13%)
Percentage of PACs (total acres) occurring within a 400 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	13%

Alternative 5 (Resources)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near goshawk activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to goshawks from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-18). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. For further discussion regarding those effects please see discussion above. In the absence of further field review, it is assumed that motorized use along all routes within 400 meters of activity centers would result in some disturbance to nesting goshawks. Therefore, it is assumed that approximately 1% of nest sites would receive some disturbance. Since there is a significant decrease from Alternative 1 in the number of routes added to the system or converted to a trail within PACs, near activity centers, and within preferred habitat, there would be a significant decrease in the direct and indirect effects goshawks within the project area. This alternative would result in very minor amounts of habitat fragmentation that would not have any measurable effects to goshawks. Although these effects would impact individuals and some reproducing pairs over the short-term, they would not result in impacts to populations within the project area over the short or long-term.

Table 3.11-18 Alternative 5 - Direct and Indirect Effects Indicators (northern goshawk)

Indicators	
Miles of routes added to the NFTS within PACs	0.19
Miles of ML1 roads converted to trails within PACs	0
Number of PACs intersected by routes added to the NFTS or ML1 roads converted to trails (Percentage of all PACs in Project Area)	2 (3%)
Miles of routes added to the NFTS within 400 meters of Activity Centers	0.03
Miles of ML1 roads converted to trails within 400 meters of Activity Centers	0
Number of Activity Centers occurring within 400 meters of routes added to the NFTS or ML1 roads converted to trails (Percentage of all Activity Centers in Project Area)	1 (1%)
Percentage of PACs (total acres) occurring within a 400 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	1%

Season of Use: Although the exact timing may vary, goshawks may start nesting in February. Therefore, seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period. Since approximately 96% of the goshawk PACs would be within these Zones, these closures would reduce disturbance to most goshawks during the early nesting period.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

CUMULATIVE EFFECTS

In 2001and 2004 the Forest Service amended 11 Sierra Nevada Forest Plans to better address the needs of old forest-associated species (USDA 2001a and 2004b,c). During this assessment, the following risk factors were identified for northern goshawks in the Sierra Nevada: (1) changes to the amount and quality of goshawk habitat from timber harvest and fuels treatments; (2) loss of breeding territories due to stand replacing fires; and (3) breeding site disturbance from vegetation treatments, human recreation, or falconry harvest. Fuels reduction treatments and wildfire effects are identified as the predominant effectors of goshawk habitat. Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the STF and private lands within the forest boundary. Some, but not all, of these activities will contribute to effects upon northern goshawks.

Based on GIS analysis, 3 wildfires have burned through 3 goshawk PACs (4%) affecting approximately 28 acres or less than 1% of those PACs since 2000. Forest vegetation/fuels thinning projects (designed to reduce the risk of additional habitat loss to wildfires) have treated approximately 788 acres or 5% of goshawk PACs between 2000 and 2008. CDF currently lists a total of 2,365 acres of private land within the STF administrative boundary for which timber harvest plans have been submitted. Timber harvest on private lands is generally more intensive and does not typically maintain habitat suitability for spotted owls. These wildfires and fuels treatment projects have resulted in reduction in the amount and quality of spotted owl habitat on the STF.

Vegetation/fuels reduction projects will continue to be the primary activity affecting goshawk habitat on the STF (Appendix B). These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Although these treatments will degrade habitat, it is anticipated that over time, the amount of habitat removed in stand replacing wildfires will be reduced as a result of these treatments (USDA 2004b).

The effect of open motorized routes on goshawk populations or habitats was not identified as a significant risk factor by the Forest Service, but breeding site disturbance from human recreation was addressed (USDA 2001a and 2004b,c). Given the proportion of goshawk nest sites and habitat potentially affected, and considering the projections for future increases in recreation uses and OHV activity, Alternative 2 may, over time, contribute to cumulative effects upon goshawk populations. Because Alternative 2 does not restrict vehicles to designated routes, there is a high degree of uncertainty about future route proliferation in goshawk habitat which may have disturbance and habitat effects beyond the effects of routes open to motorized use. Alternative 3 contributes the least to cumulative effects because cross-country travel would be prohibited, open route densities in goshawk habitat are lowest, and no motorized routes would be designated. Alternatives 4, 1, and 5 would result in progressively lower risk to goshawks due to the amount of motorized routes being added to the system.

Since human disturbance has been recognized as a significant risk factor, non-motorized recreation (hiking, cycling, and equestrian use) may result in additional disturbance to nesting and foraging goshawks. Non-motorized recreation occurs along an additional 394 miles of summer trails. Human disturbance from use of non-motorized routes contributes to the direct and indirect effects of the project alternatives.

Considering the proportion of goshawk habitat influenced by motorized routes and projections for future increases in recreation uses and OHV activity, the alternatives may result in minor cumulative impacts when combined with other factors affecting goshawk habitat. Although the action alternatives may result in cumulative impacts, they are fairly minor in comparison to existing road densities and other potentially significant impacts (fire, fuels/vegetation treatments).

Table 3.11-19 Ranking of Alternative Indicators (northern goshawk)

Indicators	Rankings by Alternatives for [1]				
	1	2	3	4	5
Miles of routes added to the NFTS within PACs	3	1	5	2	4
Miles of ML1 roads converted to trails within PACs	3	1	5	2	4
Number of PAC's intersected by routes added to the NFTS or ML1 roads converted to trails	3	1	5	2	4
Miles of routes added to the NFTS within 400 meters of Activity Centers	3	1	5	3	4
Miles of ML1 roads converted to trails within 400 meters of Activity Centers	3	1	5	2	4
Number of Activity Centers occurring within 400 meters of routes added to the NFTS or ML1 roads converted to trails	3	1	5	2	4
Percentage of PACs (total acres) occurring within a 400 meter "zone of influence" of routes added to the NFTS or ML1 roads converted to trails	3	1	5	2	4
Average	**3**	**1**	**5**	**2**	**4**

[1] A score of 5 indicates the alternative has the least impact for terrestrial biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.

SUMMARY OF EFFECTS

The northern goshawk is widespread throughout the western United States and the project area. With the exception of Alternative 3, which would have beneficial impacts to the northern goshawk, the direct and indirect effects of the project alternatives (1, 2, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Ungulates

Mule Deer – Affected Environment

Species and Habitat Account

The mule deer is found throughout the western United States and is the only large ungulate that inhabits STF. Mule deer populations throughout the western United States, including the Sierra Nevada of California, reached their peak in the middle of the 20th century and have since declined (Beck 1999, Salwasser et al. 1978). More recently, mule deer populations (estimated by buck harvest and winter range counts) within the project area have been stable to slightly decreasing and below management objectives (Maddox 1980, King 1981, Maddox 1984).

It is generally agreed that mule deer within the project area exhibit two different life history strategies: migrational and resident. Resident deer spend the majority of their lives at lower elevations, exhibiting little or no seasonal movement between elevational habitat types. Although it has been recognized since the mid 20th century that these two life history strategies are exhibited, there has been little to no research focused on resident deer (Leopold et al. 1951). It is possible that an individual may exhibit both life history strategies over the course of their lives (i.e. an adult doe may migrate to summer range one year and not the next), and it is generally recognized and assumed that individuals expressing either strategy regularly coexist and interbreed on the winter range and during the rut. Since resident deer are closely associated with human development near the Forest boundary, this analysis will focus on the effects to the migrant deer herds within the project area. The migrant deer move down the western slopes of the Sierra Nevada to lower elevations with the onset of the rut and first snowfalls. After completing the rut and spending the winter at lower elevations, they follow "spring green-up" and migrate back to higher elevations where does will typically fawn and spend the summer. Historically, migrant mule deer within the project area have been considered to be associated with four main deer herds: Railroad Flat, Stanislaus, Tuolumne, and Yosemite.

Mule deer are a habitat generalist, found throughout numerous plant communities within the project area, but are primarily dependent on early successional vegetation types. In general, there are three key habitats that migrating mule deer depend on to complete their life history: winter range, summer range, and migration corridors. The 2001 SNFPA, further delineated summer and winter range habitat as follows: general winter range (309.6 mi2), winter concentration areas (164.91 mi2), critical winter range (55.12 mi2), summer concentration areas (187.33 mi2), and critical summer range (24.71 mi2) (USDA 2001). Since individuals of all herds of mule deer within the project area coexist and interbreed, this analysis focuses on the effects to delineated summer (concentration and critical) and winter (concentration and critical) range habitats.

Mule Deer – Environmental Consequences

Indicators

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the mule deer. Although thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the mule deer by:

- Prohibiting cross-country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on mule deer through: human-caused mortality or changes in behavior.

Human-Caused Mortality: In general, types of human-caused mortality that have been identified for the mule deer include collisions. Adding routes to the NFTS would improve human access into all types of mule deer habitat and may result in increased rates of collisions. Collisions with motorized vehicles may have a significant impact on mule deer mortality (Romin and Bissonette 1996, Jalkotzy et al. 1997). Collisions are typically associated with well maintained roads that allow high rates of travel (e.g. highways). Routes proposed for designation within the project alternatives are native surfaced routes that allow much slower rates of travel. These types of routes result in far fewer collisions than highways or paved routes and would likely have an insignificant impact on mule deer mortality within the project area.

Changes in Behavior: The types of changes in behavior that have been identified for the mule deer include displacement or avoidance and disturbance at a specific location. Deer responses to recreational uses have not been studied in detail, making it difficult to make reliable inferences (Barrett et al. 2004). In general, however, studies show that mule deer will move away from, or flush, from an approaching person and will usually allow a person in or on a vehicle to get closer than a person on foot (Freddy et al. 1986, Wisdom et al. 2005). Wisdom et al. (2005) 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. Although several studies have found that mule deer avoid areas in proximity to roads, Boroski and Mossman (1998) found that human disturbance did not impede mule deer use of water sources.

Road density has traditionally been used as an indicator for habitat effectiveness models (Overly and Perry 1977, Thomas, et al. 1979). These models indicate that as open road density increases, deer use declines (Thomas et al. 1979, Witmer et al 1985). Deer avoid primary roads more than secondary or tertiary roads and also avoid roads more in open habitats as opposed to areas with vegetative or topographic cover (deVos et al. 2003). The displacement distances vary between 200 and 800 meters in various studies, depending upon the road type and traffic level, and the surrounding habitat (Perry and Overly 1977, Rost and Bailey 1979, Johnson et al. 2000, Livezey 1991). Main roads were found to reduce deer use up to 0.5 miles (800 m), whereas secondary and primitive roads reduced deer densities from between 200 to 400 meters in these studies. Additional variables such as the amount and frequency of traffic, and the spatial distribution of roads in relation to deer use, influence the degree of negative effects that roads have on deer use in forested habitats (Perry and Overly 1977, Johnson et al. 2000, deVos et al. 2003).

Changes in behavior, expressed through flight response or changes in habitat use may reduce the fitness of individuals within a herd (Yarmoloy et al. 1988). Adverse effects to fitness may be measured through reduced fat or energy reserves. Adverse effects to energy reserves are typically the most significant during the winter when mule deer may already be experiencing low energy reserves and reduced food availability (Livezey 1991). If an individuals energy reserves are depleted to low enough levels on the winter range they may die (starvation) or experience reduced reproductive success the following spring. Therefore, if disturbance from motorized vehicles was having a significant impact on mule deer populations within the winter range it would likely result in malnutrition or mortality from starvation.

Numerous cases of large winter die-offs, caused by starvation, have been documented throughout the western United States (Leopold et al. 1947). Herds may be particularly prone to large scale die-offs from starvation when: 1) snow depths are great and deer are unable to migrate to lower elevations (below the snow level) or 2) herd size exceeds winter range carrying capacity. Winter habitat within the project area extends over a broad elevational range, which typically allows mule deer to move down the slope and below significant snow depths. Although there are historic records of large-scale winter die-offs within the project area (Leopold et al. 1951), literature and anecdotal evidence do not indicate that starvation is a significant or limiting factor to mule deer herds on the STF (CDFG 1980, CDFG 1981, CDFG 1984).

Another way, by which mule deer populations may be impacted by reduced fat or energy reserves, is through reduced reproductive fitness or fawn production. Yarmoloy et al. (1988) found significant reductions in fawn production from does which were intentionally harassed by ATVs. Although it is not well understood how harassment causes reduced fawn production, a mature doe that is successfully bred during the rut may not to successfully carry the fawn full term due to stress or inadequate nutrition. Low fawn recruitment is the factor that likely caused declines in the latter part of the 20th century throughout the Sierra Nevada and the factor that is currently attributed to limiting herd growth within the project area (Salwasser et al. 1978, Maddox 1984). Annual fall deer count data and recent findings from a radio telemetry study conducted within the project area indicate results similar to mortality factors discussed by Maddox (1984); a low proportion of fawns are surviving through the summer and making it onto winter range (Annual Deer Count Data - project record, CDFG 2007). Results from this study and spring deer counts further showed that seasonal fawn mortality was similar to that found on the Kings River deer herd by Salwasser et al. (1978); indicating that significant fawn mortality occurs within the first few months following birth and that winter fawn mortality was minor (Ibid.). CDFG (2007) reported that 50% of early fawn losses were attributed to predation from bears, while the other 50% “were found dead with no apparent cause”. Furthermore, they concluded that early fawn mortality was likely underestimated since captured fawns were more than a week old. Although early fawn mortality may have a significant impact on recruitment and mule deer populations within the project area, the causes for these losses maybe numerous and are largely unknown.

Summer Concentration Areas

- Miles of routes added to the NFTS within summer concentration areas.
- Miles of ML1 roads converted to trails within summer concentration areas.
- Existing density (mi/mi2) of routes under STF jurisdiction within summer concentration areas.
- Density (mi/mi2) of routes under STF jurisdiction within summer concentration areas with proposed designated routes (additional density).
- Percentage of summer concentration areas within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails.

Critical Summer Range

- Miles of routes added to the NFTS within critical summer range.
- Miles of ML1 roads converted to trails within critical summer range.
- Existing density (mi/mi2) of routes under STF jurisdiction within critical summer range.
- Density (mi/mi2) of routes under STF jurisdiction within critical summer range with proposed designated routes (additional density).
- Percentage of critical summer range within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails.

Winter Concentration Areas

- Miles of routes added to the NFTS within winter concentration areas.
- Miles of ML1 roads converted to trails within winter concentration areas.
- Existing density (mi/mi2) of routes under STF jurisdiction within winter concentration areas.
- Density (mi/mi2) of routes under STF jurisdiction within winter concentration areas with proposed designated routes (additional density).
- Percentage of winter concentration areas within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails.

Critical Winter Range

- Miles of routes added to the NFTS within critical winter range.
- Miles of ML1 roads converted to trails within critical winter range.
- Existing density (mi/mi2) of routes under STF jurisdiction within critical winter range.
- Density (mi/mi2) of routes under STF jurisdiction within critical winter range with proposed designated routes (additional density).
- Percentage of critical winter range within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails.

Alternative 1 (Proposed Action)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within all types of mule deer habitat. This would reduce the risk of direct and indirect effects to mule deer from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-20). Actions proposed in this alternative would not likely result in measurable increases in human-caused mortality, but would likely increase disturbance to some mule deer within the project area. Increases in road densities and percentages of habitat influenced by motorized vehicles on summer and winter range would likely result in increased disturbance to some individuals. Increases on summer range are minor and would influence a very small portion of available habitat. Although these increases may result in disturbance to some individuals, they would not likely have a measurable impact to populations. Mule deer within the project area are generally in fairly good condition on the winter range and starvation is not currently a significant factor impacting mule deer populations. Current levels of motorized use on the winter range are not likely having a significant impact on mule deer populations through malnutrition or starvation and early fawn losses are poorly understood. Although increased amounts of disturbance on 7.42% of winter concentration areas and 8.87% of critical winter range would increase disturbance to some individuals, this disturbance would not likely result in impacts to mule deer populations within the project area.

Season of Use: Mule deer spend a significant portion of the year at lower elevations and may be particularly prone to disturbance on winter range. This alternative would result in seasonal closures (as identified for each route in Appendix I) on approximately 73% of winter concentration areas and 73% of critical winter range. These closures would reduce disturbance to deer; therefore, providing beneficial impacts to individuals within the project area.

Mitigation Measures: The types of mitigation measures that would be implemented within mule deer habitat include: tread hardening, drain dips, fence/log/rock barriers, and hardened stream crossings. Implementation of these mitigation measures would include hand tool and machine work that would result in short-term disturbance to individual deer within the project area. This amount of disturbance would not likely reduce any individual deer’s fitness and would not result in any population level impacts within the project area.

Table 3.11-20 Alternative 1 - Direct and Indirect Effects Indicators (mule deer)

Indicators	
Summer Concentration Areas	
Miles of routes added to the NFTS within summer concentration areas	9.99
Miles of ML1 roads converted to trails within summer concentration areas	1.15
Existing density (mi/mi2) of routes under STF jurisdiction within summer concentration areas	0.97
Density (mi/mi2) of routes under STF jurisdiction within summer concentration areas with proposed designated routes (additional density)	1.03 (0.06)
Percentage of summer concentration areas occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	2.27%
Critical Summer Range	
Miles of routes added to the NFTS within critical summer range	0
Miles of ML1 roads converted to trails within critical summer range	1.36
Existing density (mi/mi2) of routes under STF jurisdiction within critical summer range	0.72
Density (mi/mi2) of routes under STF jurisdiction within critical summer range with proposed designated routes (additional density)	0.72 (0.0)
Percentage of critical summer range occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	1.64%
Winter Concentration Areas	
Miles of routes added to the NFTS within winter concentration areas	31.64
Miles of ML1 roads converted to trails within winter concentration areas	17.87
Existing density (mi/mi2) of routes under STF jurisdiction within winter concentration areas	2.56
Density (mi/mi2) of routes under STF jurisdiction within winter concentration areas with proposed designated routes (additional density)	2.76 (0.2)
Percentage of winter concentration areas occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	7.42%
Critical Winter Range	
Miles of routes added to the NFTS within critical winter range	15.39
Miles of ML1 roads converted to trails within critical winter range	5.66
Existing density (mi/mi2) of routes under STF jurisdiction within critical winter range	2.33
Density (mi/mi2) of routes under STF jurisdiction within critical winter range with proposed designated routes (additional density)	2.61 (0.28)
Percentage of critical winter range occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	8.87%

Alternative 2 (No Action)

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to mule deer. These effects would be similar to those discussed within Alternative 4 for the short-term, but would be exacerbated over the long-term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to mule deer.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within mule deer habitat. This would reduce the risk of direct and indirect effects to fisher from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to mule deer.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 4 (Recreation)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within mule deer habitat. This would reduce the risk of direct and indirect effects to mule deer from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-21). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the number of routes added to the system or converted to a trail within summer and winter range habitat, there would be a slight increase in the direct and indirect effects to mule deer within the project area. Although these increases would result in more individuals being impacted, these increases would not likely be significant enough to result in impacts to mule deer populations within the project area.

Season of Use: Mule deer spend a significant portion of the year at lower elevations and may be particularly prone to disturbance on winter range. This alternative would result in seasonal closures (as identified for each route in Appendix I) on approximately 73% of winter concentration areas and

73% of critical winter range. These closures would reduce disturbance to deer; therefore, providing beneficial impacts to individuals within the project area.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-21 Alternative 4 - Direct and Indirect Effects Indicators (mule deer)

Indicators	
Summer Concentration Areas	
Miles of routes added to the NFTS within summer concentration areas	11.52
Miles of ML1 roads converted to trails within summer concentration areas	1.67
Existing density (mi/mi2) of routes under STF jurisdiction within summer concentration areas	0.97
Density (mi/mi2) of routes under STF jurisdiction within summer concentration areas with proposed designated routes (additional density)	1.0 (0.07)
Percentage of summer concentration areas occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	2.60%
Critical Summer Range	
Miles of routes added to the NFTS within critical summer range	0.43
Miles of ML1 roads converted to trails within critical summer range	1.36
Existing density (mi/mi2) of routes under STF jurisdiction within critical summer range	0.72
Density (mi/mi2) of routes under STF jurisdiction within critical summer range with proposed designated routes (additional density)	0.74 (0.02)
Percentage of critical summer range occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	2.06%
Winter Concentration Areas	
Miles of routes added to the NFTS within winter concentration areas	35.41
Miles of ML1 roads converted to trails within winter concentration areas	28.61
Existing density (mi/mi2) of routes under STF jurisdiction within winter concentration areas	2.56
Density (mi/mi2) of routes under STF jurisdiction within winter concentration areas with proposed designated routes (additional density)	2.78 (0.22)
Percentage of winter concentration areas occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	9.74%
Critical Winter Range	
Miles of routes added to the NFTS within critical winter range	16.1
Miles of ML1 roads converted to trails within critical winter range	6.53
Existing density (mi/mi2) of routes under STF jurisdiction within critical winter range	2.33
Density (mi/mi2) of routes under STF jurisdiction within critical winter range with proposed designated routes (additional density)	2.62 (0.29)
Percentage of critical winter range occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	9.67%

Alternative 5 (Resources)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within mule deer habitat. This would reduce the risk of direct and indirect effects to mule deer from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-22). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a significant decrease from Alternative 1 in the number of routes added to the system or converted to a trail within winter and summer range habitat, there would be a significant decrease in the direct and indirect effects to individual mule deer within the project area. Although these impacts would have adverse effects on some individuals, they would not likely be significant enough to result in impacts to mule deer populations within the project area.

Season of Use: Mule deer spend a significant portion of the year at lower elevations and may be particularly prone to disturbance when concentrated on winter range. This alternative would result in seasonal closures (as identified for each route in Appendix I) on approximately 73% of winter concentration areas and 73% of critical winter range. These closures would reduce disturbance to deer; therefore, providing beneficial impacts to individuals within the project area.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-22 Alternative 5 - Direct and Indirect Effects Indicators (mule deer)

Indicators	
Summer Concentration Areas	
Miles of routes added to the NFTS within summer concentration areas	2.36
Miles of ML1 roads converted to trails within summer concentration areas	0.36
Existing density (mi/mi2) of routes under STF jurisdiction within summer concentration areas	0.97
Density (mi/mi2) of routes under STF jurisdiction within summer concentration areas with proposed designated routes (additional density)	0.98 (0.01)
Percentage of summer concentration areas occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	<1%
Critical Summer Range	
Miles of routes added to the NFTS within critical summer range	0
Miles of ML1 roads converted to trails within critical summer range	0
Existing density (mi/mi2) of routes under STF jurisdiction within critical summer range	0.72
Density (mi/mi2) of routes under STF jurisdiction within critical summer range with proposed designated routes (additional density)	0.72 (0.0)
Percentage of critical summer range occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	0%
Winter Concentration Areas	
Miles of routes added to the NFTS within winter concentration areas	10.57
Miles of ML1 roads converted to trails within winter concentration areas	3.66
Existing density (mi/mi2) of routes under STF jurisdiction within winter concentration areas	2.56
Density (mi/mi2) of routes under STF jurisdiction within winter concentration areas with proposed designated routes (additional density)	2.63 (0.07)
Percentage of winter concentration areas occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	1.80%
Critical Winter Range	
Miles of routes added to the NFTS within critical winter range	1.74
Miles of ML1 roads converted to trails within critical winter range	0
Existing density (mi/mi2) of routes under STF jurisdiction within critical winter range	2.33
Density (mi/mi2) of routes under STF jurisdiction within critical winter range with proposed designated routes (additional density)	2.36 (0.03)
Percentage of critical winter range occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	1.02%

CUMULATIVE EFFECTS

Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the STF and private lands within the Forest boundary. Some, but not all, of these activities will contribute to effects upon mule deer. CDFG (1998) identified the following primary factors influencing deer populations in the Central Sierra Nevada: (1) reduced forage availability resulting from fire exclusion; (2) reduced forage and cover resulting from logging, forest thinning, and/or herbicide treatments; (3) reduced forage and cover resulting from livestock grazing in meadows; and (4) loss of habitat to private land development.

Within the project area, hazardous fuels reduction and associated timber harvest have occurred on approximately 25,410 acres of NFS land since 2000 (Appendix B). These treatments are anticipated to be the primary activity that will alter forest vegetation within deer ranges over the next several years. These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Poor forage condition has largely attributed to fire suppression and changing forest management practices on public and private land (forest thinning treatments, rather than clearcutting and group selection timber harvest) (CDFG 1982, CDFG 1998). Thinning and mastication can benefit deer by removing dense overstory vegetation thereby encouraging the growth of young brush, grasses, and forbs in the understory, which is preferred by deer for forage. Thinning of conifers also releases the remaining oaks and encourages new oak sprouts. The benefit of thinning on deer habitat has been questioned, however, due to concern that the treatments remove hiding and thermal cover over large acreages and may result in a decline in forage in the short term (Kucera and Barrett 1995 In CDFG 1998, Barrett et al. 2004). Although these treatments will reduce deer hiding cover and may reduce forage for several years, forage values are expected to improve in the long-term, especially where followed by additional prescribed burning treatments.

Fire suppression has also resulted in decreasing forage availability for deer. Since 2000, approximately 103,000 acres of NFS land have burned in wildfires. These fires have likely increased forage availability across the broad landscape, but the intensity and large size of the fires did not result in optimum distribution of openings and cover. Within the project area, prescribed burning has occurred on about 22,500 acres between 2000 and 2008. Prescribed burning can help offset the negative effects of fire suppression and is widely accepted as a valuable tool to enhance deer habitat (CDFG 1998). Burning enhances many plants favored by deer for forage by stimulating new growth on sprouting species, germinating seeds in fire-adapted species, thinning understory vegetation to allow more light to the forest floor, and consuming part of the duff layer to enhance the seedbed.

Table 3.11-23 Ranking of Alternative Indicators (mule deer)

Indicators	Rankings by Alternatives [1]				
	1	**2**	**3**	**4**	**5**
Summer Concentration					
Miles of routes added to the NFTS within summer concentration areas	3	1	5	2	4
Miles of ML1 roads converted to trails within summer concentration areas	3	1	5	2	4
Density (mi/mi2) of routes under STF jurisdiction within summer concentration areas with proposed designated routes (additional density)	3	1	5	2	4
Percentage of summer concentration areas occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	3	1	5	2	4
Critical Summer					
Miles of routes added to the NFTS within critical summer range	4	1	5	3	4
Miles of ML1 roads converted to trails within critical summer range	3	1	5	3	4
Density (mi/mi2) of routes under STF jurisdiction within critical summer range with proposed designated routes (additional density)	4	1	5	3	4
Percentage of critical summer range occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	3	1	5	2	4
Winter Concentration					
Miles of routes added to the NFTS within winter concentration areas	3	1	5	2	4
Miles of ML1 roads converted to trails within winter concentration areas	3	1	5	2	4
Density (mi/mi2) of routes under STF jurisdiction within winter concentration areas with proposed designated routes (additional density)	3	1	5	2	4
Percentage of winter concentration areas occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	3	1	5	2	4
Critical Winter					
Miles of routes added to the NFTS within critical winter range	3	1	5	2	4
Miles of ML1 roads converted to trails within critical winter range	3	1	5	2	4
Density (mi/mi2) of routes under STF jurisdiction within critical winter range with proposed designated routes (additional density)	3	1	5	2	4
Percentage of critical winter range occurring within a 200 meter “zone of influence” of routes added to the NFTS or ML1 roads converted to trails	3	1	5	2	4
Average	**3.13**	**1**	**5**	**2.19**	**4**

[1] score of 5 indicates the alternative is the best for terrestrial biota related to the indicator; A score of 1 indicates the alternative is the worst for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.

CDF currently lists a total of 2,365 acres of private land within the STF administrative boundary for which timber harvest plans have been submitted. On private timberlands, harvest methods include selective thinning and regeneration (clearcut) and then are reforested using herbicides to suppress competing vegetation. Clearcut harvest can benefit deer by promoting early succession vegetation that deer prefer, but the benefit to foraging habitat is limited in quality, quantity, and duration by reforestation efforts (CDFG 1998, deVos et al. 2003). Early succession habitat is available to deer for

8 to 12 years under these conditions as opposed to up to 30 years under natural regeneration (deVos et al. 2003).

Livestock grazing, particularly within meadows and aspen stands, has reduced the quality of fawning and foraging habitats for deer. Monitoring of the condition and trend of Sierra montane meadows indicates that meadow condition across the bioregion shows a slight upward trend (Green 2003). Livestock grazing occurs on 35 active grazing allotments on the STF, totaling approximately 792,042 acres of NFS and private lands. On the STF, the impacts of livestock grazing on meadows is variable between years, but has been steadily decreasing as forage utilization levels are being reduced by stricter standards established by the Sierra Nevada Forest Plan Amendment.

Although mule deer populations “ultimately are limited by habitat quality and quantity,” other stressors can exacerbate decline, particularly in poor habitat conditions (deVos et al. 2003, Barrett et al. 2004). At present, livestock grazing influences the quality of meadow habitat used by all mule deer in the project area, and fuels treatments may be reducing cover or forage in localized areas (though forage may be improving in areas treated more than five to ten years ago). Existing roads influence a considerable portion of deer habitat and surfaced roads (e.g. highways) also result in increased mortality from collisions. Other types of recreation, including hiking and equestrian use along 394 miles maintained as non-motorized trails, result in disturbance and displacement effects that may be similar to those described for the motorized routes in the project Alternatives. The combined effects of forest uses and management actions upon deer and their habitat is complex (deVos et al. 2003).

SUMMARY OF EFFECTS

Mule deer populations are stable to slightly decreasing throughout the project area (CDFG 1980, CDFG 1981, CDFG 1984). With the exception of Alternative 3, which would have beneficial impacts to the mule deer, the direct and indirect effects of the project alternatives (1, 2, 4 and 5) combined with the cumulative effects would likely result in impacts to some individuals but would not likely impact populations within the project area. As described in the project MIS report, project alternatives may affect habitat quality but will not alter the existing habitat trend, nor will it lead to a change in the distribution of mule deer across the Sierra Nevada bioregion (Pyron 2009, see project record).

Riparian Associated Species

Bald Eagle – Affected Environment

Species and Habitat Account

The bald eagle is a large raptor that is found throughout North America. Down listed from Endangered to a Sensitive species, the bald eagle has experienced range wide population increases since a nationwide ban on the use of DDT, a pesticide which causes eggshell thinning and low reproduction success. Bald eagles are strongly associated with large riparian areas since their primary prey species are waterfowl and fish. On the STF, bald eagles are commonly seen wintering along numerous bodies of water including: Beardsley Reservoir, Cherry Lake, and Lyons Lake. The STF has four bald eagle management areas and two known nest sites. Neither of the nest sites are within the designated bald eagle management areas, but are located near the bald eagle management areas on the shores of Beardsley Reservoir and Cherry Lake. Two other areas that may provide suitable nesting habitat for bald eagles are Salt Springs Reservoir and Lyons Lake. Bald eagles have been observed at both of these locations, but despite numerous surveys nesting has never been documented.

Bald Eagle – Environmental Consequences

Indicators

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the bald eagle. Although thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Miles of routes added to the NFTS within Designated Territories.
- Miles of ML1 roads converted to trails within Designated Territories.
- Miles of routes added to the NFTS within 660 feet of nest sites.
- Miles of ML1 roads converted to trails within 660 feet of nest sites.
- Miles of routes added to NFTS within 400 meters of lakes/reservoirs used for foraging.
- Miles of ML1 roads converted to trails within 400 meters of lakes/reservoirs used for foraging.

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the bald eagle by:

- Prohibiting cross-country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on bald eagles through: human-caused mortality, changes in behavior, and habitat modification.

Human-Caused Mortality: In general, the road and trail-associated factors that have been identified for the bald eagle include poaching, disturbance at specific site (nests and roost sites), and avoidance and displacement (Skagen et al. 1991, Stalmaster and Newman 1978).

Changes in Behavior: In general, the road and trail-associated factors that have been identified for the bald eagle include poaching, disturbance at specific site (nests and roost sites), and avoidance and displacement (Skagen et al. 1991, Stalmaster and Newman 1978).Individuals will show different thresholds of tolerances for disturbance, but are particularly vulnerable during the breeding season. Several studies reported that eagles avoid or are adversely affected by human disturbance during the breeding period and may result in nest abandonment and reproductive failure (Stalmaster and Newman 1978, Andrew and Mosher 1982, Fraser 1985, Fraser et al. 1985, Knight and Skagen 1988, Buehler et al. 1991, Grubb and King 1991, Grubb et al. 1992, Chandler et al. 1995, Grubb 1995, Trombulak and Frissell 2000). Although disturbance has been shown to adversely affect nesting bald eagles, individual pairs of bald eagles may be more tolerant to disturbance. For example, the Tahoe National Forest documented a bald eagle nest, in 2005, near a County road that was used to access a popular reservoir. A similar case has been documented on the Stanislaus National Forest where the pair continues to successfully reproduce.

Adding routes to the NFTS or converting ML1 roads to trails may result in increased disturbance to nesting or foraging bald eagles. To reduce disturbance to nesting bald eagles, land management agencies typically implement restrictions on certain activities within a specified distance (buffer) of nests. Recommended buffers around nests have typically varied between 100 and 800 meters (Anthony and Isaacs 1989, Fraser et al. 1985, McGarigal 1988, Stalmaster 1987, USFWS 2007). Latest recommendations from USFWS (2007) suggest 660 feet where there is increased visibility and exposure to noise. To minimize disturbance to foraging bald eagles routes motorized vehicles use should be minimized or not allowed between nesting or roosting sites and foraging areas (USFWS 2007).

Habitat Modification: Travel management and motorized activity may also indirectly affect bald eagles through impacts to potentially suitable roost or nest trees and to their prey base. Forest policy requires that hazard trees are removed along roads for public safety, often resulting in a reduction of snags within a 60 meter zone along both sides of some NFTS roads. Hazard tree removal along NFTS roads has the potential to reduce potential nest and roost sites for bald eagles. Hazard tree removal is typically conducted along Maintenance Level 2, 3, 4 and 5 roads (not Maintenance Level 1 roads or trails). The project alternatives primarily propose actions on trails and maintenance level (ML) 1 roads. Changing use, converting roads to trails, and proposing closures that are proposed on ML 1 and 2 roads within any of the project alternatives would result in a net reduction in miles of road on which hazard trees may be removed. These actions will provide a benefit to wildlife through snag and woody downed log retention. Therefore, the minor amounts of impact that the project alternatives may have on future hazard tree removal would be beneficial to bald eagle habitat.

Although bald eagles are opportunistic foragers, their primary prey base is fish. Roads and trails may contribute sediment to nearby streams, thereby reducing the quantity and quality of fish spawning habitat. Although the action alternatives would result in some sedimentation to select drainages within the project area, the primary foraging areas for bald eagles in the project area are lakes and reservoirs. These lakes and reservoirs contain abundant populations of fish, which provide an adequate prey base for bald eagles. Sedimentation resulting from the action alternatives will result in an immeasurable decrease in fish populations associated with bald eagle foraging.

Alternative 1 (Proposed Action)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within Designated Territories, near nest sites, and near foraging areas. This would reduce the risk of direct and indirect effects to bald eagles from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-24). Actions proposed in this alternative would not likely result in any human-caused mortality, but would likely increase disturbance to bald eagles within the project area. This alternative would add approximately 0.79 miles of unauthorized routes to the NFTS and would convert approximately 0.93 miles of ML1 road to trail within 400 meters of bald eagle foraging areas. These changes would likely result in disturbance to some individual eagles.

Actions proposed in this alternative would not likely result in any indirect effects to bald eagles through habitat modification. These actions would not result in any adverse impacts to available roost or nest sites nor would they measurably impact the bald eagles' prey base.

Season of Use: Although the exact timing may vary, bald eagles may start nesting in late winter into early spring. Bald eagle nest sites and foraging areas are located within Zone 2 and Zone 3 (as identified for each route in Appendix I) of the seasonal closure. These closures would reduce disturbance to over-wintering individuals and bald eagle pairs during the early portion of their nesting season.

Mitigation Measures: Mitigation measures would not be implemented near any bald eagle nest sites or within any Designated Territories. The only types of mitigation measures that would be implemented near reservoirs used for foraging are tread hardening and drain dips. Implementation of these mitigation measures would include hand tool and machine work that may result in short-term disturbance to individual foraging eagles within the project area. This amount of disturbance would not likely reduce any individual bald eagles fitness and would not result in any population level impacts within the project area.

Table 3.11-24 Alternative 1 - Direct and Indirect Effects Indicators (bald eagle)

Indicators	
Miles of routes added to the NFTS within Designated Territories	0
Miles of ML1 roads converted to trails within Designated Territories	0
Miles of Routes added to the NFTS within 660 feet of nest sites	0
Miles of ML1 roads converted to trails within 660 feet of nest sites	0
Miles of routes added to the NFTS within 400 meters of lakes/reservoirs used for foraging	0.79
Miles of ML1 roads converted to trails within 400 meters of lakes/reservoirs used for foraging	0.93

Alternative 2 (No Action)

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to bald eagles. These effects would be similar to those discussed within Alternative 4 for the short-term, but would be exacerbated over the long-term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to bald eagles.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within Designated Territories, near nest sites, and near foraging areas. This would reduce the risk of direct and indirect effects to bald eagles from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to bald eagles.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 4 (Recreation)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within Designated Territories, near nest sites, and near foraging areas. This would reduce the risk of direct and indirect effects to bald eagles from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-25). Direct and indirect effects of the actions proposed in this alternative would be the same as those discussed in Alternative 1.

Season of Use: Although the exact timing may vary, bald eagles may start nesting in late winter into early spring. Bald eagle nest sites and foraging areas are located within Zone 2 and Zone 3 (as identified for each route in Appendix I) of the seasonal closure. These closures would reduce disturbance to over-wintering individuals and bald eagle pairs during the early portion of their nesting season.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-25 Alternative 4 - Direct and Indirect Effects Indicators (bald eagle)

Indicators	Miles
Miles of routes added to the NFTS within Designated Territories	0
Miles of ML1 roads converted to trails within Designated Territories	0
Miles of Routes added to the NFTS within 660 feet of nest sites	0
Miles of ML1 roads converted to trails within 660 feet of nest sites	0
Miles of routes added to the NFTS within 400 meters of lakes/reservoirs used for foraging	0.79
Miles of ML1 roads converted to trails within 400 meters of lakes/reservoirs used for foraging	0.93

Alternative 5 (Resources)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within Designated Territories, near nest sites, and near foraging areas. This would reduce the risk of direct and indirect effects to bald eagles from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-26). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a decrease from Alternative 1 in the number of routes added to the system or converted to a trail near foraging habitat, there would be a decrease in the direct effects to bald eagles within the project area. Since these impacts would affect a very small percentage of suitable and occupied habitat (Table 3.11-26), these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long-term.

Season of Use: Although the exact timing may vary, bald eagles may start nesting in late winter into early spring. Bald eagle nest sites and foraging areas are located within Zone 2 and Zone 3 (as identified for each route in Appendix I) of the seasonal closure. These closures would reduce disturbance to over-wintering individuals and bald eagle pairs during the early portion of their nesting season.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-26 Alternative 5 - Direct and Indirect Effects Indicators (bald eagle)

Indicators	Miles
Miles of routes added to the NFTS within Designated Territories	0
Miles of ML1 roads converted to trails within Designated Territories	0
Miles of Routes added to the NFTS within 660 feet of nest sites	0
Miles of ML1 roads converted to trails within 660 feet of nest sites	0
Miles of routes added to the NFTS within 400 meters of lakes/reservoirs used for foraging	0.56
Miles of ML1 roads converted to trails within 400 meters of lakes/reservoirs used for foraging	0

CUMULATIVE EFFECTS

Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the STF and private lands within the Forest boundary. Some, but not all, of these activities will contribute to effects upon bald eagles. The primary risks to the bald eagles have been identified as: (1) ingestion of poisonous substances; (2) collision with stationary or moving structures or objects; (3) degradation of wintering or breeding habitat through human development or habitat alteration; and (4) disturbance at nest and roost sites (Birds of North America).

On the STF, increasing recreation use and associated disturbances at reservoirs, and habitat alteration associated with fuels reduction projects, are the primary factors influencing bald eagles or their habitat. Recreation disturbance at known nest locations has been limited through the use of area closures, but boating and campground activity may result in some degree of habitat avoidance by foraging eagles, or may result in avoidance of potential nesting habitats. Reservoirs on the STF vary in size, but typically provide large areas of undisturbed habitat due to the surrounding topography. Since fuels reduction projects are not removing large trees or snags, they are generally not reducing the quality of nesting habitat, and treatments are expected to make habitat more sustainable in the event of a wildfire.

The direct and indirect effects of the project alternatives contribute to two of the four risk factors described above. Alternative 2 has the greatest potential to result in disturbance to nesting and foraging bald eagles since cross-country travel would not be prohibited and vehicles could potentially gain access near foraging areas and nest sites. Since the three action alternatives would only result in small amounts of route near foraging areas and no routes near nest sites, they would only have very minor impacts to individual foraging bald eagles within the project area. The effects of the action alternatives when combined with the effects of current and future recreation activities may result in minor adverse cumulative effects to some individuals and would not likely measurably impact populations.

SUMMARY OF EFFECTS

Bald eagle populations are estimated to be increasing range-wide (USDA 2007). With the exception of Alternative 3, which would have beneficial impacts to the bald eagle, the direct and indirect effects of the project alternatives (1, 2, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Table 3.11-27 Ranking of Alternative Indicators (bald eagle)

Indicators	Rankings by Alternatives [1]				
	1	2	3	4	5
Miles of routes added to the NFTS within Designated Territories	4	1	5	4	4
Miles of ML1 roads converted to trails within Designated Territories	4	1	5	4	4
Miles of routes added to the NFTS within 660 feet of nest sites	4	1	5	4	4
Miles of ML1 roads converted to trails within 660 feet of nest sites	4	1	5	4	4
Miles of routes added to the NFTS within 400 meters of lakes/reservoirs used for foraging	3	1	5	3	4
Miles of ML1 roads converted to trails within 400 meters of lakes/reservoirs used for foraging	3	1	5	3	4
Average	**3.66**	**1**	**5**	**3.66**	**4**

[1] score of 5 indicates the alternative is the best for terrestrial biota related to the indicator; A score of 1 indicates the alternative is the worst for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.

Great Gray Owl – Affected Environment

Species and Habitat Account

The great gray owl is a large nocturnal owl that is not easily observed. It is found in the boreal climatic zones of North America from Alaska to central California (Collins 1980, Mikkola 1983). The population that inhabits California represents the southern extent of its range (van Riper III and Wagtendonk 2006). Yosemite National Park and the STF currently represent the core range of the great gray owl in California. There are currently 21 documented great gray owl PACs on the STF, which are primarily located on the southern portion of the Forest. Great gray owl PACs are defined as "at least 50 acres of the highest quality nesting habitat available in the forested area surrounding nests and the meadow or meadow complex that support a prey base for the nesting owls" (USDA 2004). Although there are 21 designated PACs within the project area, activity centers have only been designated for 12 of them. PACs that do not currently have a designated activity center have not had any documented activity for a significant period of time. Activity centers for the PACs may not necessarily be nest sites, but may be the location of a roost site or territorial call. This data may vary in its accuracy, but it is currently considered the best available information and provides a means by which to evaluate the relative impacts of each of the project alternatives.

Great gray owls are found in mixed conifer forests, but are highly dependent upon meadows for foraging habitat (Winter 1981). A radio telemetry study in and around Yosemite National Park found that over 80% of the owl relocations were within 200 meters of meadows (Winter 1982). For this analysis, great gray owl emphasis habitat will be defined as meadows greater than 15 acres that are within 5 miles of existing PACs. Since great gray owls have been found to prefer areas within 200 meters of meadows, a 200 meter buffer will be applied to these meadows and included in the emphasis habitat. The results of this habitat delineation indicated that there are approximately 3,077 acres of meadows and a total of approximately 13,971 acres of emphasis habitat (includes buffer acres) within the project area.

Great Gray Owl – Environmental Consequences

Indicators

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the great gray owl. Although thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Miles of routes added to the NFTS within great gray owl PACs
- Miles of ML1 roads converted to trails within great gray owl PACs
- Great gray owl PACs intersected by routes added to the NFTS or ML1 roads converted to trails (number of PACs)
- Great gray owl PACs intersected by routes added to the NFTS or ML1 roads converted to trails (Percentage of all PACs in Project Area)
- Miles of routes added to the NFTS within 400 meters of documented great gray owl activity centers
- Miles of ML1 roads converted to trails within 400 meters of documented great gray owl activity centers
- Miles of routes added to the NFTS within great gray owl emphasis habitat
- Miles of ML1 roads converted to trails within great gray owl emphasis habitat

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the great gray owl by:

- Prohibiting cross-country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on owls through: human-caused mortality, changes in behavior, and habitat modification.

Human-Caused Mortality: Collisions with motor vehicles have been documented in several locations and have been a significant source of trauma and mortality in some areas (Lopes et al. 2007, USDA 2004). The Cascades Raptor Center (2007) reported that collisions with vehicles “was the greatest cause of mortality” in great gray owls. There have been at least two reported collisions near the project area on Highways 120 and 140. Collisions with vehicles typically occur along well maintained roadways that allow high rates of travel. Routes proposed for designation within the project alternatives are native surfaced routes that allow much slower rates of travel. These types of routes would result in far fewer, if any collisions.

Changes in Behavior: Although there is very little documented information regarding disturbance from human activity to great gray owls, it will be assumed that great gray owls would respond to noise and human disturbance in much the same way as other owls. Therefore, changes in behavior are anticipated to be similar to those disclosed in the California spotted owl analysis. The Forest Service, Region 5, has generally assumed that activities (including road and trail use) occurring farther than 0.25 miles from California spotted owl nest sites have little potential to affect owl nesting (USDA 2004). The miles of routes that will be added to the NFTS with 0.25 miles of activity centers will be determined for each of the alternatives. Although activity centers have not been documented for each of the PACs and all of the activity centers may not be known nest sites, this analysis will serve as an indicator of the amount of disturbance that may occur to nest sites.

Habitat Modification: The use of meadows for nest sites or foraging is likely affected by the quality of the meadow habitat. Meadow habitat quality may be affected numerous different ways by motorized travel. The most obvious way motorized vehicles may impair meadow quality is through direct mechanical damage (rutting). Since soil typically has lower bulk density and can be more easily penetrated when it is wet, mechanical damage often occurs in meadows that are naturally wet or in dry meadows after significant rainfall or immediately following the retreat of the snow at higher elevations. When roads or trails are created in meadows they may intercept surface and subsurface flow (Kattelmann 1996). When flows are intercepted and redirected, meadow drying occurs, changing the fauna and flora associated with it.

Changing the faunal community within meadows may impact quantity and quality of great gray owl foraging. Two species that have been noted as being important prey items to great gray owls are microtines and pocket gophers (Franklin 1988, Winter 1981, Winter 1982). Winter (1981) and (1982) found that microtines may be a preferred prey item for great gray owls in the Sierra Nevada area and may be essential for successful reproduction. He further suggested that Microtus were also associated with moist areas that had good grass cover. Therefore, slight shifts in meadow hydrology caused by motorized travel may impact suitable habitat for mictrotines; thereby potentially adversely affecting the quantity and quality of great gray owl prey.

Alternative 1 (Proposed Action)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near great gray owl activity centers, PACs, and emphasis habitat. This would reduce the risk of direct and indirect effects to the great gray owl from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct effects from adding routes to the NFTS, two analyses were completed: 1) miles of routes that would be added to the NFTS within great gray owl PACs and, 2) miles of routes that would be added to the NFTS within 400 meters of documented great gray owl activity centers (Table 3.11-28). Alternative 1 would result in the addition of 0.56 miles of motorized routes to 2 separate great gray owl PACs (Crocker Meadow and Ackerson 3) and 0.28 miles of routes within 400 meters of one Activity Center (Table 3.11-28). Although the Crocker Meadow and Ackerson 3 PACs have not had any recently documented activity, great gray owls use the entire Ackerson meadow complex and the addition of these routes may increase disturbance to some individual great gray owls within the project area. Increases in disturbance resulting from the addition of these routes would not likely be significant enough to reduce any individual owl's fitness; therefore, it would not result in any population level impacts to the great gray owl.

To determine the relative risk of the indirect effects of adding routes to the NFTS, two analyses were completed: 1) miles of routes that would be added to the NFTS within great gray owl PACs and, 2) miles of routes added to the NFTS within great gray owl emphasis habitat. Field surveys were completed on the routes that proposed to be added to the NFTS within the PACs. The route that was proposed to be added within the Crocker Meadow PAC does not cross any streams nor does it enter the meadow. Therefore, the addition of this route to the NFTS would not have significant impacts to the hydrology of the meadow. One of the routes that were proposed to be added to the NFTS within the Ackerson 3 PAC crosses a small unnamed tributary to Ackerson Creek. The route and the crossing are not within the meadow. The addition of this route would not likely result in significant impacts to the hydrology of the meadow complex. If GIS analysis indicated that a route within great gray owl emphasis habitat crossed a stream, a field survey was completed on the route. The GIS analysis indicated that there were two routes (FR98514 and FR98486) within great gray owl emphasis habitat that crossed streams. After completing field surveys on these routes it was determined that they would not result in any adverse impact to the hydrology of the meadows.

Season of Use: Although the exact timing may vary, great gray owls start nesting near the month of March. Since seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period and approximately 90% of the great gray owl PACs would be within these Zones, these closures would reduce disturbance to those individuals returning to their breeding territories and starting to nest.

Mitigation Measures: The only type of mitigation measure that would be implemented within PACs is no-dig barriers. There would not be any mitigation measures implemented within 400 meters of activity centers. The installation of no-dig barriers would be completed with hand tools and would not likely result in any disturbance to owls within the PAC.

Table 3.11-28 Alternative 1 - Direct and Indirect Effects Indicators (great gray owl)

Indicators	
Miles of routes added to the NFTS within PACs	0.56
Miles of ML1 roads converted to trails within PACs	0.24
PACs intersected by routes added to the NFTS or ML1 roads converted to trails (number of PACs)	3
PACs intersected by routes added to the NFTS or ML1 roads converted to trails (Percentage of all PACs in Project Area)	14
Miles of routes added to the NFTS within 400 meters of Activity Centers	0.28
Miles of ML1 roads converted to trails within 400 meters of Activity Centers	0
Miles of routes added to the NFTS within emphasis habitat	1.63
Miles of ML1 roads converted to trails within emphasis habitat	1.16

Alternative 2 (No Action)

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to great gray owls. These effects would be similar to those discussed within Alternative 4 for the short-term, but would be exacerbated over the long-term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to great gray owls.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near great gray owl activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to the great gray owl from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to great gray owl.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 4 (Recreation)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near great gray owl activity centers, PACs, and emphasis habitat. This would reduce the risk of direct and indirect effects to the great gray owl from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-29). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. The only exception is that there would be an additional 0.08 miles of routes added to the NFTS within great gray owl emphasis habitat. GIS analysis indicated that this route would not cross any streams nor would it impact the hydrology of the meadow.

Season of Use: Although the exact timing may vary, great gray owls start nesting near the month of March. Since seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period and approximately 90% of the great gray owl PACs would be within these Zones, these closures would reduce disturbance to those individuals returning to their breeding territories and starting to nest.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-29 Alternative 4 - Direct and Indirect Effects Indicators (great gray owl)

Alternative 4 - Great Gray Owl - Direct and Indirect Effects Indicators	
Miles of routes added to the NFTS within PACs	0.56
Miles of ML1 roads converted to trails within PACs	0.24
PACs intersected by routes added to the NFTS or ML1 roads converted to trails (number of PACs)	3
PACs intersected by routes added to the NFTS or ML1 roads converted to trails (Percentage of all PACs in Project Area)	14
Miles of routes added to the NFTS within 400 meters of Activity Centers	0.28
Miles of ML1 roads converted to trails within 400 meters of Activity Centers	0
Miles of routes added to the NFTS within emphasis habitat	1.71
Miles of ML1 roads converted to trails within emphasis habitat	1.19

Alternative 5 (Resources)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near great gray owl activity centers, PACs, and emphasis habitat. This would reduce the risk of direct and indirect effects to the great gray owl from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-30). This Alternative would not result in the addition of any routes to the NFTS within great gray owl PACs or within 400 meters of Activity Centers. Therefore, this Alternative would not likely result in any direct effects to the great gray owl. This Alternative would result in the addition of 0.53 miles of routes to NFTS within emphasis habitat. GIS analysis indicated that this route would not cross any streams nor would it impact the hydrology of the meadow. This Alternative would not result in any adverse impacts to great gray owl emphasis habitat; therefore, it would not likely have any indirect effect to the great gray owl.

Season of Use: Although the exact timing may vary, great gray owls start nesting near the month of March. Since seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period and approximately 90% of the great gray owl PACs would be within these Zones, these closures would reduce disturbance to those individuals returning to their breeding territories and starting to nest.

Mitigation Measures: There would not be any mitigation measures implemented as part of this alternative.

Table 3.11-30 Alternative 5 - Direct and Indirect Effects Indicators (great gray owl)

Indicators	
Miles of routes added to the NFTS within PACs	0
Miles of ML1 roads converted to trails within PACs	0
PACs intersected by routes added to the NFTS or ML1 roads converted to trails (number of PACs)	0
PACs intersected by routes added to the NFTS or ML1 roads converted to trails (Percentage of all PACs in Project Area)	0
Miles of routes added to the NFTS within 400 meters of Activity Centers	0
Miles of ML1 roads converted to trails within 400 meters of Activity Centers	0
Miles of routes added to the NFTS within emphasis habitat	0.53
Miles of ML1 roads converted to trails within emphasis habitat	0

CUMULATIVE EFFECTS

Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the STF and private lands within the Forest boundary. Some, but not all, of these activities will contribute to effects upon great gray owls. Factors responsible for low numbers of great gray owls breeding in the Sierra Nevada are not fully known. During the past century, the widespread removal of large trees from mature and oldgrowth forest has reduced the abundance of potential nest trees, fire suppression has allowed meadow foraging habitats to decrease in size, and livestock grazing altered meadow hydrology, potentially reducing prey abundance (Verner 1994).

Livestock grazing occurs on 35 active grazing allotments on the STF, totaling approximately 792,042 acres of NFS and private lands. In some meadows, livestock grazing has reduced the suitability of meadow vegetation for microtine rodents and other great gray owl prey (USDA 2001). On the STF, the impacts of livestock grazing on meadows is variable between years, but has been steadily decreasing as forage utilization levels are being reduced by stricter standards established by the Sierra Nevada Forest Plan Amendment. Furthermore, some meadows within PACs are protected by grazing exclosures designed to reduce the impacts of grazing and improve cover for great gray owl prey. Although improvements have been made, livestock grazing has historically and may continue to have cumulative effects on cover for great gray owl prey within meadows in the project area.

Although human disturbance has not been recognized as a significant threat to great gray owls, the use of motorized vehicles in meadow habitats can have significant impacts to meadow hydrology and the associated flora and fauna. The greatest risk of impacts to great gray owls and their habitats is in Alternative 2 since it would not prohibit cross-country travel and meadows are often easily accessed by vehicles. Therefore, the direct and indirect effects of Alternative 2 and the effects of continued livestock grazing may have significant impacts to individuals. Although the population of great gray owls within the project area is not precisely known, it is known to be relatively small with a limited distribution. Impacts to meadows that maybe associated with unabated cross-country travel would likely impact enough individuals to result in measurable reductions to the population size within the project area.

The direct and indirect effects of motorized routes within meadows in Alternatives 1, 4 and 5, combined with the effects of past and continued livestock grazing, may adversely affect meadow habitats and associated species (as described above). Since the action alternatives would only result in disturbance to some individuals and would not impact meadow hydrology they would not likely result in impacts to any individual’s fitness or populations with the project area.

Table 3.11-31 Ranking of Alternative Indicators (great gray owl)

Indicators	Rankings by Alternatives [1]				
	1	**2**	**3**	**4**	**5**
Miles of routes added to the NFTS within PACs	3	1	5	3	4
Miles of ML1 roads converted to trails within PACs	3	1	5	3	4
Number of PACs intersected by routes added to the NFTS or ML1 roads converted to trails	3	1	5	3	4
Miles of routes added to the NFTS within 400 meters of Activity Centers	3	1	5	3	4
Miles of ML1 roads converted to trails within 400 meters of Activity Centers	3	1	5	3	4
Miles of routes added to the NFTS within emphasis habitat	3	1	5	2	4
Miles of ML1 roads converted to trails within emphasis habitat	3	1	5	2	4
Average	**3**	**1**	**5**	**2.71**	**4**

[1] score of 5 indicates the alternative is the best for terrestrial biota related to the indicator; A score of 1 indicates the alternative is the worst for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.

SUMMARY OF EFFECTS

Since great gray owls have limited distribution within the project area and within the Sierra Nevada, population level impacts associated with Alternative 2 may result in a trend toward listing and may impact the viability of the species. Alternative 3 would prohibit cross-country travel and would not add any routes to the NFTS, therefore this alternative would have beneficial impacts to the great gray owl. The direct and indirect effects of the action alternatives (1, 4 and 5) combined with the cumulative effects to habitat are not likely to result in a trend toward Federal listing or a loss of viability for the great gray owl. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Aquatic Biota

Effects Common to all Aquatic Wildlife

Due to their limited distribution on the landscape and life history requirements, most species of aquatic wildlife are similarly affected by motorized travel. Although Gaines et al. (2003) described the effects of recreation routes on "riparian species", the effects to aquatic species are very similar and can be categorized in much of the same way. Therefore, the effects of motorized travel on aquatic species may be categorized by human-caused mortality, changes in behavior, and habitat modification. Generally, site-specific studies on the species interaction with road and trail-associated factors is lacking in the literature. Where site-specific information or literature on road and trail associated factors to aquatic species is unavailable, general information on potential impacts is presented. Additional information on the effects to the aquatic environment is presented in Chapter 3.10, Watershed Resources.

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

Introduction of toxins, non-native organisms, parasites, and disease vectors are the final ways which motorized travel may result in human-caused mortality. When vehicles travel along a route near a stream or cross a stream at a ford, small amounts of toxins may be introduced to the environment. Although there is a low risk that individuals will be exposed to lethal levels of any of these toxins, small exposures may elicit immune responses within individuals. McCallum and Trauth (2007) found that male northern cricket frogs that elicited immune responses had reduced fertility rates. Therefore, introduction of toxins at low levels may result in reduced reproductive fitness of some aquatic species.

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

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

Indirect affects of disturbance are commonly displayed through changes in an individual’s time and energy budget. As a vehicle or human approaches an individual, the most obvious and common disturbance response is for that individual to avoid the threat and seek cover. After an individual exhibits the disturbance response, a period of time will elapse until that individual resumes pre-disturbance behavior. Since this change in an individual’s time budget may result in less time feeding or resting, the disturbance may result in changes to the individual’s energy budget. If an individual is repeatedly disturbed in an area, they may avoid the area, essentially being displaced from the habitat. Significant changes to an individual’s energy budget or displacement from its habitat may result in impacts to the individual’s fitness. Rodriguez-Prieto and Fernandez-Juricic (2005) found that increases in disturbance from human-visitation resulted in significant reductions in the use of stream banks by Iberian frogs. They further concluded that disturbance from recreational activities negatively affected Iberian frogs through spatial and temporal losses in resources.

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

The transfer of sediment to streams and other water bodies at road crossings is a consequence of roads and trails (Richardson et al. 1975). The surfaces of unpaved roads can route fine sediments to streams, lakes, and wetlands, increasing turbidity of the water (Reid and Dunne 1984). Various studies have demonstrated that sediment delivery to stream channels in a forested environment is correlated to road surface type, physical characteristics of the adjacent areas (e.g., litter depth, coarse wood), soils (erodibility), the steepness of slope below the road, and vehicle usage (Chin and others 2004, Clinton and Vose 2003). The knowledge of the impact of increased sediment load on amphibians is limited (Gillespie 2002). However, the negative impacts of increased sediments on aquatic species, including fish, macroinvertebrates, and periphyton, are well known (Power 1990, Newcombe and MacDonald 1991, Waters 1995). High concentrations of suspended sediment may directly kill aquatic organisms and impair aquatic productivity (Newcombe and Jensen 1996). Egg survival may be impacted by roads and trails through increases in fine sediments. Increased sedimentation may also reduce availability of important food resources for tadpoles such as algae (Power 1990). Fine sediment deposits also tend to fill pools and smooth gravel beds, degrading habitats (Forman and Alexander 1998) and possibly the availability of oviposition sites or larval refugia (Welsh and Ollivier 1998). In addition, the consequences of past sedimentation are long term and cumulative, and cannot be mitigated effectively (Hagans et al. 1986).

The effects are heightened if the sediments contain toxic materials (Maxell and Hokit 1999). At least five different general classes of chemicals are transferred into the environment from maintenance and use of roads: heavy metals, salt, organic molecules, ozone, and nutrients (Trombulak and Frissell 2000). The changes to water chemistry by road runoff may affect living organisms in several ways. For example, chemicals found in road de-icers may kill (Doughtery and Smith 2006) or displace frog life stages, or they may be accumulated in plants as toxins which, in turn, can depress larval amphibian growth.

Roads can also influence both peak flows (floods) and debris flows (rapid movements of soil, sediment, and large wood stream channels) two processes which have major influences on riparian vegetation (Jones et al. 2000) as well as aquatic and riparian patch dynamics critical to stream ecosystems (Pringle et al. 1988). Numerous frog species breed in streams which can be adversely affected by fluctuations in the frequency or magnitude of peak flows, thereby, adversely affecting recruitment.

For amphibians, the species and habitat accounts below were summarized from Lannoo (2005). Additional references are cited to address specific elements of the species and habitat accounts for all species below.

California Red-legged Frog – Affected Environment

Species and Habitat Account

The California red-legged frog (CRLF) historically occurred from the California coast, throughout the Central Valley and into the Sierra Nevada foothills. Currently, the CRLF occupies approximately 70% of their historic range and are primarily located in streams and wetlands in coastal drainages (71 FR 19244). There are no recent (<40 years) occurrences of the STF (USFWS 2002); however, historic records exist in CNDDB at Jordan Pond (1967) and Woods Creek (1950). Herpetofauna surveys have occurred extensively throughout the STF, but surveys have used a generalized visual encounter method (Fellers and Freel 1995) and have not been conducted according to the most recent CRLF protocol (USFWS 2005) nor have they covered all aquatic habitat within the project area in. Between 1995 and 2005, USFWS protocol-level surveys were conducted for CRLF within the project area in the following areas: Bull Creek (in Anderson Valley), Rush Creek, Jordan Pond, Bean Creek, Smith Creek. Despite significant survey efforts, there have been no recent observations of the CRLF within the project area. Although there have not been any observations of the CRLF in the project area, all suitable habitat has not been surveyed within the last two years to the most recent protocol (USFWS 2005). Therefore, this analysis assumes that suitable habitat is occupied.

The CRLF is a highly aquatic species typically found in cold water ponds and stream pools with depths exceeding 0.7 meters and with overhanging vegetation such as willows, as well as emergent and submergent vegetation (Hayes and Jennings 1988). Suitable habitat on the forest is defined as areas on the landscape that meet the definition of a primary constituent element (PCE) as defined in Federal Register and consist of aquatic breeding habitat, non-breeding aquatic habitat, upland habitat, and dispersal habitat (71 FR 19244).

California Red-legged Frog – Environmental Consequences

Indicators

To assist with the Travel Management Planning process, Region 5 USFS entered into programmatic consultation with the United States Fish and Wildlife Service (USFWS) for motorized vehicle route designation. On December 27, 2006, the USFWS issued a Letter of Concurrence for 14 National Forests in California, including the STF. The Letter of Concurrence approved the Project Design Criteria (PDC) as outlined in the document entitled “Route Designation: Project Design Criteria for ‘No Effect’ or ‘May Affect Not Likely to Adversely Affect’ determination for TE Species – October

2006 version 1". Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the California red-legged frog. Although biological thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Number of routes that have the potential to capture surface run-off and then deliver sediment into a stream associated with the California red-legged frog.
- Number of routes that do not avoid Riparian Reserve (RR) and Riparian Conservation Areas (RCAs) except where necessary to cross streams.
- Number of stream crossings on unauthorized routes within suitable habitat.
- Miles of routes added to the NFTS within 300 feet of suitable habitat.
- Miles of ML1 roads converted to trails within 300 feet of suitable habitat.
- Miles of routes added to the NFTS within dispersal habitat.
- Miles of ML1 roads converted to trails within dispersal habitat.

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the California red-legged frog by:

- Prohibiting cross-country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on California red-legged frogs through: human-caused mortality, changes in behavior, and habitat modification (see Effects Common to all Aquatic Wildlife). Furthermore, these frogs may be more or less prone to the effects of motorized travel because they utilize upland habitats, frequently considerable distances from aquatic features. Bulger et al. (2003) and Fellers and Kleeman (2007) reported terrestrial movements up to 1.7 miles before and after the breeding period as adults dispersed into other non-breeding aquatic habitats. Fellers and Kleeman (2007) also reported that a large portion of the population (35%) can move during single rainfall events and a majority of all frogs in a population migrate during the breeding season. The CRLF can also move in excess of 150 yards from aquatic habitat to seek cover in upland habitats and remain for up to three weeks (Bobzien and DiDonato 2007).

Alternative 1 (Proposed Action)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near suitable California red-legged frog habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-32). This alternative would result in the addition of several routes with 20 stream crossings within suitable CRLF habitat. These stream crossings would likely result in direct and indirect effects to some individuals of all CRLF life history stages. The addition of routes and conversion of roads to trails within 300 feet of suitable aquatic habitat may result in direct effects to some juvenile and adult frogs and indirect effects to all life history stages. The addition of routes and conversion of roads to trails within dispersal areas may also result in direct effects to some adults dispersing between breeding sites.

Season of Use: The CRLF primarily inhabits lower elevations throughout its range and are not known to overwinter or enter into torpor. Suitable habitat within the project area is located within Zone 1 and Zone 2 of the seasonal closures (as identified for each route in Appendix I). Since Zone 1 is open to year-round use, there would not be any beneficial impacts to the CRLF or it's habitat within this Zone. Since breeding typically occurs in late winter and early spring, restrictions on the season of use within Zone 2 would likely reduce direct effects to breeding adults and those that may be migrating between breeding sites. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and subsequent sedimentation routing into streams associated with all life history stages of the CRLF.

Mitigation Measures: Types of mitigation measures proposed on routes associated with suitable CRLF habitat include: barriers, tread hardening, drain dips, and hardened stream crossings. The installation of a hardened stream crossing would likely result in a short-term increase in sedimentation which may impact some individuals. The installation of all mitigation measures may result in short-term disturbance to some individual frogs, but will limit trail widening, reduce soil perturbation, and reduce sedimentation, providing beneficial effects over the long-term.

Table 3.11-32 Alternative 1 - Direct and Indirect Effects Indicators (California red-legged frog)

Indicators	
Number of routes which may capture surface run-off and then deliver sediment into a stream associated with the California red-legged frog	7
Number of routes that do not avoid Riparian Reserve (RR) and Riparian Conservation Areas (RCAs) except where necessary to cross streams	13
Number of stream crossings on proposed unauthorized routes within suitable habitat	20
Miles of routes added to the NFTS within 300 feet of suitable aquatic habitat	4.45
Miles of ML1 roads converted to trails within 300 feet of suitable aquatic habitat	0.83
Miles of routes added to the NFTS within dispersal habitat	1.65
Miles of ML1 roads converted to trails within dispersal habitat	1.06

Alternative 2 (No Action)

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to these frogs. These effects would be similar to those discussed within Alternative 4 for the short-term, but would be exacerbated over the long-term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to individual frogs.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable CRLF habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the CRLF.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 4 (Recreation)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near suitable California red-legged frog habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-33). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the number of routes added to the system or converted to a trail within 300 feet of suitable aquatic habitat, there would be a slight increase in the direct and indirect effects to these frogs within the project area.

Season of Use: The CRLF primarily inhabits lower elevations throughout its range and are not known to overwinter or enter into torpor. Suitable habitat within the project area is located within Zone 1 and Zone 2 of the seasonal closures (as identified for each route in Appendix I). Since Zone 1 is open to year-round use, there would not be any beneficial impacts to the CRLF or it’s habitat within this Zone. Since breeding typically occurs in late winter and early spring, restrictions on the season of use within Zone 2 would likely reduce direct effects to breeding adults and those that may be migrating between breeding sites. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and subsequent sedimentation routing into streams associated with all life history stages of the CRLF.

Mitigation Measures: The types and effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-33 Alternative 4 - Direct and Indirect Effects Indicators (California red-legged frog)

Indicators	
Number of routes which may capture surface run-off and then deliver sediment into a stream associated with the California red-legged frog	7
Number of routes that do not avoid Riparian Reserve (RR) and Riparian Conservation Areas (RCAs) except where necessary to cross streams	13
Number of stream crossings on proposed unauthorized routes within suitable habitat	20
Miles of routes added to the NFTS within 300 feet of suitable aquatic habitat	4.47
Miles of ML1 roads converted to trails within 300 feet of suitable aquatic habitat	2.99
Miles of routes added to the NFTS within dispersal habitat	1.65
Miles of ML1 roads converted to trails within dispersal habitat	1.32

Alternative 5 (Resources)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near suitable California red-legged frog habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-34). Routes added within this alternative would not likely result in disturbance or crushing of any individuals or contribute sediment to steams associated with the CRLF. Therefore, this alternative would not result in the addition of any routes to the NFTS that would have direct or indirect effects to the CRLF.

Season of Use: The CRLF primarily inhabits lower elevations throughout its range and are not known to overwinter or enter into torpor. Suitable habitat within the project area is located within Zone 1 and Zone 2 of the seasonal closures (as identified for each route in Appendix I). Since Zone 1 is open to year-round use, there would not be any beneficial impacts to the CRLF or it's habitat within this Zone. Since breeding typically occurs in late winter and early spring, restrictions on the season of use within Zone 2 would likely reduce direct effects to breeding adults and those that may be migrating between breeding sites. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and subsequent sedimentation routing into streams associated with all life history stages of the CRLF.

Mitigation Measures: The types and effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-34 Alternative 5 - Direct and Indirect Effects Indicators (California red-legged frog)

Indicators	
Number of routes which may capture surface run-off and then deliver sediment into a stream associated with the California red-legged frog	0
Number of routes that do not avoid Riparian Reserve (RR) and Riparian Conservation Areas (RCAs) except where necessary to cross streams	0
Number of stream crossings on proposed unauthorized routes within suitable habitat	0
Miles of routes added to the NFTS within 300 feet of suitable aquatic habitat	0
Miles of ML1 roads converted to trails within 300 feet of suitable aquatic habitat	0
Miles of routes added to the NFTS within dispersal habitat	0
Miles of ML1 roads converted to trails within dispersal habitat	0

CUMULATIVE EFFECTS

The California red-legged frog was once numerous and widely distributed in California. Initial declines of the California red-legged frog is attributed to over-harvesting (Jennings and Hayes 1985), and then later to the loss and alteration of habitat (USFWS 2002). Other important factors attributed to the decline of the CRLF include the introduction of non-native species (bullfrogs, centrarchid fish, crayfish) which have out-competed and predated on the CRLF and agricultural practices which modify aquatic and upland habitats (Davidson et al. 2002, USFWS 2002) . Additional stressors that may have affected the distribution and abundance of the California red-legged frog on the STF, include historic mining, livestock grazing, recreation, and water diversions (USFWS 2002). All these activities have the potential to alter California red-legged frog habitat through disturbance to vegetation, soils, and hydrology.

On the STF, a majority of the land containing suitable habitat for the CRLF is within active livestock allotments. The presence of livestock in near-stream environments can result in physical disturbance and livestock in aquatic habitats present a low risk of trampling individuals, particularly tadpoles who have lower mobility and tend to escape into fine sediments. Excessive livestock grazing can impact terrestrial habitats directly from browsing on obligate riparian vegetation that provides cover and feeding habitats for the frog. Excessive livestock grazing can affect aquatic habitats indirectly primarily through erosion and sedimentation processes if the activity occurs in near stream environments. Secondarily, the metabolic waste products may cause minor nutrient enrichment (nitrogen and phophorus) of aquatic habitats. At present, it is assumed that livestock are having negligible to minor impacts to the frog and its habitats.

Recreational mining activities (suction dredging) have the potential to adversely affect individuals directly from disturbance and possible mortality if tadpoles are entrained by the dredge. Suction dredging involves the modification of aquatic habitat directly from the movement of streambed materials and from riparian area disturbances. Suction dredging occurs in several streams that provide suitable habitat for the frog including but not limited to Bean Creek, Bull Creek, Moore Creek, Rose Creek, and Smith Creek. At present, it is assumed that recreational mining activities are having minor impacts to individuals and habitats.

Timber harvest and other vegetation management projects are occurring on private lands and on lands administered by the STF. A majority of the commercial timber lands are outside of the elevation range of the frog. Harvest on these lands has the potential to impact habitat indirectly primarily through erosion and sedimentation of aquatic habitats. Other vegetation management projects (fuel reduction) do occur within the elevation range of the frog and could affect aquatic and terrestrial habitats through sedimentation and modification of dispersal and upland habitats. Typically, activities in or near RCA are mitigated by applying best management practices (BMP) where equipment and activities are prohibited or minimal. Both public and private timber lands use herbicides for site preparation and to alleviate competition from non-desirable vegetation. The STF has developed a five year plan for managing vegetation on public lands. There are 10 to 15 projects that are planned or in planning that overlap with areas of suitable habitat. At present, vegetation management activities on private and public lands are having minor impacts to individuals and habitats.

Development of lands adjacent to the STF is also expected to elevate the potential for the introduction of non-native (exotic) species into aquatic systems. Introduced non-native aquatic predators such as centrarchid fishes, crayfish, and bullfrogs are believed to have affected herpetofauna populations in and adjacent to the Forest.

Table 3.11-35 Ranking of Alternative Indicators (California red-legged frog)

Indicators	Rankings by Alternative [1]				
	1	2	3	4	5
Number of routes which may capture surface run-off and then deliver sediment into a stream associated with the California red-legged frog	3	1	5	3	4
Number of routes that do not avoid Riparian Reserve (RR) and Riparian Conservation Areas (RCAs) except where necessary to cross streams	3	1	5	3	4
Number of stream crossings on proposed unauthorized routes within suitable habitat	3	1	5	3	4
Miles of routes added to the NFTS within 300 feet of suitable habitat	3	1	5	2	4
Miles of ML1 roads converted to trails within 300 feet of suitable aquatic habitat	3	1	5	2	4
Miles of routes added to the NFTS within dispersal habitat	3	1	5	3	4
Miles of ML1 roads converted to trails within dispersal habitat	3	1	5	2	4
Average	**3**	**1**	**5**	**2.57**	**4**

[1] score of 5 indicates the alternative is the best for terrestrial biota related to the indicator; A score of 1 indicates the alternative is the worst for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.

SUMMARY OF EFFECTS

The California red-legged frog is not known to occur within the project area, but protocol-level surveys have not been completed in all suitable habitat (USFWS 2005). Alternative 3 would prohibit cross-country travel and would not add any routes to the NFTS, therefore this alternative would have beneficial effects to the California red-legged frog. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not comply with USFWS PDC and would likely adversely affect the California red-legged frog. Alternatives 1 and 4 would prohibit cross-country travel, but would add routes that would not comply with USFWS PDC and would likely adversely affect the California red-legged frog; therefore, consultation with FWS will have to occur for these alternatives. Alternative 5 would prohibit cross-country travel, would not add any routes that would have any direct or indirect effects, and would comply with USFWS PDC; therefore, this alternative would not affect the California red-legged frog. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Foothill Yellow-legged Frog – Affected Environment

Species and Habitat Account

The foothill yellow-legged frog (FYLF) was historically found throughout much of California and southwestern Oregon, but currently occupies only a small portion of its historical range (Amphibiaweb 2008, Jennings and Hayes 1994). Foothill yellow-legged frogs have been extirpated from at least two thirds of their historic localities over their entire Sierran range (Jennings 1996, Lind 2005). Lind (2005) estimated FYLF populations (prior to 1980) have disappeared from approximately 51% of their historic range. Herpetofauna surveys have occurred extensively throughout the STF, but have not covered aquatic habitat within the project area in entirety. Approximately 20% of all perennial streams and 6% of all seasonal streams have been surveyed. Results from these surveys indicate that these frogs have been observed in approximately 18 separate streams throughout the STF. There are many “subpopulations” associated with multiple breeding/occupancy locales in several of these streams.

The FYLF is a highly aquatic amphibian that prefers streams with a rocky substrate. Most occurrences of the frog on the STF occur at elevations below 3,000 feet (Aquasurv 2008), though historic occurrences occurred at elevations up to 4,200 feet (CNDDB 2008). Foothill yellow-legged frogs breed at locations with substrates and channel shapes that provide suitable velocities and depths over a relatively broad range of discharge volumes (Kupferberg 1996). Locally, breeding occurs in late May or early June when water levels become stable enough to reduce the risk of stranding or scour. These frogs prefer partial shade, shallow riffles, and cobble sized or greater substrate (Hayes and Jennings 1988). Kupferberg (1996) reported adult frogs may disperse into small tributary streams with persistent water following breeding and personal observations on the STF provide support for this report. During all seasons, these frogs are rarely encountered far from permanent water, though foothill yellow-legged frogs have been observed in abandoned rodent burrows and under logs as far as 100 meters from a stream (Zeiner et al. 1988, Welsh 1994). Tadpoles typically use shallow water habitats where warmer water and food resources (diatoms, algae) are plentiful. Adults are likely to use exposed streambeds and riparian areas to forage for a variety of terrestrially- and aquatically-derived insects..

Since surveys of all aquatic habitats have not been conducted systematically for this project, suitable aquatic habitat was conservatively estimated. For the purposes of this analysis, suitable FYLF aquatic habitat has been defined and mapped as all perennial and intermittent streams within the STF below 4,500 feet in elevation. Since field surveys have not been completed on all areas adjacent to suitable aquatic habitat, this analysis assumes that all land within 30 meters of suitable aquatic habitat may provide suitable terrestrial habitat. Since the FYLF is primarily stream dwelling the potential for impacts beyond 30 meters of suitable aquatic habitat is very low and would likely result in negligible effects to the species.

Foothill Yellow-legged Frog – Environmental Consequences

Indicators

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the foothill yellow-legged frog. Although biological thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Number of stream crossings (perennial and intermittent) on routes added to the NFTS within known occupied habitat.
- Number of stream crossings (perennial and intermittent) on ML1 roads converted to trails within known occupied aquatic habitat.
- Miles of routes added to the NFTS within 30 meters of known occupied aquatic habitat.

- Miles of ML1 roads converted to trails within 30 meters of known occupied habitat
- Number of stream crossings (perennial and intermittent) on routes added to the NFTS within suitable aquatic habitat.
- Number of stream crossings (perennial and intermittent) on ML1 roads converted to trails within suitable aquatic habitat.
- Miles of routes added to the NFTS within 30 meters of suitable aquatic habitat.
- Miles of ML1 roads converted to trails within 30 meters of suitable aquatic habitat.

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the foothill yellow-legged frog by:

- Prohibiting cross-country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on foothill yellow-legged frogs through: human-caused mortality, changes in behavior, and habitat modification (see Effects Common to all Aquatic Wildlife). Furthermore, these frogs may be more or less prone to the effects of motorized travel because they are rarely found far from water, the timing and location of breeding suggests they will select a favorable breeding site in highly dynamic stream environments where localized sedimentation may be less important, and they tend to be very dispersed in their distribution within any given stream. However, recently metamorphosed individuals show a strong tendency to migrate away from the natal pool prior to the onset of winter.

Alternative 1 (Proposed Action)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable foothill yellow-legged frog habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-36). This alternative would result in the addition of one route with one stream crossing within occupied foothill yellow-legged frog habitat and several routes with 61 stream crossings within suitable habitat. These stream crossings would likely result in direct and indirect effects to some individuals of all FYLF life history stages. The addition of routes and conversion of roads to trails within 100 meters of occupied and suitable aquatic habitat would likely result in direct effects to a few juvenile and adult FYLF and would result in indirect effects to both aquatic and terrestrial habitat over the short and long-term. Since these impacts would affect a very small percentage of suitable and occupied habitat (Table 3.11-36), these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long-term.

Season of Use: The FYLF is not known to enter into torpor, but has been found overwintering as far as 100 meters from aquatic habitat. Approximately 73% of suitable FYLF habitat is within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Therefore, this would reduce the potential direct effects to a significant portion of potential overwintering juveniles and adults. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the FYLF.

Mitigation Measures: The only type of mitigation measure proposed on routes that are associated with occupied FYLF habitat are log/rock barriers. Types of mitigation measures proposed on routes associated with suitable FYLF habitat include: barriers, tread hardening, drain dips, a hardened stream crossing, and a small bridge. The installation of a hardened stream crossing and a small bridge would likely result in a short-term increase in sedimentation which may impact some individuals. The installation of all mitigation measures may result in short-term disturbance to some individual frogs, but will limit trail widening, reduce soil perturbation, and reduce sedimentation, providing beneficial effects over the long-term.

Table 3.11-36 Alternative 1 - Direct and Indirect Effects Indicators (foothill yellow-legged frog)

Indicators	
Number of stream crossings (perennial and intermittent) on routes added to the NFTS within known occupied aquatic habitat	1
Number of stream crossings (perennial and intermittent) on ML1 roads converted to trails within known occupied aquatic habitat	0
Miles of routes added to the NFTS within 30 meters of known occupied aquatic habitat	0.28
Miles of ML1 roads converted to trails within 30 meters of known occupied habitat	0.11
Percentage of upland habitat (within 30 meters of occupied aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%
Number of stream crossings (perennial and intermittent) on routes added to the NFTS within suitable aquatic habitat	51
Number of stream crossings (perennial and intermittent) on ML1 roads converted to trails within suitable aquatic habitat	10
Miles of routes added to the NFTS within 30 meters of suitable aquatic habitat	5.91
Miles of ML1 roads converted to trails within 30 meters of suitable aquatic habitat	1.68
Percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%

Alternative 2 (No Action)

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to these frogs. These effects would be similar to those discussed within Alternative 4 for the short-term, but would be exacerbated over the long-term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to individual frogs.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable foothill yellow-legged frog habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the FYLF.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 4 (Recreation)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable foothill yellow-legged frog habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-37). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the number of routes added to the system or converted to a trail within suitable FYLF habitat, there would be a slight increase in the direct and indirect effects to these frogs within the project area. Although these increases would result in more individuals being impacted, these increases would not likely be significant enough to result in impacts to FYLF populations within the project area.

Season of Use: The FYLF is not known to enter into torpor, but has been found overwintering as far as 100 meters from aquatic habitat. Approximately 73% of suitable FYLF habitat is within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Therefore, this would reduce the potential direct effects to a significant portion of potential overwintering juveniles and adults. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the FYLF.

Mitigation Measures: The types and effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-37 Alternative 4 - Direct and Indirect Effects Indicators (foothill yellow-legged frog)

Indicators	
Number of stream crossings (perennial and intermittent) on routes added to the NFTS within known occupied aquatic habitat	1
Number of stream crossings (perennial and intermittent) on ML1 roads converted to trails within known occupied aquatic habitat	0
Miles of routes added to the NFTS within 30 meters of known occupied aquatic habitat	0.28
Miles of ML1 roads converted to trails within 30 meters of known occupied habitat	0.18
Percentage of upland habitat (within 30 meters of occupied aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%
Number of stream crossings (perennial and intermittent) on routes added to the NFTS within suitable aquatic habitat	53
Number of stream crossings (perennial and intermittent) on ML1 roads converted to trails within suitable aquatic habitat	21
Miles of routes added to the NFTS within 30 meters of suitable aquatic habitat	6.22
Miles of ML1 roads converted to trails within 30 meters of suitable aquatic habitat	3.31
Percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%

Alternative 5 (Resources)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable foothill yellow-legged frog habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Table 3.11-38 Alternative 5 - Direct and Indirect Effects Indicators (foothill yellow-legged frog)

Indicators	
Number of stream crossings (perennial and intermittent) on routes added to the NFTS within known occupied aquatic habitat	0
Number of stream crossings (perennial and intermittent) on ML1 roads converted to trails within known occupied aquatic habitat	0
Miles of routes added to the NFTS within 30 meters of known occupied aquatic habitat	0.02
Miles of ML1 roads converted to trails within 30 meters of known occupied habitat	0
Percentage of upland habitat (within 30 meters of occupied aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%
Number of stream crossings (perennial and intermittent) on routes added to the NFTS within suitable aquatic habitat	20
Number of stream crossings (perennial and intermittent) on ML1 roads converted to trails within suitable aquatic habitat	1
Miles of routes added to the NFTS within 30 meters of suitable aquatic habitat	1.39
Miles of ML1 roads converted to trails within 30 meters of suitable aquatic habitat	0.05
Percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-38). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a decrease from Alternative 1 in the number of routes added to the system or converted to a trail within suitable and occupied FYLF habitat, there would be a significant decrease in the direct and indirect effects to these frogs within the project area. Since these impacts would affect a very small percentage of suitable and occupied habitat (Table 3.11-38), these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long-term.

Season of Use: The FYLF is not known to enter into torpor, but has been found overwintering as far as 100 meters from aquatic habitat. Approximately 73% of suitable FYLF habitat is within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Therefore, this would reduce the potential direct effects to a significant portion of potential overwintering juveniles and adults. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the FYLF.

Mitigation Measures: The types and effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

CUMULATIVE EFFECTS

Many past cumulative impacts have likely contributed to the decline in FYLF numbers and distribution. The reduction in foothill yellow-legged frog distribution and population numbers has largely been attributed to loss or alteration of habitats and increased competition/predation from introduced species. Habitat loss and alteration is associated with the following management activities on the STF: livestock grazing, mining, water development projects, vegetation management, and pesticide exposure.

Historic livestock grazing likely had a significant cumulative impact to FYLF and their habitat. Historic livestock grazing evidence indicates that heavy livestock use in the Sierra Nevada led to riparian habitat degradation across much of the Sierra Nevada. Livestock trampling has the potential to directly kill most life stages of FYLF. The mortality risk from livestock trampling is greatest for tadpoles and recently metamorphosed frogs. Tadpoles have limited mobility and have a tendency to seek cover in the spaces between streambed substrates. By seeking cover in this manner, tadpoles may be unaware of the potential peril from trampling. The risk is particularly high in intermittent streams where water resources may be limited and livestock have few options for accessing water. Risk is also higher following metamorphosis when metamorphs are concentrated along aquatic margins. Sedimentation arising from concentrated livestock use areas is considered to be the biggest impact to FYLF habitat. Ten active livestock allotments overlap known localities of the foothill yellow-legged frog, and suitable foothill yellow-legged frog habitat (no known detections) overlaps with an additional 4 allotments. Livestock grazing is considered to currently have a very minor impact on individuals and habitat on the STF.

As with the California red-legged frog, recreational gold mining activities overlap with known occupied FYLF sites and the activity has the potential to impact individuals and habitat. Tadpoles are potentially vulnerable to being sucked into the dredge and mortality or injury could result. Suction dredging also presents a physical disturbance to frogs and prolonged dredging could affect the distribution of individuals in a stream. Some of the actions involved with suction dredging include moving streambed substrates, digging into streambanks, and loss of riparian vegetation. At some locations, there has been a modification of rearing habitat resulting in the loss of shallow, warm water foraging habitat for tadpoles. Also, the rearrangement of streambed substrates has the potential to change the streamflow patterns thereby affecting the suitability of habitat for deposition of egg masses. Suction dredging occurs at six to ten of the known occupied streams. Suction dredging is considered to currently have a minor impact on individuals and to moderate impact on habitat.

Water development projects have resulted in the loss of suitable habitat and have reduced the suitability of habitat for the frog. Hydroelectric projects or impoundments are present on all major rivers on the STF with the exception of the Clavey River. The New Melones Reservoir and Don Pedro Reservoir effectively eliminated dozens of miles of suitable habitat when they were impounded. These reservoirs also effectively eliminated the potential for individuals to move between watersheds. Several impoundments located upstream of suitable habitat have modified stream discharge patterns and water temperatures. Lind et al. (1996) and Bobzien and DiDonato (2007) documented reduced breeding success downstream of dams due to releases of water that either strand or scour egg masses from their attachment sites. Reduced water temperatures may delay breeding or may delay the development of tadpoles which may affect survivorship upon metamorphosis. Water developments have had a major impact on individuals and habitat in the past. Currently, water developments are having a moderate impact on individuals and habitat.

Vegetation management activities have the potential to impact individuals and habitat if activities occur in close proximity to occupied habitat. Ground disturbing activities, including timber harvest, have the potential to result in sedimentation of habitats with primary implications for tadpole survivorship and fitness. Prescribed fire in riparian areas may result in mortality of individuals or a disturbance of behavior. Prescribed fire also has the potential to modify riparian habitats if the fire is severe enough to consume woody and herbaceous species. Modification of habitat may locally reduce the suitability of riparian habitat for refuge and foraging activities; however, fire may be beneficial in providing a diversity of conditions that may meet the needs of the frog. In general, current vegetation and fuels projects are designed to reduce potential impact on FYLF habitats and minimize disturbance to the species. Best management practices are implemented and monitored to minimize sediment delivery to streams and to prevent unexpected consequences to riparian habitats. The STF has developed a five year plan for managing vegetation on public lands and there are 10 to 15 projects that are planned or in planning that overlap with areas of occupied/suitable habitat. At present, vegetation management activities on private and public lands are having minor impacts to individuals and habitats. Historically, vegetation management and fuels reduction projects likely had minor to moderate impacts on FYLF and habitats, especially if project activities occurred in or immediately adjacent to FYLF aquatic habitats.

Exposure to a variety of pesticides has the potential to impact individuals. Pesticides are introduced into the aquatic environment either through direct application, groundwater contamination, and/or drift. Herbicides are commonly used in forestry to establish plantations and to release the growing conifers from competition. The STF and private forestry have applied herbicides extensively across the forest and in proximity to occupied and suitable habitat for the FYLF. Monitoring on the STF has shown that herbicide applications have resulted in very low concentrations of herbicide contaminating aquatic habitats in the past. One project on the STF is in the planning stage that would propose to apply herbicides for site preparation and release in close proximity to occupied FYLF habitat. Herbicides are and have been extensively used on private forest lands. Lenoir et al. (1999) and Sparling et al. (2001) showed a variety of pesticides are present in precipitation falling in the Sierra Nevada, a result of drift from agricultural applications in the Central Valley of California. The implications of this drift are poorly understood; however, Davidson et al. (2002) used spatial tests to link upwind herbicide application with the decline of the FYLF. Pesticide exposure is currently having a very minor impact on individuals, but historic applications likely had a minor to moderate impact on individuals.

Table 3.11-39 Ranking of Alternative Indicators (foothill yellow-legged frog)

Indicators	Rankings by Alternatives [1]				
	1	2	3	4	5
Number of stream crossings (perennial and intermittent) on routes added to the NFTS within known occupied aquatic habitat	3	1	5	3	4
Number of stream crossings (perennial and intermittent) on ML1 roads converted to trails within known occupied aquatic habitat	4	1	5	4	4
Miles of routes added to the NFTS within 30 meters of known occupied aquatic habitat	3	1	5	3	4
Miles of ML1 roads converted to trails within 30 meters of known occupied habitat	3	1	5	2	4
Percentage of upland habitat (within 30 meters of occupied aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	4	1	5	4	4
Number of stream crossings (perennial and intermittent) on routes added to the NFTS within suitable aquatic habitat	3	1	5	2	4
Number of stream crossings (perennial and intermittent) on ML1 roads converted to trails within suitable aquatic habitat	3	1	5	2	4
Miles of routes added to the NFTS within 30 meters of suitable aquatic habitat	3	1	5	2	4
Miles of ML1 roads converted to trails within 30 meters of suitable aquatic habitat	3	1	5	2	4
Percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	4	1	5	4	4
Average	**3.30**	**1**	**5**	**2.80**	**4**

[1] score of 5 indicates the alternative is the best for terrestrial biota related to the indicator; A score of 1 indicates the alternative is the worst for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.

Introduced species have the potential to impact the FYLF primarily through increased competition and predation. Kupferberg (1997) showed grazing competition from bullfrog tadpoles reduced the survivorship and mass at metamorphosis of FYLF tadpoles. Kupferberg (1997) also reported foothill yellow-legged frogs were rarely encountered in areas invaded by bullfrogs, suggesting a population-level impact. Bullfrogs have been observed across the STF, typically at lower elevations (<3,000 feet) and within the range of the FYLF (Aquasurv 2008). Fellers (2005) reports non-native bullfrogs and fish (green sunfish) are predators on the FYLF. As Moyle (1973), Jennings and Hayes (1994), and Jennings (1996) suggest, water developments (dams and diversions) may be responsible for the introduction of non-native game fish and for modifying habitats that facilitate the invasion of aquatic habitats by non-native species. Non-native game fish are found below and above many low elevation impoundments on the STF. Introduced species have had a minor to moderate impact on FYLF populations in the past, and the expectation is that competition from bullfrogs will increase as this species expands its range on the forest.

SUMMARY OF EFFECTS

The FYLF was historically found throughout much of California and southwestern Oregon, but currently occupies only a small portion of its historical range (Amphibiaweb 2008, Jennings and Hayes 1994).With the exception of Alternative 3, which would have beneficial impacts to the foothill yellow-legged frog, the direct and indirect effects of the project alternatives (1, 2, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Mountain Yellow-legged Frog – Affected Environment

Species and Habitat Account

Historically the mountain yellow-legged frog (MYLF) was extremely abundant within high elevation aquatic ecosystems of the Sierra Nevada Mountains (Grinnell and Storer 1924, Zweifel 1955). Beginning around the 1970s, the MYLF has undergone dramatic population declines throughout the Sierra Nevada (Knapp and Matthews 2000, ranging between 50-90% decline of their historic localities (USFWS 2004). Although they are found throughout most of their historic range, many populations within their range have become extirpated (Amphibiaweb 2008). Previously the mountain yellow-legged frog in the Sierra Nevada was considered to be one species; Rana muscosa. Recent genetic studies indicate mountain yellow-legged frogs in the Sierra Nevada are comprised of two species: R. sierrae, with a distribution in the northern and central Sierra Nevada, and R. muscosa, with a distribution in the southern Sierra Nevada and southern California. The contact zone for these two newly recognized species is in the vicinity of Mather Pass and the Monarch Divide, Fresno County (Vredenburg et al. 2006). Though the Regional Forester's list of sensitive species has not been revised to specifically address this apparent change in taxonomy, it is assumed that this analysis pertains to R. sierrae, the Sierra Nevada yellow-legged frog.

Over the last 15 years herpetofauna surveys have provided broad spatial coverage of aquatic habitat within the STF, but surveys were not systematic nor did they cover all potential FYLF habitat. Approximately 10-15% of all perennial streams, and 40-60% of lakes/ponds, within the elevational range of this species have been surveyed. Frogs have been found in at least 40 distinct sites forest-wide, most of which were located in designated wilderness areas.

Mountain yellow-legged frogs in the Sierra Nevada inhabit high mountain lakes, ponds, tarns, and streams, largely in areas that were glaciated (Zweifel 1955). These frogs occur in the Sierra Nevada from 4,500 feet to over 12,000 feet elevation (Jennings and Hayes 1994) however, local observations have all occurred above 5,400 feet and 95% of all observations are above 7,000 feet (Aquasurv 2008). Mountain yellow-legged frogs are seldom far from water, although they have been observed moving overland to disperse to other pond habitats. Typically, these frogs prefer well illuminated, sloping banks of meadow streams, riverbanks, isolated pools, and lake borders with vegetation that is continuous to the water's edge (Martin 1992, Zeiner et al. 1988).Most of the populations on the STF occur within fish-free lakes and ponds within wilderness areas and in fish-free lakes and ponds above 5,500' in elevation, but they are known to occur within some streams as well.

Since systematic surveys of all aquatic habitats have not been conducted as a part of this project, suitable aquatic habitat was conservatively estimated. For the purposes of this analysis, suitable MYLF aquatic habitat has been defined and mapped as all perennial streams, lakes, and ponds above 5,500 feet in elevation. Since field surveys have not been completed on all areas adjacent to suitable aquatic habitat, this analysis assumes that all land within 30 meters of suitable aquatic habitat may provide suitable terrestrial habitat. Since the MYLF is highly aquatic and typically seen within one meter of the water's edge, the potential for impacts beyond 30 meters of suitable aquatic habitat is very low and would likely result in negligible effects to the species.

Mountain Yellow-legged Frog – Environmental Consequences

Indicators

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the mountain yellow-legged frog. Although biological thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Number of stream crossings (perennial) on routes added to the NFTS within known occupied habitat.
- Number of stream crossings (perennial) on ML1 roads converted to trails within known occupied aquatic habitat.
- Miles of routes added to the NFTS within 30 meters of known occupied aquatic habitat.
- Miles of ML1 roads converted to trails within 30 meters of known occupied habitat
- Number of stream crossings (perennial) on routes added to the NFTS within suitable aquatic habitat.
- Number of stream crossings (perennial) on ML1 roads converted to trails within suitable aquatic habitat.
- Miles of routes added to the NFTS within 30 meters of suitable aquatic habitat.
- Miles of ML1 roads converted to trails within 30 meters of suitable aquatic habitat.

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the mountain yellow-legged frog by:

- Prohibiting cross-country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on mountain yellow-legged frogs through: human-caused mortality, changes in behavior, and habitat modification (see Effects Common to all Aquatic Wildlife). Furthermore, these frogs may be less prone to adverse effects from motorized travel because they are closely associated with aquatic features and less likely to be exposed to direct mortality. They presumably do not make long distance migrations outside of the breeding season, remaining close to suitable aquatic habitat. In streams, the larvae of the MYLF are typically associated with deeper pool habitats that have limited potential for direct mortality.

Alternative 1 (Proposed Action)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable mountain yellow-legged frog habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-40). This alternative would not result in the addition of any stream crossings within occupied mountain yellow-legged frog habitat, but would result in the addition of 8 stream crossings within suitable habitat. These stream crossings may result in direct and indirect effects to some individuals of all MYLF life history stages. The addition of routes and conversion of roads to trails within 30 meters of occupied and suitable aquatic habitat would likely result in direct effects to a few juvenile and adult MYLF and would result in indirect effects to both aquatic and terrestrial habitat over the short and long-term. Since these impacts would affect a very small percentage of suitable and occupied habitat, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long-term.

Table 3.11-40 Alternative 1 - Direct and Indirect Effects Indicators (mountain yellow-legged frog)

Indicators	
Number of stream crossings (perennial) on routes added to the NFTS within known occupied aquatic habitat	0
Number of stream crossings (perennial) on ML1 roads converted to trails within known occupied aquatic habitat	0
Miles of routes added to the NFTS within 30 meters of known occupied aquatic habitat	0
Miles of ML1 roads converted to trails within 30 meters of known occupied habitat	0.02
Percentage of upland habitat (within 30 meters of occupied aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%
Number of stream crossings (perennial) on routes added to the NFTS within suitable aquatic habitat	2
Number of stream crossings (perennial) on ML1 roads converted to trails within suitable aquatic habitat	6
Miles of routes added to the NFTS within 30 meters of suitable aquatic habitat	1.19
Miles of ML1 roads converted to trails within 30 meters of suitable aquatic habitat	0.61
Percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%

Season of Use: The MYLF inhabits higher elevations and spends the cold winter months in torpor. All occupied and suitable MYLF habitat would be within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Since these frogs typically overwinter in aquatic habitat (mountain lakes or deep pools), the use of wheeled motor vehicles during the winter months would have very little impact on them. Although impacts are expected to be minimal during the winter, these closures may provide some additional protection prior to these frogs entering torpor in fall and after emergence in the spring. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the MYLF.

Mitigation Measures: There would not be any mitigation measures proposed on routes that are associated with occupied MYLF habitat. Types of mitigation measures proposed on routes associated with suitable MYLF habitat include: barriers, tread hardening, drain dips, and a hardened stream crossing. The installation of a hardened stream crossing would likely result in a short-term increase in sedimentation which may impact some individuals. The installation of all mitigation measures may result in short-term disturbance to some individual frogs, but will limit trail widening, reduce soil perturbation, and reduce sedimentation, providing beneficial effects over the long-term.

Alternative 2 (No Action)

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to these frogs. These effects would be similar to those discussed within Alternative 4 for the short-term, but would be exacerbated over the long-term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to these frogs.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any miles of unauthorized routes to the NFTS and would not change the use on any NFTS routes, but there would not be any restrictions on cross-country travel.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the MYLF.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 4 (Recreation)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable mountain yellow-legged frog habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-41). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the number of ML1 roads converted to a trail within suitable MYLF habitat, there would be a slight increase in the direct and indirect effects to these frogs within the project area. Although these increases may result in more individuals being impacted, these increases would not likely be significant enough to result in impacts to MYLF populations within the project area.

Table 3.11-41 Alternative 4 - Direct and Indirect Effects Indicators (mountain yellow-legged frog)

Indicators	
Number of stream crossings (perennial) on routes added to the NFTS within known occupied aquatic habitat	0
Number of stream crossings (perennial) on ML1 roads converted to trails within known occupied aquatic habitat	0
Miles of routes added to the NFTS within 30 meters of known occupied aquatic habitat	0
Miles of ML1 roads converted to trails within 30 meters of known occupied habitat	0.02
Percentage of upland habitat (within 30 meters of occupied aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%
Number of stream crossings (perennial) on routes added to the NFTS within suitable aquatic habitat	2
Number of stream crossings (perennial) on ML1 roads converted to trails within suitable aquatic habitat	7
Miles of routes added to the NFTS within 30 meters of suitable aquatic habitat	1.19
Miles of ML1 roads converted to trails within 30 meters of suitable aquatic habitat	0.63
Percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%

Season of Use: The MYLF inhabits higher elevations and spends the cold winter months in torpor. All occupied and suitable MYLF habitat would be within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Since these frogs typically overwinter in aquatic habitat (mountain lakes or deep pools) the use of wheeled motor vehicles during the winter months would have very little impact on them. Although impacts are expected to be minimal during the winter, these closures may provide some additional protection prior to these frogs entering torpor in fall and after emergence in the spring. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the MYLF.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Alternative 5 (Resources)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable mountain yellow-legged frog habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-42). This alternative would not result in the addition of any stream crossings within occupied or suitable mountain yellow-legged frog habitat. The conversion of approximately 0.26 miles of roads to trails within 30 meters of suitable aquatic habitat may result in direct effects to very few juvenile and adult MYLF. The conversion of this route to trail may result in minor indirect effects to both aquatic and terrestrial habitat over the short and long-term. Since these impacts would affect a very small percentage of suitable and occupied habitat, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long-term.

Season of Use: The MYLF inhabits higher elevations and spends the cold winter months in torpor. All occupied and suitable MYLF habitat would be within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Since these frogs typically overwinter in aquatic habitat (mountain lakes or deep pools) the use of wheeled motor vehicles during the winter months would have very little impact on them. Although impacts are expected to be minimal during the winter, these closures may provide some additional protection prior to these frogs entering torpor in fall and after emergence in the spring. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the MYLF.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-42 Alternative 5 - Direct and Indirect Effects Indicators (mountain yellow-legged frog)

Indicators	
Number of stream crossings (perennial) on routes added to the NFTS within known occupied aquatic habitat	0
Number of stream crossings (perennial) on ML1 roads converted to trails within known occupied aquatic habitat	0
Miles of routes added to the NFTS within 30 meters of known occupied aquatic habitat	0
Miles of ML1 roads converted to trails within 30 meters of known occupied habitat	0
Percentage of upland habitat (within 30 meters of occupied aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	0%
Number of stream crossings (perennial) on routes added to the NFTS within suitable aquatic habitat	0
Number of stream crossings (perennial) on ML1 roads converted to trails within suitable aquatic habitat	0
Miles of routes added to the NFTS within 30 meters of suitable aquatic habitat	0.26
Miles of ML1 roads converted to trails within 30 meters of suitable aquatic habitat	0
Percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%

CUMULATIVE EFFECTS

Many past and current cumulative impacts have contributed to the decline in mountain yellow-legged frog numbers and distribution. One factor attributed to wide-scale population declines of the mountain yellow-legged frog has been the introduction of salmonid fishes during the last century (Bradford et al. 1993, Knapp 1993, Knapp 1996). Recently, it has been determined that a chytridomycete fungus has been associated with numerous MYLF die-offs in the Sierra Nevada of California (Rachowicz 2006). Other factors that have contributed to cumulative impacts to the species includes pesticides, ultraviolet radiation; bacterial, fungal, and viral pathogens; acidification from the atmospheric deposition; nitrate deposition; livestock grazing; recreational activities; and drought have all been identified as potential factors affecting the species and its habitat (USDA 2001).

Introduced trout species within high mountain lakes has severely affected mountain yellow-legged frog population trends in the Sierra Nevada including the STF. In recent years, the California Department of Fish and Game has actively addressing this issue to proactively manage for mountain yellow-legged frog restoration opportunities while still providing a recreational fisheries within high mountain lakes. Recent experimental efforts to remove introduced trout species from high mountain lakes has shown that mountain yellow-legged frog populations may positively respond. Non-native game fish are found in many high mountain lakes on the STF and have likely had a major impact on MYLF populations in the past. Although some actions are presently being taken to mitigate the impacts of introduced game fish, it is costly, labor intensive, and difficult to remove fish populations from some high mountain lakes. Therefore, they will likely continue to have significant impacts on the ability of MYLF populations to grow and expand on the STF in the future.

The chytrid fungus Batrachochytrium dendrobatidis has recently been determined to be common within MYLF populations within the Sierra Nevada and that it has likely played a significant role in population declines (Fellers et al. 2001, Rachowicz et al. 2006). Although it is well documented that this fungus may play a significant role in population declines, its dispersal ability is not currently well understood (Rachowicz 2006). Without further research, it is difficult to determine the level of risk motorized use and access may have on the dispersal of this disease.

Historic livestock grazing likely had a significant cumulative impact to this species and their habitat. Historic livestock grazing evidence indicates that heavy livestock use in the Sierra Nevada led to riparian habitat degradation across much of the Sierra Nevada. Livestock trampling has the potential to directly kill all life stages of MYLF. The greatest potential of mortality risk from livestock trampling is expected to occur when adult MYLF aggregate and lay egg masses in the early season, and during metamorphosis, when juveniles are metamorphosing along aquatic margins. Current standards and guidelines in the Sierra Nevada Forest Plan Amendment were implemented to reduce the risk of trampling by livestock (USDA 2004). Known mountain yellow-legged frog habitat sites currently overlap with 9 active livestock grazing allotments. Potential mountain yellow-legged frog habitat overlaps with approximately 18 additional allotments. Management direction including standards and guidelines for grazing should reduce potential grazing impacts from livestock grazing over the long-term.

Historic vegetation management and fuels reduction projects have likely contributed to past and present cumulative affects, especially if projects occurred adjacent to MYLF aquatic habitats. Ground disturbing activities including timber harvest and fuels treatment projects (burning and mastication projects) potentially caused direct mortality to this species which may have affected the abundance of the species on the STF. In general, current vegetation and fuels projects are designed to reduce potential impacts on MYLF habitats, and therefore, minimize disturbance to the species. However, as MYLF migrate between breeding sites, and between breeding sites and overwintering sites (usually in or very near water), there is some potential for direct impacts from being crushed or burned from vegetation and fuels projects. In general the magnitude of this happening across the range of the MYLF frog habitats on the STF should be limited given the timing of MYLF migration which is in the spring, with the exception to spring prescribed burning projects. In general, the adverse impacts of spring burning is expected to be low given the relatively low amount that occurs on the Forest within an average year.

Recreation use has increased and is expected to continue to increase on the STF (see Recreation section Affected Environment), resulting in greater likelihood and magnitude of human disturbance to aquatic wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation, based upon State figures for OHV sales (see Recreation section). The project alternatives would contribute to these past and current conditions with added displacement from noise and human activity, and indirect effects to aquatic habitat. In the future, there is approximately 5 miles of new trail construction that is proposed to be added to the NFTS as well as numerous short route segments for dispersed camping access. These trails are proposed to provide “connector routes” between existing NFTS routes and motorized access to historical dispersed camping opportunities.

Although motorized vehicle use has not been identified as one a major contributing factors to MYLF declines, the direct and indirect effects of the project alternatives would likely contribute to cumulative effects for this species. Because Alternative 2 does not prohibit cross-country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon FYLF. Alternative 3 would prohibit cross-country travel and would not add any routes to the NFTS, therefore the effects of this alternative would be beneficial. Alternatives 1, 4 and 5 contribute cumulatively to the disturbance and habitat alteration from activities described above. Alternatives 4, 1, and 5 would result in progressively lower risk to these frogs due to the amount of motorized routes being added to the system. These alternatives do not result in a loss of habitat (no route construction), but would likely influence habitat suitability. Although the action alternatives may result in additional cumulative impacts, they are very minor in comparison to other factors affecting this species.

Table 3.11-43 Ranking of Alternative Indicators (mountain yellow-legged frog)

Indicators	Rankings by Alternatives [1]				
	1	2	3	4	5
Number of stream crossings (perennial and intermittent) on routes added to the NFTS within known occupied aquatic habitat	4	1	5	4	4
Number of stream crossings (perennial and intermittent) on ML1 roads converted to trails within known occupied aquatic habitat	4	1	5	4	4
Miles of routes added to the NFTS within 30 meters of known occupied aquatic habitat	4	1	5	4	4
Miles of ML1 roads converted to trails within 30 meters of known occupied habitat	3	1	5	3	4
Percentage of upland habitat (within 30 meters of occupied aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	3	1	5	3	4
Number of stream crossings (perennial and intermittent) on routes added to the NFTS within suitable aquatic habitat	3	1	5	3	4
Number of stream crossings (perennial and intermittent) on ML1 roads converted to trails within suitable aquatic habitat	3	1	5	2	4
Miles of routes added to the NFTS within 30 meters of suitable aquatic habitat	3	1	5	2	4
Miles of ML1 roads converted to trails within 30 meters of suitable aquatic habitat	3	1	5	3	4
Percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	4	1	5	4	4
Average	**3.40**	**1**	**5**	**3.20**	**4**

[1] score of 5 indicates the alternative is the best for terrestrial biota related to the indicator; A score of 1 indicates the alternative is the worst for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.

SUMMARY OF EFFECTS

Historically the MYLF was extremely abundant within high elevation aquatic ecosystems of the Sierra Nevada Mountains, but has recently undergone dramatic population declines throughout the Sierra Nevada (Grinnell and Storer 1924, Zweifel 1955, Knapp and Matthews 2000, USFWS 2004). With the exception of Alternative 3, which would have beneficial impacts to the mountain yellow-legged frog, the direct and indirect effects of the project alternatives (1, 2, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Western Pond Turtle – Affected Environment

Species and Habitat Account

The western pond turtle (WPT) is the only extant aquatic turtle native to California and ranges from Washington to southern California (Stebbins 1985, Reese and Welsh 1997). They have been found throughout lower elevations of the STF, but are primarily located on the southern portions of the project area at elevations <4,500 feet (Aquasurv 2008). While herpetofauna surveys have occurred extensively throughout the STF, surveys have not been conducted systematically as part of this project nor have they covered aquatic habitat within the project area in entirety. Approximately 20% of all perennial streams, 6% of all seasonal streams, and approximately 20% of all lakes and ponds have been surveyed. Results from these surveys and various other sources indicate that pond turtles have been observed at more than 20 locations throughout the STF.

Western pond turtles are habitat generalists, occurring in a wide variety of permanent and intermittent aquatic habitats and by using terrestrial habitats extensively. Although they may occur up to 6,000 feet in elevation, they have rarely been observed above 5,000 feet within the project area (Stebbins 1972, Aquasurv 2008). Individual western pond turtles (usually males) may have large home ranges and may wander within a given watercourse for several kilometers on a regular basis (Holland 1994, Reese and Welsh 1997). In streams, Reese (1996) found that all turtles in the study used terrestrial habitats during the course of the year. Terrestrial habitats are needed for nesting, overwintering, and for seasonal uses. Western pond turtle nests have been found as far as 435 yards from the stream (Reese and Welsh 1997) in open sunny areas on hillslopes, generally with a south to southwest facing aspect. Nest sites typically occur in open areas dominated by grasses or herbaceous annuals on dry, well-drained soils with high clay/silt content and low (less than 15 degree) slope (Holland 1994). There is some indication that most nesting excursions occur at night (Rathbun et al. 2002). Western pond turtles also move into upland slopes while overwintering or during periods when aquatic habitats become unsuitable (dry). The timing of overwintering movements is poorly understood, but generally occur within the project area from the fall (October) to early spring (April).

For the purposes of this analysis, suitable western pond turtle aquatic habitat has been defined and mapped as continuous (minimum of 200 feet) perennial and intermittent streams with less than 6% gradient and all lentic habitats below 5,000 feet in elevation. Since systematic surveys for the project were not conducted for pond turtles in all potentially suitable aquatic habitat, occupied aquatic habitat was conservatively estimated. These estimates were determined using the most current recorded sightings of pond turtles. Since locations of pond turtles were often associated with a specific point on land, all adjacent potentially suitable aquatic habitats were assumed occupied. Suitable stream habitat was assumed occupied upstream and downstream of the sighting until a reach of unsuitable (> 6% gradient) stream habitat greater than 400 meters was encountered. Further, this analysis assumes that all land within 400 meters of suitable aquatic habitat may provide suitable nesting habitat. Although pond turtles may travel further than 400 meters from aquatic habitat for overwintering purposes, these movements appear to be far less frequent. Since nesting primarily occurs within 400 meters of aquatic habitat, potential for impacts beyond 400 meters of suitable aquatic habitat is very low and would likely result in negligible effects to the species (Storer 1930, Holland 1994, Rathbun et al. 1992, Reese 1996, Reese and Welsh 1997, Rathbun et al. 2002).

Western Pond Turtle – Environmental Consequences

Indicators

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the western pond turtle. Although biological thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Number of stream crossings on routes added to the NFTS within known occupied habitat.
- Number of stream crossings on ML1 roads converted to trails within known occupied aquatic habitat.
- Miles of routes added to the NFTS within 400 meters of known occupied aquatic habitat.
- Miles of ML1 roads converted to trails within 400 meters of known occupied habitat
- Number of stream crossings (perennial and intermittent) on routes added to the NFTS within suitable aquatic habitat.
- Number of stream crossings on ML1 roads converted to trails within suitable aquatic habitat.
- Miles of routes added to the NFTS within 400 meters of suitable aquatic habitat.
- Miles of ML1 roads converted to trails within 400 meters of suitable aquatic habitat.

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the western pond turtle by:

- Prohibiting cross-country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on pond turtles through: human-caused mortality, changes in behavior, and habitat modification (see Effects Common to all Aquatic Wildlife). Furthermore, pond turtles may be more or less prone to the effects of motorized travel because essentially all individuals use terrestrial habitats extensively throughout the year and they are wary of human presence. During nesting excursions, females are very sensitive to disturbance and will abandon the nesting effort (Reese 1996, Rathbun et al. 2002). The WPT also uses upland habitats extensively as overwintering habitat (Holland 1994, Rathbun et al. 2002), a period of reduced activity partially in response to cold weather and limited availability of food resources.

Alternative 1 (Proposed Action)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable western pond turtle habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-44). This alternative would result in the addition of several routes and 22 stream crossings within occupied western pond turtle habitat and several routes with 38 stream crossings within suitable habitat. These routes and stream crossings would likely result in direct and indirect effects to some juvenile and adult individual western pond turtles. The addition of routes and conversion of roads to trails within 400 meters of occupied and suitable aquatic habitat may result in direct effects to adults (females) moving overland to find suitable nesting locations. Since nests are prepared in terrestrial habitat with vegetation providing some cover, it is unlikely that nests would be built directly in routes. Therefore, motorized use on routes would not likely result in the destruction of pond turtle nests. In areas where routes intersect suitable nesting habitat, hatchlings may be disturbed or crushed as they leave the nest to find suitable aquatic habitat.

The addition of routes and conversion of ML1 roads to trails would result in indirect effects to both aquatic and terrestrial habitat over the short and long-term. Indirect effects that are likely to occur to suitable and occupied habitat include: the loss of suitable nesting habitat and increased sedimentation into streams. Since these impacts would affect a very small percentage of suitable and occupied habitat, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long-term.

Season of Use: Western pond turtles generally move into upland terrestrial habitat to overwinter. Most of the occupied and suitable pond turtle habitat in the project area is within Zone 2 or Zone 3 of the seasonal closures (as identified for each route in Appendix I). Limiting the season of use would likely reduce disturbance to some individual overwintering pond turtles. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the western pond turtle.

Mitigation Measures: Types of mitigation measures proposed on routes associated with occupied pond turtle habitat include: barriers, tread hardening, and drain dips. Types of mitigation measures proposed on routes associated with suitable pond turtle habitat include: barriers, tread hardening, drain dips, hardened stream crossings, water bars, a cattle guard, and a small bridge. The installation of hardened stream crossings and a small bridge would likely result in a short-term increase in sedimentation which may impact some individuals. The installation of all mitigation measures may result in short-term disturbance to some individual pond turtles, but will limit trail widening, reduce soil perturbation, and reduce sedimentation, providing beneficial effects over the long-term.

Table 3.11-44 Alternative 1 - Direct and Indirect Effects Indicators (western pond turtle)

Indicators	
Number of stream crossings on routes added to the NFTS within known occupied aquatic habitat	22
Number of stream crossings on ML1 roads converted to trails within known occupied aquatic habitat	0
Miles of routes added to the NFTS within 400 meters of known occupied aquatic habitat	8.21
Miles of ML1 roads converted to trails within 400 meters of known occupied habitat	6.95
Percentage of upland habitat (within 400 meters of occupied aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%
Number of stream crossings on routes added to the NFTS within suitable aquatic habitat	34
Number of stream crossings on ML1 roads converted to trails within suitable aquatic habitat	4
Miles of routes added to the NFTS within 400 meters of suitable aquatic habitat	34.1
Miles of ML1 roads converted to trails within 400 meters of suitable aquatic habitat	30.12
Percentage of upland habitat (within 400 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%

Alternative 2 (No Action)

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to pond turtles. These effects would be similar to those discussed within Alternative 4 for the short-term, but would be exacerbated over the long-term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to pond turtles.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable western pond turtle habitat. This would reduce the risk of direct and indirect effects to pond turtle from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the western pond turtle.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 4 (Recreation)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable western pond turtle habitat. This would reduce the risk of direct and indirect effects to pond turtles from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-45). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is an increase from Alternative 1 in the number of routes added to the system or converted to a trail within occupied and suitable pond turtle habitat, there would be an increase in the direct and indirect effects to individuals within the project area. Although these increases would result in more individuals being impacted, these increases would not likely be significant enough to result in impacts to western pond turtle populations within the project area.

Table 3.11-45 Alternative 4 - Direct and Indirect Effects Indicators (western pond turtle)

Indicators	
Number of stream crossings on routes added to the NFTS within known occupied aquatic habitat	22
Number of stream crossings on ML1 roads converted to trails within known occupied aquatic habitat	4
Miles of routes added to the NFTS within 400 meters of known occupied aquatic habitat	8.6
Miles of ML1 roads converted to trails within 400 meters of known occupied habitat	15.49
Percentage of upland habitat (within 400 meters of occupied aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%
Number of stream crossings on routes added to the NFTS within suitable aquatic habitat	34
Number of stream crossings on ML1 roads converted to trails within suitable aquatic habitat	13
Miles of routes added to the NFTS within 400 meters of suitable aquatic habitat	39.91
Miles of ML1 roads converted to trails within 400 meters of suitable aquatic habitat	43.99
Percentage of upland habitat (within 400 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%

Season of Use: Western pond turtles generally move into upland terrestrial habitat to overwinter. Most of the occupied and suitable pond turtle habitat in the project area is within Zone 2 or Zone 3 of the seasonal closures (as identified for each route in Appendix I). Limiting the season of use would likely reduce disturbance to some individual overwintering pond turtles. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the western pond turtle.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Alternative 5 (Resources)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable western pond turtle habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-46). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a significant decrease from Alternative 1 in the number of routes added to the system or converted to a trail within suitable and occupied pond turtle habitat, there would be a significant decrease in the direct and indirect effects to individuals within the project area. Since these impacts would affect a very small percentage of pond turtle habitat (Table 3.11-46), these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long-term.

Season of Use: Western pond turtles generally move into upland terrestrial habitat to overwinter. Most of the occupied and suitable pond turtle habitat in the project area is within Zone 2 or Zone 3 of the seasonal closures (as identified for each route in Appendix I). Limiting the season of use would likely reduce disturbance to some individual overwintering pond turtles. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the western pond turtle.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-46 Alternative 5 - Direct and Indirect Effects Indicators (western pond turtle)

Indicators	
Number of stream crossings on routes added to the NFTS within known occupied aquatic habitat	0
Number of stream crossings on ML1 roads converted to trails within known occupied aquatic habitat	0
Miles of routes added to the NFTS within 400 meters of known occupied aquatic habitat	0
Miles of ML1 roads converted to trails within 400 meters of known occupied habitat	0.36
Percentage of upland habitat (within 400 meters of occupied aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%
Number of stream crossings on routes added to the NFTS within suitable aquatic habitat	2
Number of stream crossings on ML1 roads converted to trails within suitable aquatic habitat	1
Miles of routes added to the NFTS within 400 meters of suitable aquatic habitat	5.94
Miles of ML1 roads converted to trails within 400 meters of suitable aquatic habitat	2.06
Percentage of upland habitat (within 400 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%

CUMULATIVE EFFECTS

Like the amphibians discussed above, the western pond turtle has experienced dramatic declines within its range. The Federal Register (57 FR 45761) listed habitat destruction as the primary cause for the decline of the species. Within the analysis area, livestock grazing, suction dredge mining, water developments, and vegetation management activities have impacted or have the potential to result in impacts to individuals or modification of habitat.

Grazing has the potential to affect the western pond turtle. Livestock may injure or kill individuals through trampling, particularly hatchlings in the nest or in shallow water habitats. Sediment arising from areas of high use by livestock may impact pool habitat (reduction in volume). Grazing likely does not have a major influence on upland habitat attributes, such as vegetation composition or availability of overwintering sites. When livestock access water, there is the potential that their presence will result in a physical disturbance to individual turtles and cause them to seek refuge in aquatic habitat. The consequence of this disturbance is likely very minor in that it may interrupt an activity like basking that is necessary for basic metabolism. Basking is tied to metabolism which is linked with food intake and growth. If the interruptions are occasional, then the effect on metabolism is likely to be negligible. Extended disturbance may result in dispersal from the affected area or in loss of body mass (Cadi and Joly 2003). Nine active allotments overlap known populations of WPT and six other allotments overlap suitable habitat. Historic grazing likely had a minor impact on individuals and habitats, while current livestock grazing has minor impact on individuals and habitats.

Suction dredge mining can result in disturbance to individuals and modification of habitat. The presence of people operating dredges in occupied habitat can cause physical disturbance to individuals, thereby interrupting their normal activity pattern. As noted above, if the disturbance is occasional then the effect on metabolism is assumed to be negligible; however, if the disturbance is excessive then physiological effects on growth is expected. Dredging can also alter habitats, possibly favoring the turtle. On the STF, observations have indicated that pool habitats are frequently deepened by dredging and WPT take advantage of this “improved” pool habitat. It is unlikely that dredgers unintentionally suck turtles into the dredge because they are relatively conspicuous and typically attempt to avoid capture. The impact of past and current suction dredging is minor to individuals and negligible to the aquatic habitats needed by the species.

Water developments have the potential to impact the WPT through loss and/or modification of habitat. As noted above, several impoundments have been constructed on rivers across the STF resulting in a direct loss of habitat. Holland (1994) found that large impoundments are largely unsuitable for the WPT. Indirect impacts to habitat include loss of habitat complexity and alterations in water temperatures. Reese and Welsh (1998) investigated the impacts of regulated streamflow downstream of an impoundment and found that habitat suitability was reduced in a dammed stream because there were fewer slow-velocity and warm water habitats than in an undimmed stream. The implication of reduced habitat suitability was more time spent basking for thermoregulation which increased predation risk (Reese and Welsh 1998). Dams also physically interrupt the continuity of aquatic habitats which can effectively separate populations of turtles and limit genetic dispersal. The impact of past and current water developments on the STF have had, and continue to have, moderate to major impacts on the western pond turtle and its habitats.

Vegetation management activities have the potential to impact individuals and the habitats required by the WPT. Since the turtle uses upland habitats extensively, there is the potential that timber harvest, fuel reduction activities, and prescribed fire can impact individuals directly. Mechanical operations (harvest, shredding) and prescribed fire frequently occur within 100 meters of occupied streams. These activities can injure or kill individual females attempting to nest, overwintering, or by impacting nests (eggs and hatchlings). Fuel reduction and prescribed fire have the potential to modify upland and riparian habitats directly by changing the composition and density of vegetation in upland habitats. There may be detrimental and beneficial effects associated with loss of leaf duff/overwintering habitat and increased nesting habitat, respectively. Typically, the amount of sediment arising from vegetation management projects is minor and only has small and localized impacts to aquatic habitat (reduced pool volume). There are 10 to 15 projects that are planned or in the planning phase on the STF that could affect WPT habitats. Additional vegetation management projects have and will occur on private timber lands within the analyzed landscape. Past activities likely had a greater impact (moderate) on the WPT because protections have only occurred in the last 10 years and management activities occurred close to streams. At present, mitigation measures are incorporated to minimize effects at occupied sites and the current level of impact is minor on the turtle.

SUMMARY OF EFFECTS

The western pond turtle is the only extant aquatic turtle native to California and ranges from Washington to southern California (Stebbins 1985, Reese and Welsh 1997). With the exception of Alternative 3, which would have beneficial impacts to the western pond turtle, the direct and indirect effects of the project alternatives (1, 2, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Table 3.11-47 Ranking of Alternative Indicators (western pond turtle)

Indicators	Rankings by Alternatives [1]				
	1	2	3	4	5
Number of stream crossings on routes added to the NFTS within known occupied aquatic habitat	3	1	5	3	4
Number of stream crossings on ML1 roads converted to trails within known occupied aquatic habitat	4	1	5	3	4
Miles of routes added to the NFTS within 400 meters of known occupied aquatic habitat	3	1	5	2	4
Miles of ML1 roads converted to trails within 400 meters of known occupied habitat	3	1	5	2	4
Percentage of upland habitat (within 400 meters of occupied aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	4	1	5	4	4
Number of stream crossings on routes added to the NFTS within suitable aquatic habitat	3	1	5	3	4
Number of stream crossings on ML1 roads converted to trails within suitable aquatic habitat	3	1	5	2	4
Miles of routes added to the NFTS within 400 meters of suitable aquatic habitat	3	1	5	2	4
Miles of ML1 roads converted to trails within 400 meters of suitable aquatic habitat	3	1	5	2	4
Percentage of upland habitat (within 400 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or ML1 roads converted to trails	3	1	5	2	4
Average	**3.20**	**1**	**5**	**2.50**	**4**

[1] score of 5 indicates the alternative is the best for terrestrial biota related to the indicator; A score of 1 indicates the alternative is the worst for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.

Yosemite Toad – Affected Environment

Species and Habitat Account

The Yosemite toad is an endemic species to the state of California and is found at high elevations in the Sierra Nevada Mountains. Although they occur in habitats that are less impacted by humans, they currently only occupy approximately 50% of their historic range (Lannoo 2005). Herpetofauna surveys have occurred throughout the STF, but surveys have not been conducted systematically for this project nor have they covered Yosemite toad habitat within the project area in entirety. Approximately 55% of all wet meadows within the range of the toad have been surveyed. Results from these surveys and various other sources indicate that these toads have been observed at approximately 65-70 locations throughout the STF.

The Yosemite toad inhabits high elevation meadows that are typically associated with a water source and a willow component. Upon snowmelt, the toad moves from a hibernaculum to a breeding site typically located in a meadow. Shallow water sheeting across/through vegetation appears to be favored for breeding because water temperatures are very warm and allow for rapid development of the eggs and tadpoles. However, tadpoles have been observed in small streams in wet meadows. Females may breed once every two to three years. Following breeding, the adults move into the rest of the meadow, willow thickets, and the uplands surrounding the meadow to forage (Kagarise Sherman and Morton 1984, Martin 2008). Dispersal distance from the breeding site to foraging habitat is variable, but Martin (2008) reports movements exceeding 600 meters are possible. At the end of the season, toads seek underground refugia (ex. rodent burrows) to overwinter. Morton (1981) reported toads may overwinter up to 750 meters from the nearest breeding site. Kagarise Sherman and Morton (1984) reported a majority of activity occurred during the day; however, Martin (2008) reported most longer distance movements occurred at night. Although the elevation range of the species begins at approximately 6,400 feet, they have only been found within the project area above 7,200 feet. For the purposes of this analysis, potentially suitable Yosemite toad habitat has been defined and mapped as the Wet Willow and Wet Other CWHR types above 7,000 feet in elevation.

Yosemite Toad – Environmental Consequences

Indicators

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the Yosemite toad. Although biological thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Number of stream crossings on routes added to the NFTS within known occupied habitat.
- Number of stream crossings on ML1 roads converted to trails within known occupied habitat.
- Miles of routes added to the NFTS within known occupied habitat.
- Miles of ML1 roads converted to trails within known occupied habitat.
- Percentage of occupied habitat directly impacted by routes added to the NFTS or ML1 roads converted to trails.
- Miles of routes added to the NFTS within 100 meters of known occupied habitat.
- Miles of ML1 roads converted to trails within 100 meters of known occupied habitat.
- Miles of routes added to the NFTS within 400 meters of known occupied habitat.
- Miles of ML1 roads converted to trails within 400 meters of known occupied habitat.
- Number of stream crossings on routes added to the NFTS within known suitable habitat.
- Number of stream crossings on ML1 roads converted to trails within known suitable habitat.
- Miles of routes added to the NFTS within potentially suitable habitat.
- Miles of ML1 roads converted to trails within potentially suitable habitat.
- Percentage of suitable habitat directly impacted by routes added to the NFTS or ML1 roads converted to trails.

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the Yosemite toad by:

- Prohibiting cross-country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on toads through: human-caused mortality, changes in behavior, and habitat modification (see Effects Common to all Aquatic Wildlife). Furthermore, pond turtles may be more or less prone to motorized travel because breeding movements typically occur when roads near breeding sites are impassable due to snow, trails/roads are not located within meadows, and because most post-breeding movements occur in the breeding meadow or upland habitats adjacent to the breeding meadow. However, the dispersal and overwintering movements are large (exceeding 600 meters) making it possible that toads may have to cross roads to reach preferred foraging or overwintering sites.

Alternative 1 (Proposed Action)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable Yosemite toad. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-48). This alternative would result in the addition of zero stream crossings in occupied habitat and three stream crossings within suitable habitat. These stream crossings may result in direct and indirect effects to some individuals of all Yosemite toad life history stages. Routes being added to the system within or near occupied and suitable Yosemite toad habitat may result in direct effects to some juveniles and adults and indirect effects to all life history stages of this toad. Since these impacts would affect a very small percentage of suitable and occupied habitat, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long-term.

Table 3.11-48 Alternative 1 - Direct and Indirect Effects Indicators (Yosemite toad)

Indicators	
Number of stream crossings on routes added to the NFTS within known occupied habitat	0
Number of stream crossings on ML1 roads converted to trails within known occupied habitat	0
Miles of routes added to the NFTS within known occupied habitat	0.19
Miles of ML1 roads converted to trails within known occupied habitat	0
Percentage of occupied habitat directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%
Miles of routes added to the NFTS within 100 meters of known occupied habitat	0.3
Miles of ML1 roads converted to trails within 100 meters of known occupied habitat	0
Miles of routes added to the NFTS within 400 meters of known occupied habitat	0.3
Miles of ML1 roads converted to trails within 400 meters of known occupied habitat	0
Number of stream crossings on routes added to the NFTS within potentially suitable habitat	0
Number of stream crossings on ML1 roads converted to trails within potentially suitable habitat	3
Miles of routes added to the NFTS within potentially suitable habitat	0.14
Miles of ML1 roads converted to trails within potentially suitable habitat	0.1
Percentage of suitable habitat directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%

Season of Use: The Yosemite toad inhabits higher elevations and spends the cold winter months in torpor. All occupied and suitable Yosemite toad habitat would be within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Since these frogs typically overwinter in earthen cavities (rodent burrows, rock crevices) the use of wheeled motor vehicles during the winter months would have very little impact on them. Although impacts are expected to be minimal during the winter, these closures may provide some additional protection prior to these toads entering torpor in fall and after emergence in the spring. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the Yosemite toad.

Mitigation Measures: The only type of mitigation measure proposed on routes that are associated with occupied Yosemite toad habitat is a drain dip. Types of mitigation measures proposed on routes associated with suitable Yosemite toad habitat include barriers and drain dips. The installation of all mitigation measures may result in short-term disturbance to some individual toads, but will limit trail widening, reduce soil perturbation, and reduce sedimentation, providing beneficial effects over the long-term.

Alternative 2 (No Action)

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to these toads. These effects would be similar to those discussed within Alternative 4 for the short-term, but would be exacerbated over the long-term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to these toads.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable Yosemite toad. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the Yosemite toad.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 4 (Recreation)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable Yosemite toad. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-49). Direct and indirect effects of the actions proposed in this alternative would be the same as those discussed in Alternative 1.

Table 3.11-49 Alternative 4 - Direct and Indirect Effects Indicators (Yosemite toad)

Indicators	
Number of stream crossings on routes added to the NFTS within known occupied habitat	0
Number of stream crossings on ML1 roads converted to trails within known occupied habitat	0
Miles of routes added to the NFTS within known occupied habitat	0.19
Miles of ML1 roads converted to trails within known occupied habitat	0
Percentage of occupied habitat directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%
Miles of routes added to the NFTS within 100 meters of known occupied habitat	0.3
Miles of ML1 roads converted to trails within 100 meters of known occupied habitat	0
Miles of routes added to the NFTS within 400 meters of known occupied habitat	0.3
Miles of ML1 roads converted to trails within 400 meters of known occupied habitat	0
Number of stream crossings on routes added to the NFTS within potentially suitable habitat	0
Number of stream crossings on ML1 roads converted to trails within potentially suitable habitat	3
Miles of routes added to the NFTS within potentially suitable habitat	0.14
Miles of ML1 roads converted to trails within potentially suitable habitat	0.1
Percentage of suitable habitat directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%

Season of Use: The Yosemite toad inhabits higher elevations and spends the cold winter months in torpor. All occupied and suitable Yosemite toad habitat would be within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Since these frogs typically overwinter in earthen cavities (rodent burrows, rock crevices) the use of wheeled motor vehicles during the winter months would have very little impact on them. Although impacts are expected to be minimal during the winter, these closures may provide some additional protection prior to these toads entering torpor in fall and after emergence in the spring. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the Yosemite toad.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Alternative 5 (Resources)

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near occupied and suitable Yosemite toad. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long-term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-50). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight decrease from Alternative 1 in the amount of routes added to the system or converted to a trail within suitable habitat, there would likely be a slight decrease in the direct and indirect effects to individuals within the project area. Since these impacts would affect a very small percentage of suitable and occupied habitat (Table 3.11-50), these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long-term.

Table 3.11-50 Alternative 4 - Direct and Indirect Effects Indicators (Yosemite toad)

Indicators	
Number of stream crossings on routes added to the NFTS within known occupied habitat	0
Number of stream crossings on ML1 roads converted to trails within known occupied habitat	0
Miles of routes added to the NFTS within known occupied habitat	0.19
Miles of ML1 roads converted to trails within known occupied habitat	0
Percentage of occupied habitat directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%
Miles of routes added to the NFTS within 100 meters of known occupied habitat	0.3
Miles of ML1 roads converted to trails within 100 meters of known occupied habitat	0
Miles of routes added to the NFTS within 400 meters of known occupied habitat	0.3
Miles of ML1 roads converted to trails within 400 meters of known occupied habitat	0
Number of stream crossings on routes added to the NFTS within potentially suitable habitat	0
Number of stream crossings on ML1 roads converted to trails within potentially suitable habitat	3
Miles of routes added to the NFTS within potentially suitable habitat	0.03
Miles of ML1 roads converted to trails within potentially suitable habitat	0.1
Percentage of suitable habitat directly impacted by routes added to the NFTS or ML1 roads converted to trails	<1%

Season of Use: The Yosemite toad inhabits higher elevations and spends the cold winter months in torpor. All occupied and suitable Yosemite toad habitat would be within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Since these frogs typically overwinter in earthen cavities (rodent burrows, rock crevices) the use of wheeled motor vehicles during the winter months would have very little impact on them. Although impacts are expected to be minimal during the winter, these closures may provide some additional protection prior to these toads entering torpor in fall and after emergence in the spring. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the Yosemite toad.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

CUMULATIVE EFFECTS

While the causes of decline for Yosemite toad are unclear, several past and current stressors have contributed to the decline in Yosemite toad numbers and distribution. The decline of the Yosemite toad has largely been hypothesized to include factors such as livestock grazing, disease, and pesticide drift.

Martin (2008) associated declines in Yosemite toad populations primarily to livestock grazing. Beginning in the 1860's, high elevation meadows were heavily impacted by unrestricted, large numbers of sheep. Cattle were introduced in the early 1900's and large numbers were allowed unrestricted access to the high elevation meadows that provide suitable habitat for the toad. Primary impacts to individuals include the trampling of tadpoles in breeding habitat, adults and subadults in upland habitats, and recent metamorphs who have limited mobility. Impacts to habitat may have been more severe, with many meadows losing hydrologic function when streams incised and widened, thereby preventing annual flood waters from inundating the meadow and lowering the water table. Lowered water tables may be important in the persistence of breeding habitat (early dessication), which is naturally vulnerable in a Mediterranean climate. Livestock have the tendency to linger in the wet habitats in late summer because these habitats frequently support palatable forage. As such, breeding habitats tend to be heavily trampled and pocked by hooves. Livestock also graze the vegetation that may be important to toads for cover, foraging, and creating a cool, moist microclimate at the ground surface. There is also some speculation that the metabolic waste products degrade breeding habitats occupied by tadpoles through exposure to nitrogen (nitrates, nitrites, ammonium) and phosphorus compounds. On the STF, livestock allotments overlap a majority of the occupied Yosemite toad habitat. Approximately 45% of the known occupied sites occur outside of livestock allotments, primarily in the Emigrant Wilderness area. Historic livestock grazing likely had major impacts to individuals and habitat. Current impacts are considered to be moderate, since livestock numbers have steadily declined over the last 80 years and because restrictions on utilization and the timing of grazing have been recently implemented.

Kagarise Sherman and Morton (1993) documented declines of Yosemite toad populations in and near Yosemite National Park. Using pathological examinations of toads collected during this die-off, Green and Kagarise Sherman (2001) indicated disease may have been critical in the declines of Yosemite toad populations within protected areas. Several diseases and parasites were detected in preserved specimens, including the chytrid fungus (Batrachochytrium dendrobatidis) suspected in many amphibian die offs (Berger et al. 1998, Lips 1998, Fellers et al. 2001, Daszak et al. 2003). This fungus is apparently widespread and has the potential to affect every population of Yosemite toad on the STF. While the past and present impact of disease on Yosemite toad populations is unknown, it is assumed that diseases (in general) and chytridiomycosis (in specific) have a major potential to impact the remaining populations on the STF.

Davidson et al. (2002) used spatial tests to determine that windborne contaminants were consistent with Yosemite toad declines because at historic sites where Yosemite toads were absent had twice as much agricultural land upwind compared to historic sites that still have toads. Fellers et al. (2004) found elevated levels of DDE and other organochlorines in frog tissues in an area upwind of extensive agriculture. Fellers et al. (2007) and Davidson and Knapp (2007) both suggest airborne agrochemical deposition in the Sierra Nevada are contributing to declines of amphibians in relatively undisturbed environments. It is not known how pesticide contamination has affected the Yosemite toad on the STF in the past or currently. It is assumed that airborne contaminants are having a minor to moderate effect on Yosemite toad populations and habitat.

Summary of Effects

The Yosemite toad is an endemic species to the state of California and is found at high elevations in the Sierra Nevada Mountains. Although they occur in habitats that are less impacted by humans, they currently only occupy approximately 50% of their historic range (Lannoo 2005). With the exception of Alternative 3, which would have beneficial impacts to the Yosemite toad, the direct and indirect effects of the project alternatives (1, 2, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Table 3.11-51 Ranking of Alternative Indicators (Yosemite toad)

Indicators	Rankings by Alternatives [1]				
	1	2	3	4	5
Number of stream crossings on routes added to the NFTS within known occupied habitat	4	1	5	4	4
Number of stream crossings on ML1 roads converted to trails within known occupied habitat	4	1	5	4	4
Miles of routes added to the NFTS within known occupied aquatic habitat	4	1	5	4	4
Miles of ML1 roads converted to trails within known occupied habitat	4	1	5	4	4
Percentage of occupied habitat directly impacted by routes added to the NFTS or ML1 roads converted to trails	4	1	5	4	4
Miles of routes added to the NFTS within 100 meters of occupied habitat	4	1	5	4	4
Miles of ML1 roads converted to trails within 100 meters of occupied habitat	4	1	5	4	4
Miles of routes added to the NFTS within 400 meters of occupied habitat	4	1	5	4	4
Miles of ML1 roads converted to trails within 400 meters of occupied habitat	4	1	5	4	4
Number of stream crossings on routes added to the NFTS within suitable habitat	4	1	5	4	4
Number of stream crossings on ML1 roads converted to trails within suitable habitat	3	1	5	3	4
Miles of routes added to the NFTS within potentially suitable habitat	3	1	5	3	4
Miles of ML1 roads converted to trails within potentially suitable habitat	3	1	5	3	4
Percentage of suitable habitat directly impacted by routes added to the NFTS or ML1 roads converted to trails	4	1	5	4	4
Average	**3.79**	**1**	**5**	**3.79**	**4**

[1] score of 5 indicates the alternative is the best for terrestrial biota related to the indicator; A score of 1 indicates the alternative is the worst for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same ranking.

Compliance with Forest Plan, USFWS Management Guidelines and Project Design Criteria

American Marten

The American marten was identified by the Regional Forester as a Sensitive Species and Management Indicator Species (MIS) on the STF (USDA 2007a; USDA 2007b). The FSEIS amended the STF Forest Plan with updated guidelines for managing furbearers, including the marten (USDA 2004). The FSEIS removed the 1991 plan requirements for marten territories and the associated standards and guidelines.

Forest Plan Direction

1. Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest associated species (particularly fisher and marten) in biological evaluations.
2. Mitigate impacts where there is documented evidence of disturbance to the den 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 den sites.

Forest Plan Compliance

1. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not minimize old forest habitat fragmentation and would not comply with the above mentioned S&G. Alternatives 1, 3, 4, 5 would prohibit cross-country travel; therefore, they would minimize old forest habitat fragmentation and would comply with the above mentioned S&G.
2. There are no known marten den sites within the project area; therefore, all of the project alternatives would not have the potential to disturb den sites and would comply with the above mentioned S&G.

Pacific Fisher

The Pacific fisher was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The FSEIS amended the STF Forest Plan with updated guidelines for managing furbearers, including the fisher (USDA 2004). The FSEIS removed the 1991 plan requirements for marten territories and the associated standards and guidelines.

Forest Plan Direction

1. Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest associated species (particularly fisher and marten) in biological evaluations.
2. Mitigate impacts where there is documented evidence of disturbance to the den 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 den sites.

Forest Plan Compliance

1. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not minimize old forest habitat fragmentation and would not comply with the above mentioned S&G. Alternatives 1, 3, 4, 5 would prohibit cross-country travel; therefore, they would minimize old forest habitat fragmentation and would comply with the above mentioned S&G.
2. There are no known fisher den sites within the project area; therefore, all of the project alternatives would not have the potential to disturb den sites and would comply with the above mentioned S&G.

California Spotted Owl

The California spotted owl was identified by the Regional Forester as a Sensitive Species and Management Indicator Species (MIS) on the STF (USDA 2007a, USDA 2007b).

Forest Plan Direction

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.

Forest Plan Compliance

The STF does not monitor spotted owl nest sites for disturbance from motorized recreation; therefore, there is not any documented disturbance to spotted owl nest sites from existing recreation.

Northern Goshawk

The northern goshawk was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a).

Forest Plan Direction

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.

Forest Plan Compliance

The STF does not monitor goshawk nest sites for disturbance from motorized recreation; therefore, there is not any documented disturbance to goshawk nest sites from existing recreation.

Mule Deer

The mule deer was identified by the Regional Forester as a Management Indicator Species (MIS) on the STF (USDA 2007b?).

Forest Plan Direction

1. Deer winter concentration areas or critical winter range may be closed to motorized use from 11/15 – 4/15.
2. Deer summer concentration areas or critical summer range may be closed to motorized use from 4/15 – 8/1.

Forest Plan Compliance

1. Alternatives 2 and 3 would implement seasonal closures that are route specific and inconsistent between administrative units. Alternatives 1, 4 and 5 would implement Forest-wide winter seasonal closures for varying lengths of time (between Alternatives) that are close to the dates mentioned above on the majority of winter concentration areas and critical winter range.
2. None of the project alternatives would result in any seasonal closures on deer summer concentration areas or critical summer range.

Bald Eagle

The bald eagle was listed by the U.S. Fish and Wildlife Service (USFWS) as a federally endangered species in 1978 and was removed from the federal list of Threatened and Endangered Species on June 28, 2007. The bald eagle was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). Since 1978 populations have increased nationwide as well as in the Sierra Nevada (USDA 2001). Management direction for the bald eagle is now provided by the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c) and the Migratory Bird Treaty Act (16 USC 703-712) of 1972. Under these acts, disturbance that is likely to cause injury, substantial interference with normal breeding, feeding or sheltering behavior, or nest abandonment is prohibited (USFWS 2007).

USFWS Management Guidelines

1. Off-road vehicle use (including snowmobiles). No buffer is necessary around nest sites outside the breeding season. During the breeding season, do not operate off-road vehicles within 330 feet of the nest. In open areas, where there is increased visibility and exposure to noise, this distance should be extended to 660 feet.
2. Minimize potentially disruptive activities and development in the eagles’ direct flight path between their nest and roost sites and important foraging areas.

USFWS Compliance

1. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not prevent disturbance to nest sites during the breeding season and would not comply with the above mentioned management guideline. Alternatives 1, 3, 4, 5 would prohibit cross-country travel and would not add any routes within 660 feet of nest sites; therefore, these alternatives would prevent disturbance to nest sites during the breeding season and would comply with the above mentioned management guideline.
2. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not “minimize potentially disruptive activities… between the eagles’ nest and roost sites and important foraging areas” and would not comply with the above mentioned management guideline. Alternatives 1, 3, 4, 5 would prohibit cross-country travel and would not add any routes “between the eagles’ nest and roost sites and important foraging areas”; therefore, these alternatives would comply with the above mentioned management guideline.

Forest Plan Direction

1. Within Designated Territories (delineated bald eagle management areas, or additional territories, based on nesting occupancy):
   - Implement a Limited Operating Period (LOP) from January 1 through August 31.
   - Apply LOP restriction to motor vehicle activities on level 1 roads and OHV routes open to the general public.
   - Prohibit motor vehicle activity in wetlands, streamside management zones, and within 200 feet of lake shorelines that are used by bald eagles.
2. Outside Designated Territories (new active bald eagle nests outside of designated management territories):
   - From January 1 through August 31, implement the following restriction around the nest for a distance determined by the Wildlife Biologist on a site-specific basis.
   - Re-route existing OHV use to routes at a safe distance from the nest.
   - Close or detour existing roads in the proximity of the nest site.
   - Prohibit motor vehicle activities in the roost area.

Forest Plan Compliance

1. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not prevent disturbance within Designated Territories; therefore, this alternative would not comply with the above mentioned S&G. Alternatives 1, 3, 4, 5 would prohibit cross-country travel and would not add any routes within Designated Territories; therefore, these alternatives would comply with the above mentioned S&G.
2. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not prevent disturbance outside Designated Territories; therefore, this alternative would not comply with the above mentioned S&G. Alternatives 1, 3, 4, 5 would prohibit cross-country travel and would not add any routes near nest sites outside of Designated Territories; therefore, these alternatives would comply with the above mentioned S&G.

Peregrine Falcon

The peregrine falcon was listed as a federally endangered species from 1970 through 1999. On August 25, 1999 the final rule was published to de-list the peregrine falcon and it was then identified by the Regional Forester as a Sensitive Species on the STF (64 FR 46542, USDA 2007a).

Forest Plan Direction

Implement a limited operating period (LOP), from February 1 through July 31, on all peregrine falcon territories active within the preceding five years, for at least 0.5 miles from the nest.

- Restrict motor vehicle activities and new road construction; during this LOP, according to a management plan for the area.
- Prohibit motor vehicle activity within 200 feet of lake shorelines that are used by peregrine falcons.

Forest Plan Compliance

Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not prevent disturbance within peregrine falcon territories; therefore, this alternative would not comply with the above mentioned S&G. Alternatives 1, 3, 4, 5 would prohibit cross-country travel and would not add any routes within peregrine falcon territories; therefore, these alternatives would comply with the above mentioned S&G.

Valley Elderberry Longhorn Beetle

On August 8, 1980, the valley elderberry longhorn beetle (VELB) was listed as a threatened species (45 FR 52803). Critical habitat was also designated at this time, but does not occur on the STF. Project Design Criteria (PDC) for route designation were determined through a programmatic consultation with the USFWS to achieve “No Effect” or “May Affect Not Likely to Adversely Affect” determinations.

USFWS Project Design Criteria

1. Staging areas are not within 100 feet of occupied VELB sites or suitable habitat of elderberry plants containing stems measuring 1.0 inches or greater in diameter at ground level.
2. Routes or areas are not within 20 feet of occupied VELB sites or suitable habitat of elderberry plants containing stems measuring 1.0 inches or greater in diameter at ground level.

Project Design Criteria Compliance

1. The project alternatives do not propose to add any staging areas; therefore, all project alternatives would be in compliance with the above mentioned PDC.
2. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not prevent the creation of routes within 20 feet of occupied VELB sites or suitable habitat; therefore, this alternative would not comply with the above mentioned PDC. Field surveys were completed on all routes below 3000 feet in elevation that were proposed to be added within Alternatives 1, 4 and 5. Alternatives 1, 3, 4, 5 would prohibit cross-country travel and would not add any routes within 20 feet of occupied VELB sites or suitable habitat; therefore, these alternatives would comply with the above mentioned PDC.

Lahontan Cutthroat Trout

The Lahontan cutthroat trout (LCT) was listed by the USFWS as an endangered species in 1970 (35 FR 13520). The listing was reclassified to threatened status in 1975 to facilitate recovery and management efforts and authorize regulated angling (40 FR 29864). Critical Habitat has not been designated for the LCT (USFWS 1995). Project Design Criteria (PDC) for route designation were determined through a programmatic consultation with the USFWS to achieve “No Effect” or “May Affect Not Likely to Adversely Affect” determinations.

USFWS Project Design Criteria

1. Routes and areas do not cross any stream within the occupied range of LCT.
2. Route and areas are not located on active landslides and do not re-route surface water onto active landslides within watersheds that provide habitat for LCT.
3. Within watersheds that provide habitat for LCT, routes or areas do not have the potential to capture surface run-off and then deliver sediment into a stream.
4. Areas are located outside of Riparian Conservation Areas (RCAs) that are within watersheds that provide habitat for LCT.
5. Within watersheds that provide habitat for LCT, routes avoid RCAs.

Project Design Criteria Compliance

1. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not prevent the creation of routes and stream crossings within the occupied range of LCT; therefore, this alternative would not comply with the above mentioned PDC. Alternatives 1, 3, 4, 5 would prohibit cross-country travel and would not add any routes or stream crossings within the occupied range of LCT; therefore, these alternatives would comply with the above mentioned PDC.
2. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not prevent the creation of routes on active landslides nor would it prevent the creation of routes that could potentially divert surface water onto active landslides within watersheds that provide habitat for

LCT; therefore, this alternative would not comply with the above mentioned PDC. Alternatives 1, 3, 4, 5 would prohibit cross-country travel and would not add any routes on active landslides nor would they add any routes that could potentially divert surface water onto active landslides within watersheds that provide habitat for LCT; therefore, these alternatives would comply with the above mentioned PDC.

3. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not prevent the creation of routes that may have the potential to capture surface run-off and then deliver sediment into a stream that provides habitat for LCT; therefore, this alternative would not comply with the above mentioned PDC. Alternatives 1, 3, 4, 5 would prohibit cross-country travel and would not add any routes that may have the potential to capture surface run-off and then deliver sediment into a stream that provides habitat for LCT; therefore, these alternatives would comply with the above mentioned PDC.
4. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not prevent the creation of routes within RCAs that are within watersheds that provide habitat for LCT; therefore, this alternative would not comply with the above mentioned PDC. Alternatives 1, 3, 4, 5 would prohibit cross-country travel and would not add any routes within RCAs that are within watersheds that provide habitat for LCT; therefore, these alternatives would comply with the above mentioned PDC.
5. Alternative 2 would not prohibit cross-country travel; therefore, this alternative may result in the creation of routes that do not avoid RCAs within watershed that provide habitat for LCT; therefore, this alternative would not comply with the above mentioned PDC. Alternatives 1, 3, 4, 5 would prohibit cross-country travel and would not add any routes within RCAs that are within watersheds that provide habitat for LCT; therefore, these alternatives would comply with the above mentioned PDC.

California Red-legged Frog

On May 23, 1996, the California red-legged frog was listed as a threatened species (61 FR 25813). On April 13, 2006 critical habitat was designated, but does not exist on the STF (71 FR 19244). To assist with the Travel Management Planning process, the Forest Service entered into programmatic consultation with the United States Fish and Wildlife Service (USFWS) for motorized vehicle route designation. On December 27, 2006, the USFWS issued a Letter of Concurrence for 14 National Forests in California, including the STF. The Letter of Concurrence approved the Project Design Criteria (PDC) as outlined in the document entitled “Route Designation: Project Design Criteria for ‘No Effect’ or ‘May Affect Not Likely to Adversely Affect’ determination for TE Species – October 2006 version 1”. Therefore, all actions proposed within a Travel Management Plan Alternatives (analyzed in detail) must comply with the PDC to reach a determination of “No Effect” or “May Affect Not Likely to Adversely Affect” for TE species.

USFWS Project Design Criteria

1. Routes or areas do not have the potential to capture surface run-off and then deliver sediment into a stream associated with the California red-legged frog.
2. In suitable California red-legged frog habitat, routes avoid Riparian Reserve (RR) and Riparian Conservation Areas (RCAs) except where necessary to cross streams. Crossing approaches get the riders in and out of the stream channel and riparian area in the shortest distance possible while meeting the gradient and approach length standards.
3. Routes or areas do not cross any stream or waterbody within 500 feet of known occupied sites of California red-legged frog; and route or area is not within a distance of 500 feet from wetland (i.e. springs, wet meadows, ponds, marshes).
4. In habitat occupied by California red-legged frog, routes or areas do not have the potential to capture or divert stream flow. The approaches to stream crossings are down-sloped toward the stream on both sides.

5. Areas are located outside of RR and RCAs, meadows, and wetlands, within California red-legged frog habitat.
6. No route or areas are within Critical Aquatic Refuges for California red-legged frog.

Project Design Criteria Compliance

1. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not prevent the creation of routes that may have the potential to capture surface run-off and then deliver sediment into a stream associated with the California red-legged frog; therefore, this alternative would not comply with the above mentioned PDC. Alternative 3 would prohibit cross-country travel and would not add any routes to the NFTS; therefore, this alternative would comply with the above mentioned PDC. Alternatives 1 and 4 would prohibit cross-country travel but would add routes that may have the potential to capture surface run-off and then deliver sediment into a stream associated with the California red-legged frog; therefore, these alternatives would not comply with the above mentioned PDC (Table 3.11-52). Alternative 5 would prohibit cross-country travel and would not add routes that may have the potential to capture surface run-off and then deliver sediment into a stream associated with the California red-legged frog; therefore, this alternative would comply with the above mentioned PDC (Table 3.11-52).
2. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not prevent the creation of routes that avoid RCAs except where necessary to cross streams in suitable California red-legged frog habitat; therefore, this alternative would not comply with the above mentioned PDC. Alternative 3 would prohibit cross-country travel and would not add any routes to the NFTS; therefore, this alternative would comply with the above mentioned PDC. Alternatives 1 and 4 would prohibit cross-country travel but would add routes that do not avoid RCAs except where necessary to cross streams in suitable California red-legged frog habitat; therefore, these alternatives would not comply with the above mentioned PDC (Table 3.11-52). Alternative 5 would prohibit cross-country travel and would not add routes that do not avoid RCAs except where necessary to cross streams in suitable California red-legged frog habitat; therefore, this alternative would comply with the above mentioned PDC (Table 3.11-52).
3. There are not any known occupied sites of California red-legged frog within the project area; therefore, all the project alternatives would comply with the above mentioned PDC.
4. There are not any known occupied sites of California red-legged frog within the project area; therefore, all the project alternatives would comply with the above mentioned PDC.
5. There are not any Critical Aquatic Refuges for California red-legged frog within the project area; therefore, all the project alternatives would comply with the above mentioned PDC.

Table 3.11-52 Routes inconsistent with USFWS PDC for the California red-legged frog

Route Number	PDC Consistency	Addition to the NFTS		
		ALT 1	ALT 4	ALT 5
17EV192	Inconsistent	Yes	Yes	No
17EV192A	Inconsistent	Yes	Yes	No
17EV192B	Inconsistent	Yes	Yes	No
17EV194	Inconsistent	Yes	Yes	No
1S17M	Inconsistent	Yes	Yes	No
FR98488	Inconsistent	Yes	Yes	No
FR98508	Inconsistent	Yes	Yes	No
FR98509	Inconsistent	Yes	Yes	No
FR98510	Inconsistent	Yes	Yes	No
FR98511	Inconsistent	Yes	Yes	No
FR98514	Inconsistent	Yes	Yes	No
FR98566	Inconsistent	Yes	Yes	No
FR98575	Inconsistent	Yes	Yes	No

Forest Plan Direction

Within 300 feet of streams or ponds that have potential suitable habitat:

- Construct new roads or trails or use off-road routes for motorized vehicles only after conducting amphibian surveys to the most recent protocol for the frog.
- Allow stream crossings only where the route, through the water, and the adjacent streamside areas are naturally resistant to tires or are hardened with rock or other materials.

Forest Plan Compliance

Table 3.11-53 Routes inconsistent with the Forest Plan for the California red-legged frog

Route Number	Forest Plan Consistency	Addition to the NFTS		
		ALT 1	ALT 4	ALT 5
17EV192	Inconsistent	Yes	Yes	No
17EV192A	Inconsistent	Yes	Yes	No
17EV192B	Inconsistent	Yes	Yes	No
17EV194	Inconsistent	Yes	Yes	No
17EV195	Inconsistent	Yes	Yes	No
17EV196	Inconsistent	Yes	Yes	No
17EV197	Inconsistent	Yes	Yes	No
1S1734A	Inconsistent	No	Yes	No
1S17E35B	Inconsistent	Yes	Yes	No
1S17M	Inconsistent	Yes	Yes	No
FR10178	Inconsistent	Yes	Yes	No
FR8516	Inconsistent	Yes	Yes	No
FR98481	Inconsistent	Yes	Yes	No
FR98488	Inconsistent	Yes	Yes	No
FR98508	Inconsistent	Yes	Yes	No
FR98509	Inconsistent	Yes	Yes	No
FR98510	Inconsistent	Yes	Yes	No
FR98511	Inconsistent	Yes	Yes	No
FR98513	Inconsistent	Yes	Yes	No
FR98514	Inconsistent	Yes	Yes	No
FR98566	Inconsistent	Yes	Yes	No
FR98575	Inconsistent	Yes	Yes	No

Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not prevent the creation of routes or unhardened stream crossings within 300 feet of potential suitable habitat for the California red-legged frog; therefore, this alternative would not comply with the above mentioned S&G. Alternative 3 would prohibit cross-country travel and would not add any routes to the NFTS; therefore, this alternative would comply with the above mentioned S&G. Alternative 5 would prohibit cross-country travel and would not add any routes within 300 feet of potential suitable California red-legged frog habitat; therefore, this alternative would comply with the above mentioned S&G. Alternatives 1 and 4 would prohibit cross-country travel but would add routes and unhardened stream crossings within 300 feet of potential suitable habitat for the California red-legged frog (Table 3.11-53). Mitigation measures (surveys completed to protocol and hardened stream crossings) are proposed on these routes to ensure that Alternatives 1 and 4 would comply with the above mentioned S&G.

Western Pond Turtle

The western pond turtle was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a).

Forest Plan Direction

In areas adjacent to waters with known populations of western pond turtle:

- Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist.

Forest Plan Compliance

Table 3.11-54 Routes inconsistent with the Forest Plan for the western pond turtle

Route Number	Forest Plan Consistency	Addition to the NFTS		
		ALT 1	ALT 4	ALT 5
17EV192	Inconsistent	Yes	Yes	No
17EV192A	Inconsistent	Yes	Yes	No
17EV192B	Inconsistent	Yes	Yes	No
17EV194	Inconsistent	Yes	Yes	No
17EV195	Inconsistent	Yes	Yes	No
17EV196	Inconsistent	Yes	Yes	No
17EV197	Inconsistent	Yes	Yes	No
17EV197A	Inconsistent	Yes	Yes	No
17EV901	Inconsistent	Yes	Yes	No
1S1727	Inconsistent	Yes	Yes	No
1S17E35B	Inconsistent	Yes	Yes	No
1S17M	Inconsistent	Yes	Yes	No
1S1902	Inconsistent	Yes	Yes	No
1S1907A	Inconsistent	No	Yes	No
1S1929	Inconsistent	Yes	Yes	No
1S1929C	Inconsistent	Yes	Yes	No
FR10178	Inconsistent	Yes	Yes	No
FR8516	Inconsistent	Yes	Yes	No
FR8601	Inconsistent	Yes	Yes	No
FR98482	Inconsistent	Yes	Yes	No
FR98486	Inconsistent	Yes	Yes	No
FR98488	Inconsistent	Yes	Yes	No
FR98504	Inconsistent	Yes	Yes	No
FR98508	Inconsistent	Yes	Yes	No
FR98509	Inconsistent	Yes	Yes	No
FR98510	Inconsistent	Yes	Yes	No
FR98511	Inconsistent	Yes	Yes	No
FR98513	Inconsistent	Yes	Yes	No
FR98514	Inconsistent	Yes	Yes	No
FR98515	Inconsistent	Yes	Yes	No
FR98520	Inconsistent	Yes	Yes	No
FR98537	Inconsistent	Yes	Yes	No
FR98539	Inconsistent	Yes	Yes	No
FR98541	Inconsistent	Yes	Yes	No
FR98548	Inconsistent	Yes	Yes	No
FR98554	Inconsistent	Yes	Yes	No
FR98560	Inconsistent	Yes	Yes	No
FR98566	Inconsistent	Yes	Yes	No
FR98575	Inconsistent	Yes	Yes	No
FR98599	Inconsistent	Yes	Yes	No

Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not prevent the creation of routes within ¼ mile of occupied pond turtle habitat and would not comply with the above mentioned S&G. Alternative 3 would prohibit cross-country travel and would not add any routes to the NFTS; therefore, this alternative would comply with the above mentioned S&G. Alternative 5 would prohibit cross-country travel and would not add any routes to the NFTS within ¼ mile of occupied pond turtle habitat; therefore, this alternative would comply with the above mentioned S&G. Alternatives 1 and 4 would prohibit cross-country travel but would add routes within ¼ mile of occupied pond turtle habitat that were not approved by a Wildlife Biologist; therefore, these routes would not comply with the above mentioned S&G (Table 3.11-54). These routes will be excepted from this S&G through a minor LRMP amendment. The effects of excepting these routes from this amendment are disclosed above under the western pond turtle section and within the BA/BE (Pyron 2009, project record).

3.12 Short-Term Uses and Long-Term Productivity

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101). Alternatives 5, 3, 1, 4 then 2 respectively from most to least could potentially improve the long-term productivity by reducing the number of existing routes on the landscape. Routes not designated for public motorized use will eventually revert to vegetated conditions, reducing many of the adverse effects related to these routes.

3.13 Unavoidable Adverse Effects

Implementation of any of the alternatives would result in some unavoidable adverse environmental effects. Although formation of the alternatives included avoidance of some effects, other adverse effects could occur that cannot be completely mitigated. The environmental consequences section for each resource area discusses these effects.

3.14 Irreversible and Irretrievable Commitments

Irreversible commitments of resources are those that cannot be regained, such as the 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 road. The addition of existing unauthorized routes, or not adding existing unauthorized routes to the NFTS or changing use on the NFTS is not anticipated to cause an irreversible or irretrievable commitment of resources.

3.15 Other Required Disclosures

National Environmental Policy Act of 1969: NEPA at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders." This EIS was prepared in accordance with the following regulations:

National Historic Preservation Act (NHPA) of 1966: Section 106 requires federal agencies to consider the potential effects of a Preferred Alternative on historic, architectural, or archaeological resources that are eligible for inclusion on the National Register of Historic Places and to afford the President's Advisory Council on Historic Preservation an opportunity to comment. Section 110 requires federal agencies to identify, evaluate, inventory, and protect National Register of Historic Places resources on properties they control. Potential impacts to archaeological and historic resources were evaluated in compliance with Section 106.

Executive Order 11644 ORV Management: Executive Order (EO) 11644, Use of Off-Road Vehicles on Public Lands (issued February 8, 1972), provides for the establishment of policies and procedures that will ensure that the use of OHVs on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands. Agency heads are directed to provide for administrative designations of the specific areas and trails on public lands on which the use of OHVs may be permitted, and areas in which the use of OHVs may not be permitted.

Executive Order 11989 ORV Management: EO 11989, Use of Off-Road Vehicles on Public Lands (issued May 24, 1977), clarifies agency authority to define zones of use by OHVs on public lands. Agency heads, when they determine that the use of OHVs will cause or is causing considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat, or cultural or historic resources to immediately close such areas or trails to the type of OHV causing such effects, until such time that it is determined that such adverse effects are eliminated and that measures are implemented to prevent further recurrences.

Executive Order 12898 Environmental Justice: EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (issued February 11, 1994), requires that each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high or adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. None of the alternatives disproportionately affect minority and low-income populations.

Clean Water Act: regulates the dredging and filling of freshwater and coastal wetlands. Section 404 (33 USC 1344) prohibits the discharge of dredged or fill material into waters (including wetlands) of the United States without first obtaining a permit from the U.S. Army Corps of Engineers. Wetlands are regulated in accordance with federal Non-Tidal Wetlands Regulations (Sections 401 and 404). No dredging or filling is part of this proposed action and no permits are required.

Clean Air Act of 1970: provides for the protection and enhancement of the nation’s air resources. No exceeding of the federal and state ambient air quality standards is expected to result from any of the alternatives.

Endangered Species Act (ESA) of 1973: requires that any action authorized by a federal agency not be likely to jeopardize the continued existence of a threatened or endangered 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 (16 USC 1531 et seq.), as amended, requires the responsible federal agency to consult the USFWS and the National Marine Fisheries Service concerning endangered and threatened species under their jurisdiction.

National Forest Management Act (NFMA) of 1976: amends the Forest and Rangeland Renewable Resources Planning Act of 1974 and sets forth the requirements for Land and Resource Management Plans (Forest Plans) for the National Forest System. The proposed action is consistent with the NFMA and the Forest Plan.

4. Consultation and Coordination

The first section of this chapter shows the preparers and contributors followed by a second section outlining the distribution of the EIS.

4.01 Preparers and Contributors

The Forest Service consulted the following individuals; federal, state and local agencies; and, tribes during the development of this EIS.

Interdisciplinary Team

Millie Baird

Education: B.S. Civil Engineer, University of North Dakota, Grand Forks, 1996
Experience: Civil Engineer, Chippewa National Forest 12 years
Team Responsibility: Mixed Use Analysis, Transportation Specialist Report

James M. (Mike) Bradshaw

Education: A.S. Engineering, Imperial Valley College, 1966; B.S. Civil Engineering, Cal Poly, Pomona, 1969; M.S. Civil Engineering, University of Oklahoma, 1970
Experience: Facilities Management, Stanislaus National Forest 10 years; Civil Engineer (Roads and Facilities), San Bernardino National Forest 8 years; Civil Engineer (Road Management), Stanislaus National Forest 22 years
Team Responsibility: Transportation/Engineering

Kathy Burnett

Education: A.A. General Education, Columbia College, 1973; B.A. Biology, UC Santa Cruz, 1975; Master of Human Resources and Organization Development, University of San Francisco, 1997
Experience: Program Manager, Stanislaus National Forest 10 years; Wildlife Biologist, Stanislaus National Forest 10 years; Laboratory Technician, Columbia College 2 years; Consulting Biologist 5 years; Biological Technician, Stanislaus National Forest 8 years
Team Responsibility: Facilitator, Recorder

Yolanda Durston

Education: Undergraduate coursework (30 units) Columbia College, 1990-1994
Experience: GIS Specialist, Stanislaus National Forest 15 years; Administrative Assistant, Stanislaus National Forest 1 year; Engineering Technician, Stanislaus National Forest 2 years; Engineering Technician, Mt. St Helen's Ranger District, Gifford Pinchot National Forest 7 years
Team Responsibility: GIS Specialist

James W. Frazier

Education: B.A. Physical Geography, California State University Long Beach, 1968; M.S. Watershed Management, Humboldt State University, 1973
Experience: Hydrologist, Stanislaus National Forest 32 years
Team Responsibility: Hydrologist

Alan J. Gallegos

Education: B.S. in Geology, University of Southern Colorado
Experience: Southern Sierra Province Geologist (Sierra, Sequoia and Stanislaus National Forests) and the Sierra National Forest Soils Program Manager; 28 years with the Forest Service in Central California and prior experience in Central Utah and Northern California.
Team Responsibility: Geologist

Sharon Grant

Education: A.S. Natural Resource Management, Columbia College, 1999; A.S. Computer Geographic Information Systems, Columbia College, 1999
Experience: Hydrology Technician, Stanislaus National Forest 12 years
Team Responsibility: Hydrology Technician, Writer/Editor

Steve Holdeman

Education: B.S. Wildlife and Fisheries, University of Tennessee, 1988, M.S. Wildlife and Fisheries, University of Tennessee, 1993
Experience: Forest Aquatic Biologist, Stanislaus National Forest 7 years; Private consultant, Aquatic Biology 17 years
Team Responsibility: Forest Aquatic Biologist

Crispin Holland

Education: B.S. Rangeland Resource Science, CSU Humboldt, 1994
Experience: Forest Wildlife, Range and Botany Coordinator, Stanislaus National Forest 1 year; Range Program Manager, Pacific Southwest Region 4 years; Range Conservationist, Plumas National Forest 5 years; Range Conservationist, Stanislaus National Forest 5 years
Team Responsibility: Analysis Review; Forest Wildlife Biologist

Alex Janicki

Education: B.S. Geology, University of Florida, 1970; M.S. Soil Science, Cal Poly San Luis Obispo, 1980
Experience: Soil Scientist, Stanislaus National Forest 28 years; Terrain Analyst, U.S. Army Engineering Terrain Detachment 2 years
Team Responsibility: Soil Scientist

R. Brian Kermeen

Education: B.S. Landscape Architecture, University of Wisconsin, Madison, 1974
Experience: Landscape Architect, Stanislaus National Forest 32 years; Dutch Forest Service (Netherlands) 2 years
Team Responsibility: Recreation, Social/Economic and Visual Resources Specialist

John Maschi

Education: B.S. Landscape Architecture, Rutgers University, 1976; Master of Landscape Architecture, University of Illinois, 1978
Experience: Forest Planner, Stanislaus National Forest 12 years; Assistant Recreation Officer 6 years; Landscape Architect 11 years
Team Responsibility: Land Management Planning

Jason Pyron

Education: B.S. Fishery Resources, University of Idaho, 2004; Masters of Public Administration, Emphasis in Natural Resources, University of Idaho, 2007
Experience: Wildlife Biologist, Stanislaus National Forest 1 year; Fisheries Biologist, NOAA Fisheries 1 year; Natural Resource Specialist, Salmon-Challis National Forest 1 year
Team Responsibility: Wildlife Biologist

Jim Schmidt

Education: B.S. Economics, Santa Clara University, 1972; Graduate work, Resource Economics, University of California, Riverside, 1973-74; Masters Degree, Forest Management, Emphasis in Forest Economics, Oregon State University, 1975
Experience: GIS Specialist, Stanislaus National Forest 17 years; GIS Instructor Columbia College 12 years; GIS Coordinator, Stanislaus National Forest 2 years; Economist, Stanislaus National Forest 5 years; Economist, Mt. Baker-Snoqualmie National Forest 6 years, Research Analyst; Oregon State University 2 years
Team Responsibility: GIS Specialist

Jay Power

Education: B.A. Earth Sciences/Environmental Studies, U. C. Santa Cruz, 1972
Experience: Patrol Captain, Law Enforcement 4 years; Hydrologist, Klamath National Forest 16 years; Geologist, 8 years; Hydrologist, Alaska Department of Environmental Conservation 2 years; Geologist, California Division of Mines and Geology 3 years
Publications: Using shear waves to measure soil strength, Charles Real and Jay Power, California Geology, 1975
Team Responsibility: Law Enforcement

Chuck James

Education: Forestry Certificate Columbia College, 1992; A.S. Natural Resources, Columbia College, 1993; A.S. Geographic Information Systems, Columbia Community College, 2001
Experience: OHV Specialist, Stanislaus National Forest 14 years; Park Ranger, Bureau of Reclamation 4 years
Team Responsibility: OHV Specialist

Beth Martinez

Education: B.S. Natural Resource Management, Utah State University, 1983; M.S. Forest Planning and Administration, Oregon State University, 1987
Experience: Public Services Program Area Leader, Stanislaus National Forest 16 years
Team Responsibility: Recreation Specialist

Christopher Mease

Education: B.S. Biology, Oregon State University, 1997
Experience: Fisheries Biologist, Stanislaus National Forest 2 years; Fisheries Biologist, Tahoe National Forest 7 years; Fisheries Technician, State of Oregon 2 years
Team Responsibility: Aquatic Biology

Mark Schug

Education: GIS Certificate, Columbia College, 2006; B.S. Forestry, Northern Arizona University, 1990; Associate in Applied Science, Forestry, 1985 College of Environmental Science and Forestry, Wanakena Ranger School, 1985
Experience: GIS Specialist, Stanislaus National Forest 6 years; Forestry Technician 10 years
Team Responsibility: GIS Specialist

Kathy Strain

Education: B.A. Anthropology, CSU Bakersfield, 1990; M.A. Behavioral Science, Anthropology emphasis, CSU Bakersfield, 1994
Experience: Forest Heritage Resource Program Manager, Stanislaus National Forest 10 years; Ecosystem Archaeologist, Humboldt-Toiyabe National Forest 4 years; District Archaeologist Sequoia National Forest 4 years.
Team Responsibility: Heritage Resources

Terri Walsh

Education: B.S. Natural Resource Management, Emphasis in Botanical Resources, Prescott College for the Environment, Arizona, 1998; A.S. Environmental Science, Columbia College, 1996
Experience: Botanist, Recreation Solutions Enterprise Team, Forest Service 4 years; Biological Technician 9 years
Team Responsibility: Botanical Resources

Sue Warren

Education: A.S. Forest Technology, Green River Community College, Kent, Washington, 1976; B.S. Wildlife Biology, University of California, Davis, 1990
Experience: Travel Management Interdisciplinary Team Leader, Stanislaus National Forest 2 years; Public Service Program Leader, Stanislaus National Forest 10 years; District Ranger, Sierra National Forest 7 years; Wildlife Biologist 3 years
Team Responsibility: Team Leader

Federal, State and Local Agencies

Advisory Council on Historic Preservation
Calaveras Big Trees State Park
California Department of Fish and Game
California Department of Parks and Recreation, Off Highway Motor Vehicle Recreation Division
USDI Bureau of Land Management
USDI Fish and Wildlife Service
Yosemite National Park

Tribes

American Indian Council of Mariposa County
Calaveras Band of Miwuk Indians
California Valley Miwok Tribe
Central Sierra Me-Wuk Cultural and Historic Preservation Committee
Chicken Ranch Tribal Council
Sheep Ranch Tribe
Tuolumne Band of Me-Wuk Indians
Washoe Tribe of Nevada and California

4.02 DISTRIBUTION OF THE EIS

The Forest Service is circulating either the DEIS or a notice of the availability of the DEIS to the following agencies, elected officials, tribes, organizations and individuals.

Federal, State and Local Agencies

Federal Agencies

Advisory Council on Historic Preservation, Director, Planning and Review
Army Corp of Engineers
Environmental Protection Agency, Region 9 EIS Review Coordinator
Federal Aviation Administration, Western-Pacific Region Regional Administrator
Federal Highway Administration
National Marine Fisheries Service Habitat Conservationists Division Southwest Region
National Oceanic and Atmospheric Administration, Office of Policy and Strategic Planning
Rural Utilities Service
U.S. Army Engineer Division, South Pacific
U.S. Coast Guard, Environmental Management
U.S. Department of Energy, Director, Office of NEPA Policy and Compliance
U.S. Department of the Interior, Office of Environmental Policy and Compliance
USDA APHIS PPD/EAD
USDA National Agricultural Library Head Acquisitions and Serials Branch
USDA Natural Resources Conservation Service, National Environmental Coordinator
USDA Office of Civil Rights
USDI Bureau of Land Management
USDI Fish and Wildlife Service
Yosemite National Park

California State Agencies

Calaveras Big Trees State Park
California Board of Forestry
California Department of Fish and Game
California Department of Fish and Game, Wildlife Conservation Board
California Department of Forestry and Fire Protection
California Department of Parks and Recreation, Off Highway Motor Vehicle Recreation Division
California Department of Water Resources
California Environmental Protection Agency, Air Resources Board
California Highway Patrol
California Resources Agency, Department of Conservation
Lahontan Water Quality Control Board
Mining and Geology Board
Office of Environmental Health Hazard Assessment
Water Resources Control Board

Local Agencies

Alpine County Library
Amador County Library
Calaveras County Fish and Game
Calaveras County Library
Calaveras County Water District
El Dorado County Library

Hetch Hetchy Water and Power
Mariposa County Agriculture Commission
Mariposa County Library
Modesto Library
Sacramento County Library
Tuolumne County Library
Tuolumne County Planning Department
Tuolumne County Recreation Department
Tuolumne Regional Water District

Elected Officials

Alpine County Board of Supervisors
Calaveras County Board of Supervisors
California Assemblyman Tom Berryhill
California State Senator Dave Cogdill
Congressman Dan Lungren
Congressman George Radanovich
Mariposa County Board of Supervisors
Tuolumne County Board of Supervisors
U.S. Senator Barbara Boxer
U.S. Senator Diane Feinstein

Tribes

American Indian Council of Mariposa County
Calaveras Band of Miwuk Indians
California Valley Miwok Tribe
Central Sierra Me-Wuk Cultural and Historic Preservation Committee
Chicken Ranch Tribal Council
Sheep Ranch Tribe
Tuolumne Band of Me-Wuk Indians
Washoe Tribe of Nevada and California

Organizations

4x4 In Motion 4WD Club
American Motorcycle Association
Backcountry Horsemen
Bear Valley Mt. Resort
Bear Valley Snowmobile
Berry Blest Farm
Blue Ribbon Coalition
Boards Crossing Campers
CA 4WD Club
CA ATV Association
CA Enduro Riders Association
CA Field Director Trout Unlimited
CA Garden Clubs, Inc.
CA Native Plant Society
CA Wilderness Coalition
CA/NV Snowmobile Association
Calaveras Fly Fishers
Camp Towanga
Central Sierra Audubon Society
CORE
CORVA
Contra Costa Jeepers
Cottage Springs Resort
CSERC
Ebbetts Pass Rivers and Trails
Espirit de Four 4WD Club
Forest Issues Group
Friends of the River
Lake Alpine Improvement
Loma Prieta Sierra Club
Love Creek Ranch
Madhatters 4x4 Club
Merced Dirt Riders
Mercer's Guitars
Mountain Alliance
Mud Sweat and Gears 4WD Club
Nordic Center
Pinebrook Homeowners
Ridge Runners Motorcycle Club
Sardella's Pack Station
Sierra Club, Tuolumne Group
Sierra Nevada Adventure Company
Sierra Pacific Industries
Sonora Pass Snowgoers
Stewards of the Sequoia
Stewards of the Sierra
Stockton Bicycle Club
Trails and Wheels
Tuolumne County Trails Council
Tuolumne County Visitors Bureau
Tuolumne Group Sierra Club
Valley Trail Riders
Wilderness Society

Individuals

Abreo, Bert and Beth
Adams, Rick
Adams, James
Agoni, Anthony
Ahrens, Mike
Airola, Bob
Alamo, Richard
Alderson, George and Frances
Aldridge, Allen
Alexander, Jeff
Alford, Jonathan
Alford, Heidi
Alford, Warren
Alldrin, Mel and Joyce
Allemand, Dan
Alvara, Richard
Alves, Paul
Alwyn, Jared
Amara L., Michael S.
Amarante Jr., Ernest and Carolyn
Anderson, Jim
Andreini, Soni
Anker, Helga
Applebee, Dan
Aquilino, Jack
Araujo, Rick
Araujo, Rick
Arechiga, Carol
Arens, Bill
Arevalo, Carl
Armstrong, John B.
Armstrong, Mr. and Mrs. John B.
Asplund, Shirley
Aveggio, John
Avery, David and Kathy
Avery, Dick
Ayala, Michael
Babel, Barbara
Bailey, Art and Judy
Bailey, Fred and Marge
Bailey, Michael J.
Bailey, Bill
Bailey, Erika
Bailey, Marie and Harley
Bailey, Bill
Baker, Randy
Baker, Rod and Gayle
Baker, Harry
Baker, Arthur
Baldoni, Dan
Balmain, Gary and Karen
Balmain, Doug and Theran
Balmain, Doug
Balman, Jeanne
Bargess, Skippy
Barker, Brad
Barkow, Carolyn
Barley, James and Masain
Barnes, Randy
Barnett, Sean
Barsby, Tom
Bartholomew, Dan
Bashore, Jerry
Baskin, David
Bauder, Tom
Bayer, Gwen and Leland
Beach, Kerry
Beam, Brian
Beard, Richard
Beasley, Christine
Beauchamp, Harv
Beauchel, Jeanne
Beck, Thomas
Becker, Rahn
Beers, J.
Behr, Doug
Belisle, Warren and Bonnie
Beller, Rob
Bergantz, George W.
Bergeron, Peggy
Bergler, Walt
Bergman, Shari and Troy
Berner, Anne
Berry, Russell
Berry, David
Bettencourt, Joe
Bietz, Zandra
Bilhb, Greg
Blackway, Sam
Blakeney, Deborah
Blazej, Lucian R.
Blomerley, Peter
Boblet, Mary
Bodiford, Jeanne
Bodle, Zac and Bud
Bomley, George
Bondenhofer, Bruce
Bonfire, Mars
Bontman, Jeff
Booth, David
Bower, Rusty
Bowersox, Randy
Bowman, Marge
Boyd, Monty
Bradbury, Bob and Pat
Bradley, Mel
Bramham, Jim
Brandau, Kim
Braniff, Troy
Braughman, Richard
Brazzel, Chuck
Breaux, Sean
Bredlawy, Bob and Pat
Brennan, Sherri
Briton, Larry
Britts, Bev
Brock, Catherine and Lee
Broglio, R.M.
Brotnov, Monte
Brown, Maynard
Brown, Tony
Brown, Chad
Brown, Ken
Brown, R.C.
Brown, Terry
Brown, Steve
Brunges, Ken
Brunskill, John
Buchner, Eric
Buck, Mike
Buckely, John
Budworth, Bobbette
Burley, Eric
Burman, Bruce
Burson, Jim
Burston, Brett
Burt, Daren
Burton, Phil
Butler, Skip
Caccamo, Gallye
Cagle, Herman
Calderwood, Anne Berner
Caldwell, Terry
Callaway, Merita
Calman, Paul
Camp, Lucas
Capozzelli, Joanne
Carbonara, Mike
Cardona, Mike
Cardoza, Karen and Ray
Carkeet Jr., Ross
Carlos, Joseph
Carlson, Kerry
Carlson, Mark R.
Carney, James
Carney, Diane
Carroll, Jim
Carson, Christine
Carson-Baggett, Jerry and Carole
Casey, Eric
Caso, Dennis and Brenda
Castle, Bruce

Cauginie Jr., Nito
Cedergreen, Sandy
Cedergren,Sandra
Cercle, Richard
Cerda, Chris
Cervenka, George
Chapman, Michael
Charles, Jim and Patty
Charlton, Yolanda and Carlos
Cheary, William and Bernedean
Chernoff, Allen
Chesley, Ken and Connie
Chin, Fiona
Chisten, Deven
Christainson, Donald N.
Christensen, Steve
Clamp, Scott
Clark, Don
Clark, Rene
Clark, Robert L.
Clarke, Allen
Clarke, Ken and Kathryn
Claussen, Randy
Clay, Nick
Clinton, Craig
Cloak, Robert
Cluff, Pat
Coffill, Marjorie
Cogdill, Assemblyman David
Cole, Ty
Cole, Clifford R.
Collwyn, Larry
Combs, Bryan
Comer-Losmandy, Casey
Condra, Robert
Conner, Narvell
Cooper, Audrey
Corso, Joanne
Craig, Tina
Crandall, Linda and George
Crandell, Jr., George M.
Creech, Dave
Cross, Hayward and Audrey
Crutcher, Randy
Cully, Daryl
Cummings, Carl
Cunningham, Nicole
Curti, Scott
Curtis, Leon
Dahlin, Lee and Shirley
Dale, Evert
Damaso, Michael
Damaso, Michael
Danfield, Thomas
Danicourt, Harold
Davidson, Sam
Davis, David
Davis, Aaron
Day, Wanda
Day, Tom
Deabenderfer, Alan
Deacon, Lori and John
Deem, Don
DeGraef, Kathy
Delap, Susan
Demartine, R.
Dennis, Kitty
Denpsey, George
Denzer, Rose
Diaz, Ed
Diehl, Joe
Dinnell, Sharon
Dixon, Tamsen
Doddridge, Diane
Dodson, Stan
Doherty, Pat
Dolin, Luke
Dona, Vincent
Doty, Richard E.
Dow, Delmar
Dumolt, Terry
Dunasky, Richard
Dunasky, Charline
Duncan, Glenn and Judy
Duncan, Andrew
Dunlap, Dan
Dunlap, John
Dunlap, Tom
Dunn, Marshall
Dunning, Dan
Dunston, Roy A.
Dunwell, Bruce S.
Duston, Chuck and Pam
Eagles, Dale
Eakle, Pete and Chris
Earhart, Linda
Earhart, Nathan
Edmundson, Peter
Edwards, Peg
Edwards, Glenda
Edwards, Dennis
Egbert, Steve
Egger, Gary
Eldredge, Irene and Irv
Eldridge, David
Ellefsen, Ed
Elliott, Doug
Ellis, Ben
Eloul, Liyam
Eloul, Rohn
Emerson, Ralph
Emmons, Ric
Engs, Phillip
Erlandson, Lloyd
Erwin, Larry
Estes, Norman
Fagandes, Ken
Fagerroos, Mark
Farrell, Jeremy
Farrow, J.A.
Faurote, Annette
Felte, Steve
Fern, Richard
Fernandez, S.
Ferrante, Joseph
Ferrari, Mike
Figueroa, Kathy
Figueroa, Jesse
Filiberti, Mildred
Fink, Linda and Ron
Firebaugh, Bunny
Fish, Terry
Fish, David
Fisher, Jerry W.
Fiske, Ellen
Fleming, Melinda
Fleming, James
Fletcher, Terry
Flynn, John
Fogerty, C.
Foiles, Ben
Fontana, Mark
Forbes, Holly
Ford, Tim
Foster, Ric
Fougner, Craig
Fournier, Dan
Fournier, Conrad
Fouts, Jerry
Foutz, Lisa
Frank, Michel
Franse, Bruce
Frazer, Doug
Frederick, Earl M.
Fredrickson, Wes
Frentzen, Clark
Frey, Ron
Friedlander, Lorraine
Fryer, Gil
Fuchen, Carlos
Fuchs, Lawrence
Fueslein, Jerome L.
Fujii, Laura
Fuller, Reba
Funkhouse, Tom
Gaarde, Ralph
Gangi, Anthony
Gann, Mary

Garcia, Jerry
Garcia, Ron
Gates, Lee
Gattoni, Frank
Gee, Mark
Geer, Mr and Mrs. John
Geisdorff, Fern
Gemmet, Clara
Gende, Pat
Gentling, Jim
Georgiades, Thaleia
Geranen, Brian
Gerber, Bill
Gerhard, Andre
Gerstenberg, Greg
Gheno, Tony
Gibson, Jim
Gibson, Michael
Gill, Joanne
Ginnebaugh, Fred
Giuffra, Steve
Giuffre, Carlo
Gleason, John
Glymph, Mason
Gobel, Roland
Godfrey, Lawrence
Goehring, Brad
Gold, Suzette
Gordan, Richard
Gorman, Elaine
Grace, Margie
Graf, Teri
Graffio, John
Graf-Pulvino, Teri
Grassmuer, Matt
Graves, Michael
Graziano, Rick
Green, Jerry
Green, Mel
Green, Jerry
Green, Ron
Greenwood, David
Greer, Dale
Gregory, Steve
Grey, Ken
Griffiths, R.D.
Grigore, Sorin
Grimes, Gary
Gruendi, Ray and Charlotte
Gruendl, Charlotte and Raymond
Gruenwald, Anita
Guider, Bob
Guillory, Michael
Guillot, Leslie and Victor
Gunther, Tom
Guzman, David
Haack, Alan
Hackamack, Bob
Hadley, Bill
Hadley, Robin and Gail
Hager, Reggie
Hague, Charlotte
Haire, James
Hakata, Danielle
Hale, Tyson
Hall, Richard
Halliwell, Bob
Hamilton, John
Hammes, Sean
Hampton, John
Hancock, Bart
Hans, Richard A
Hanson, Carolyn
Harrell, Dave
Harrington, Tom and Kathy
Harris, Justin
Harrison, Walter B.
Hart, Craig
Hasler, Sister Gelmi, Sharon
Haugh, Jeff
Hayes, Russ
Hayes, Jerry
Haymond, Edd
Headley, Osceola and Madeli
Headley, Mark
Heath, Michael
Hedge, Leonard
Heggy, Gloria
Hembree, Rourke and Kim
Henderson, Charlotte
Hendricks, Tom
Hendricks, Sonny
Hendricks, Jason
Hensley, Justin
Hensley, Christopher
Hern, Cindi
Hertfelder, P.E., Dana S.
Hiatt, L DeWayne
Hicks, Rick and Chris
Hiett, Malcolm
High, Doug and Michelle
Hildenbrand, Don
Hill, Oscar
Hintz, Chris
Hix, Stephen
Hix, Tim
Hockstra, Bud
Hodges, Bob
Hoffstetter, John
Hofstra, Tom
Hohn, Robert
Holland, Nathan
Holliday, Ron
Holstrom, Michael
Holton, Dave
Homan, Rand
Honck, Toni
Honeycutt, Dennis
Hoover, Vicky
Hope, Dr. Glenda
Hope, Adam
Horne, Skip and Lynn
Horvath, Ann Conlon
Horvath, Alan
Horwath, Patricia
Houck, Toni
Houghton, Bob
Houser, Ken
Housier, Jennifer
Howard, Bill
Howard, Richard G.
Howells, Chris
Howly, John
Hoye, Pamela
Hoyle, Duane
Hoyle, Dieane
Hubanks, David
Hucks, George
Hughes, H.L.
Hunt, Eric
Hunt, Robin
Hunt, Larry
Huth, Jim
Ina, Ken
Inghs, Pat
Iverson, Bill and Kathy
Jackson, Larry
Jacobsen, Jeff
Jagger, Brian
Jagger, Patricia
Janson, Sera
Jaquez, Rudy
Jaspar, Richard
Jeanmond, Michel
Jeepers, Joaquin
Jenkins, Larry
Jenkins, Jeanne
Jensen, Andy
Jensen, Jerry
Jeppson, Dave
John, Elain
Johnson, Dave
Johnson, Casey
Johnson, Ray
Johnson, Katrina and Kevin
Jones, Mike and Dina
Jones, James
Jones, Donna R.

Jonker, Rudolf
Jow, Michael
Kafka, Steve and Michelle
Kane, Steve
Kardas, Troy
Karney, Jason
Keith, Jerry
Keller, Dwain
Kelso, Megan
Kelso, Bob and Logan
Kendrick, Shirley
Kersler, Barbara
Kesley, Steven
Kester, Dennis
Key, Richard
Kieser, Evan
Kilian, George
Killion, Fred
King, Holman
King, Jeremy
King, Carrie
King, Kenneth
King, Cynthia
Kinney, Matt
Kissler, Bob and Carol
Kitt, Ron and Dee
Kitts, Dan
Klein, Robert
Kling, Bill and Nina
Knopf, Tracy and Clay
Knopf, Clay
Knowles, Chuck
Koehn, Pat
Kolp, Ken and Jo
Korba, Troy
Krocker, John and Debbie
Kronkhtye, Corey
Krumbaegel, Perrin and Marco A.
Krupka, Mary
Kurth, Robin
Laffranchi, Suzette
LaFrance, Jim and Trudy
Lamantia, James
Lamb, Eric
Lane, Stephanie
Langsenberg, Dhane
Larson, Paul
Lashbrook, Tony
Lauresen, Sarrell
Laursen, Art
Lavanino, Steve
Lawrence, Robert
Lawson, Tina
Layendecker, Ellen
Leach, Scott
Leahy, Doug
Legters, David
Leitzell, Dawn
LeMay, Sean
Lerma, Rosanna
Leuschnne, Ray
Lewis, Mike
Lewis, Dennis E.
Lewis, James
Lewis-Dougherty, Cathy
Liebold, Robert
Light, Don
Lihou, Cristopher
Lillie, Eleanor
Lind, Rick
Linden, Raymond and Doris
Lingo, Tricia
Lish, Christophe
Little, Kenny
Littlejohn, Scott
Ller, Jim and Barbara
Loades, Jr., John W.
Locey, Ethan
Lompart, Michael
Looney, Dan
Lopes, Victoria
Loudermilk, Don
Loudermir, Jack
Lowenstein, Mike
Luce, Doug
Luke, Jim
Lung, Andy
Lunney, Keith
Lusinchi, Antonio
Lyon, Chris
Machado, Donald
Machado, P
Macias, Victor
Macias, Tony
Mackenzie, Greg
Maddox, James P
Makiney, Janice
Mancini, Randy
Marchetti, Gina
Markanen, Marilyn
Markkanen, Douglas
Marsh, Sid
Marshall, Roland
Martin, Henri B.
Matlakiewicz, Arthur
Matthews, Steve
Matzek, Mary
Maxwell, Craig and Elaine M.
Mayland, Jerry
Maynard, Brad
McCann, Catherine
McConnell, Mike
McConner, Roger
McDowell, Dennis
McEllem, George
McFarland, Jeff
McGaughey, John
McGinnis, Patrick
McGreevy, Pat
McKee, Ken
McKenna, Mark J.
McLaughlin, Bill
McManus, Dan
McManus, Michael
McMillin, Loren
McNeely, Dave
McRoberts, Mike
McVicker, Virgil
McVicker, Julie
Medearis, Ron
Medina, Gregory
Mello, Jeff and Julie
Mello, Ron and Jean
Merrihew, Lois
Merrill, Karl
Merrill, Terry
Mettes, Matt
Meyer, Joe
Middleton, Walter C and Kathy
Middleton, Rob
Mihovich, Barb
Millay, Steve
Miller, Robin
Miller, Mike
Miller, Geraldine
Miller-Gripps, Rebecca
Milne, Mike
Mines, Holly
Mintz, Robert and Dorothy
Mitchum, Marvin
Moftenson, Alan
Molnar, Judy
Moniot, Richard
Moniz, Kenn
Monroe, Lucky
Monsen, Bob
Moore, John K.
Moore, Anna
Moore, Alan
Morris, Barrie
Morris, Mike
Morrow, Ruth and Arvid
Moskalenko, Oleg
Moyle, Cliff
Mozingo, Dave
Mueller, Roger
Mueller, Arlene S.
Mulock, Will

Murphy, Dave and Marlene
Murphy II, David
Muscio, Mark
Myers, Rick
Nakamoto, Kunio
Nanney, Fred
Navell, Bob
Navone, Mike
Nedbal, Rich and Linda
Neidell, Merle
Neilson, Dave
Nelson, Brad
Nelson, Mike
Nelson, Gloria
Nelson, Bob
Neumann, Bruce
Newell, Pamela
Newman, Joe
Nichols, Steven
Nichols, Dana
Nicholson, Dorothy
Niles, BA
Norgard, Jim
Norton, Ken
Nowak, Tim
O'Conner, Dan
O'Connor, Kevin
Oletta, Gino
Oliver, Richard
Olivera, Jennifer
Olson, Terry and Diane
Olson, Evelyn
Olson, Richard
Olson, Jack and Lori
Olson, David
Olson, Rod
O'Neil, Jeannette and Bill
Orloff, Lynne
Orrock, Greg
Overcash, Shannon
Owens, Jim
Oyung, Frank
Pancrazio, Erin
Pancrazio, James
Pankey, Dale and Jeanette
Parks, Dan
Pattersen, Loro
Patterson, Stephanie
Patterson, Robin
Paukert, Larry
Paxton, Ken
Payson, Alida
Paz, Ruth
Pearson, Nick
Pechan, P.E., Jared
Pehrson, Heather
Pelland, Don and Mary
Pennington, Leal
Penrod, Gary and Carol
Perkins, Patricia
Perry, Carl
Peters, Ed
Petersen, Paul
Peterson, Kathleen
Peterson, Dan
Peterson, Greg
Peterson, Paul
Peterson, Allen
Petrie, Brian H.
Phelan, Jim
Piatt, Tom H.
Picken, Albert
Pickett, Mike
Pierce, Cathie
Pierce, Bill
Pierce, Tim
Pilch, Ann
Pips, Dick
Piskel, James
Plummer, Todd
Polzak, Gene
Porteous, Jim and Gloria
Poulson, William
Powell, Andrea
Powell, Terry
Powers, Will
Prescott, Betty Ann
Prescott, Steve
Price, Eric L.
Price, Greg
Price, Eric and Dawn
Pringle, Bill
Protiva, Eric
Radtke, Chris and Erin
Raggio, Patty
Raphael, Ron
Ratto, Thomas
Ratzlaff, Don
Rauchschwaldbe, Frank
Reed, Jason
Reed, Robert
Reed, Jim
Reiben Jr., Fred
Reich, Daniel
Reigin, Sr., Fred
Reilly, Patti
Reilly, Mike
Reseck, Karl and Shirley
Reyes, Carole
Rhinehart, Mark
Rhoades, Bob
Rhode-Moe, Erik
Rice, Bob and Cathy
Rich, Nichelle
Richard, Anne
Richie, Ann and Wayne
Ridenour, Levert
Rifenburg, Erv
Rilling, Gerald
Rinaldi, Mario
Ringland, Larry
Riordan, Ray
Rippen, Charles
Rivenes, Don and Barbara
Robbins, Rodger
Robbins, Jack
Roberts, Ted
Robinson, Jim and Liz
Robinson, Nanci
Robinson, Rick and Nanci
Robinson, Jim and Liz
Robinson, John
Rodriguez, Peggy
Rogers, Lawrence and Barbara
Rogers, Blaine
Rogers, Robert R.
Rohort, Pat
Rosenbery, Jeff
Rosenthal, Anne
Ross, Norm
Ross, Les
Ross, Erin C.
Rovno, Joanne
Rowe, Ken and Ruth
Rowe, Amanda
Rugg, Bill
Ruggiero, Ken
Ruiz, John P.
Rush, Jim
Russell, Stuart
Ruth, Bob
Ryan, Jan
Sabders, Harriet M.
Salfen, Dion
Salmon, W.K.
Salnick, Steve and Sue
Salzer, Dave
Samski, Doug
Sanford, Jeff
Sanquinetti, Lynn
Santuo, Diane
Sartorio, Paul and Cheryl
Sasser, Lance
Sattler, Steve
Saugstad, Stewart
Savidge, Bill
Saville, Chris
Scarborough, , Gary A.

Schaad, Jake
Schaad, Rick
Schaeffer, Ph.D., Robin L.
Scherer, Jason
Scherer, Veda
Schermeister, Phil
Schiefeistein, Robert and Joyce
Schiess, Steve
Schmeeckle, Matt
Schmidt, Leo
Schmidt, Mike
Schmidt, Mathilde
Schmitz, Michael
Schneider, Walter
Schneider, Lloyd
Schneider, Lynne
Schoon, Kevin
Schoradt, Brent
Schuerman, Ron
Schummer, Peter
Scroggins, Dennis
Scrogins, Travis
Seagraves, Gretchen
Sears, Kevin
Sekel, TJ
Serafine-Buys, Luann
Serpa, Dennis
Serriere, Alexander
Sharkey, Dyarle
Sharon, Winston and Mary
Sharp, Madeline
Sheffield, Rex
Sheppard Jr., Thomas and Jeanette
Shiemake, Lee
Shirk, Lawrence
Shiroyama, Matt
Shoaff, Susan
Shoshone, THPO, Lynda
Sibley, Jeff and Nada
Sigler, Larry
Sikes, Nanci
Silveiria, Bennie
Simmons, Patrick
Simon, James and Diane
Simpkins, A.
Simpkins, Jeff
Skilan, Franco
Slankand, William
Slate, Ed
Sloan, Ron
Smalley, Bob
Smith, Kenny and Rosalee
Smith, Brian
Smith, Claudia
Smith, Steve
Smith, Robert F.
Smith, Joseph
Smith, Robin
Smith, Robert
Smith, Art
Smitheman, Bob
Snakac, Kurt
Snell, J.
Snider, Thornton
Soderberg, Connie and Jim
Soling, Bob
Solnick, Sue and Steve
Sorenson, Sonny
Sorini, Mike
Sorrick, Corky
Souther, Garrett
Sowell, John and Patti
Spencer, Edward
Spencer, Bob and Judith
Stacking, Steve
Stahl, Greg
Standers, Chris
Stanfeld, Shanon
Staniford, Joe
Stapley, Attn:, Garth
Stark, Richard
Starr, Ben and Judith
Steele, Robert
Steele, Joshua
Steele, BJ
Steinhart, Peter
Steinman, Craig
Steinman, Arthur C.
Stephens, Rick
Stevens, Rick
Stevens, Mark
Stevens, Roger
Stevens, Kevin
Stewart, Kirk
Stewart, Doug
Stoller, Mark
Stone, Pat
Stortroen, Ole and Sherry
Stout, Neil and Annette
Strickland, Shawn
Struffenegger, Ed
Sturgess, Michael
Sturtevant, Jon M
Sturtevant, Bev and Ralph
Sulcxynski, Agata
Sullivan, Terri and Dennis
Sullivan, Terri and Luke
Summersett, Tyler
Sundgren, Kent
Sutton, Robert
Swager, Gary
Swanger, Nick
Sweet, Rocky
Swickard, D.K.
Synkonicz, Anne
Szymanski, Ron
Tang, Henry
Tannhauser, Jerry
Tapetillo, Bernabe
Tate, Tim
Tayler, Deircra
Taylor, Sandra and Grant
Tegley, Jim
Teixeira, Bill
Telles, Conrad
Temple, Dale
Thomas, Dale
Thomas, John and Barbara
Thomas, Don
Thompson, Charles and Jerry
Thompson, Brandy
Thompson, Robert J.
Thompson, Jeff
Thompson, Lawrence
Tiede, Craig and Karen
Titchenal, Darleen
Toeniskoetter, Leah C.
Tomczyszyn, Michael
Tonnesen, Jon
Torgerson, Rick
Toth, Mike
Tourkakis, Tim
Trimble, David
Troglin, Todd
Trotter, Vess
Trumbull, Thomas
Tucker, Nate
Tucker, Sharon
Turner, John
Turner, Neil
Turner, Dwayne
Turner, Mike
Turner, John
Turpin, Scott
Twining, Chucker and Debra
Tynan La Fontaine, Marena
Ungari, Bruce
Unger, Dan
Valdez, Denise
Van Buskirk, Annette
Van Houten, Corinne
Van Tol, Bernie
Van Velsor, Stan
Varn Buhler, Gay
Varnbuhler, Gay
Velasquez, Fred
Vella, Tom
Vera, Mary

Vernon, Laura
Vetesy, Lance
Vierra, Wayne
Vigil, Fred
Vinal, John
Vincent, Bob
Vincent, Larry
Vining, Michael
Voisinet, W.
Voorhes, Jeff and Marney
Vorce, Ray
Voytilla, Ben
Vroman, Mike
Waelly, Phillip
Wahsdal, Jim
Walker, Brian
Walker, Dorothy A.
Wallace, Kenneth
Wallin, Ed
Walters, Tracy
Ward, Tom
Warren, Mike
Warren, Kevin
Warren, Jeffrey A.
Warren, Jane
Watson, Jerry
Watson, Brian and Penny
Watson, Steve
Wattles, Clyde
Watts, Tracy
Watts, River
Wearin, Tim
Webb, George
Weeks, Ken
Weinke, Richard G.
Weissenberger, Stein
Wellhausen, Barbara
Welsh, Michael
Wesley, Harold
Wesley, Ann
West, Roger
Weston, Galen
Wetherall, Ken
Wheat, Tim A.
Wheeler, Marcy
Whim, George
Whitcher, Bruce
White, Doug
Whited, Brenda
Whitehead, Larry and Carol
Whiteman, Rick
Whiting, Jeff
Wiegand, David
Wiegand, David
Wiig, Alan
Wilcox, Al and Mary
Wilcox, Beth
Wilensky, Steve
Wilfert, H.
Wilhelm, Lori
Wilkins, Carol
Willey, Ken
Williams, Keith
Williamson, John
Willis, Dick and Pat
Wilson, Box
Wilson, Rad
Wilson, Cathy
Winn-Reed, Sharlene
Winstead, Ralph
Winstead, Ralph
Witherspoon, Joe and Levon
Wolff, Alexander
Wonser, Ester and Michael
Wood, Herb
Wood, Carly and Bob
Woodrow, Terry
Woortz, Jaciyn
Wooster, Kelly
Wubbels, Mike
Wylie, John D.
Wynn, Val
Yeargan, Gigi and Richard
Yoder, Rick
Yoder, Dan
Yoshioka, Glen
Young, Roger
Young, Jerry
Young, Steve
Zeller, George
Zetzlaff, Ted and Betty
Zimmerman, Ron
Zock, Brad
Zupan, Jay

Index

A. Abbreviations and Acronyms

4WD	4-Wheel Drive
AC	Asphalt
ACHP	Advisory Council on Historic Preservation
ADM	Administrative Use Only (closed to public motorized use)
AGG	Aggregate
ALL	All Vehicles
AMS	Aquatic Management Strategy
APE	Area of Potential Effects
ATV	All Terrain Vehicle
BA	Biological Assessment
BE	Biological Evaluation
BMI	Benthic Macro Invertebrate
BMP	Best Management Practices
BOT	Botany
BST	Bituminous Surface Treatment
CAL	Calaveras
CAR	Critical Aquatic Refuge
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CUR	Current
CVC	California Vehicle Code
CWE	Cumulative Watershed Effects
CWHR	California Wildlife Habitat Relationships
DC	Dispersed Campsite
DEIS	Draft Environmental Impact Statement
DEM	Digital Elevation Model
EIS	Environmental Impact Statement
ENF	Eldorado National Forest
ERA	Equivalent Roaded Acres
ESA	Endangered Species Act of 1973
FPO	Forest Protection Officer
FS	Forest Service
FSH	Forest Service Handbook
FSM	Forest Service Manual
FSS	Forest Service Sensitive
FYLF	Foothill yellow-legged frog
GEO	Geology
GIS	Geographic Information System
GR	Groveland
HCRA	Home Range Core Area
HCS	Hydrologically Connected Segment
HFC	Hydrologic Function Class

HLO	Highway Legal Only
HR	Heritage Resources
HSA	Hydrologically Sensitive Area
HUC	Hydrologic Unit Code
IDT	Interdisciplinary Team
IMP	Improved Native Material
INV	Inventory
IRA	Inventoried Roadless Area
LEI	Law Enforcement and Investigations
LEO	Law Enforcement Officer
MC	Motorcycle
MEHR	Maximum Erosion Hazard Rating
MI	Miles
MIS	Management Indicator Species
ML1	Maintenance Level 1 (closed to public motorized use)
ML2	Maintenance Level 2
ML3	Maintenance Level 3
MMU	Motorized Mixed Use
MOI	Memorandum of Intent
MVUM	Motor Vehicle Use Map
MW	Mi-Wok
MYLF	Mountain yellow-legged frog
NAT	Native
NEPA	National Environmental Policy Act
NF	National Forest
NFMA	National Forest Management Act
NFS	National Forest System
NFTS	National Forest Transportation System
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NVUM	National Visitor Use Monitoring
OHV	Off-Highway Vehicle
OR	Outstandingly Remarkable
PA	Programmatic Agreement
PAC	Protected Activity Center
PER	Permit Only
RARE	Roadless Area Review and Evaluation
RCA	Riparian Conservation Area
RCO	Riparian Conservation Objective
RD	Ranger District
REC	Recreation
RFA	Recreation Facility Analysis
RMO	Road Management Objective
RN	Roaded Natural
RNA	Research Natural Area
RO	Regional Office
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
SHPO	State Historic Preservation Office
SIA	Special Interest Area

S&G Standard and Guideline
SEA Season of Use
SNFPA Sierra Nevada Forest Plan Amendment
SOPA Schedule of Proposed Actions
SPM Semi-Primitive Motorized
SPNM Semi-Primitive Non-Motorized
SQF Sequoia National Forest
SRC Source
SS Site Specific Review (1-4)

1. The route was considered; a field visit was not necessary; the effects of adding the route to the NFTS are acceptable (meet law, regulation, and policy; routine maintenance is assumed).
2. The route was considered, a field visit was made and the effects are acceptable (meet law, regulation, and policy; routine maintenance is assumed).
3. The route was considered, a field visit was made and site-specific mitigation is prescribed to reduce the effects to acceptable (meet law, regulation, and policy; routine maintenance is assumed).
4. The route was considered, a field visit was made and a determination was made that the effects could not be mitigated. The route is not recommended by the specialist for inclusion.

SSI StreamScape Inventory
STF Stanislaus National Forest
SUR Surface
SUV Sports Utility Vehicle
SYS System (National Forest System)
t-ALL NFTS road converted to All Vehicles trail
t-ATV NFTS road converted to ATV trail
t-MC NFTS road converted to Motorcycle trail
t-4WD NFTS road converted to 4WD trail
TE Threatened and Endangered
TES Threatened, Endangered and Sensitive
TMO Trail Management Objective
TOC Threshold of Concern
UNR Unauthorized Road
UNT Unauthorized Trail
USDA United States Department of Agriculture
USDI United States Department of Interior
USFS United States Forest Service
USFWS United States Fish and Wildlife Service
VQO Visual Quality Objective
WLF Wildlife and Fish
WOS Wheeled Over Snow
WUI Wildland Urban Interface
X-C Cross Country
YNP Yosemite National Park

B. Cumulative Effects Analysis

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 Forest queried its databases, including the Schedule of Proposed Actions to determine past, present and reasonably foreseeable future actions. This appendix lists the specific findings and information used for the cumulative effects analysis presented for each resource in Chapter 3. This list is not all inclusive since budgets and changing landscape conditions may warrant changes in management priorities or direction.

Past Actions

For the purposes of cumulative effect analysis, past actions are land disturbance projects fully implemented under completed NEPA decisions. In order to understand the contribution of past actions to cumulative effects, this analysis relies on existing conditions as a proxy for the impacts of past actions (see section 3.01). Existing conditions reflect the aggregate impact of all prior human actions and natural events that affected the environment and might contribute to cumulative effects. The current vegetation database, updated in 2000, reflects existing conditions as of that year. In addition to actions reflected by the 2000 data, a complete assessment of cumulative effects must consider land disturbance actions implemented since that time. Table B-1 lists the land disturbance actions fully implemented from 2000-2008. Table B-2 shows the acres burned by wildfire from 2000-2008.

Table B.01-1 Past Land Disturbance Actions (2000-2008)

Project	Purpose	RD	Acres
Ackerson	Salvage	GR	336
Anderson	Reforestation	GR	253
A-Rock Reforestation	Vegetation	GR	6,085
Bandarita	Reforestation	GR	818
Bear Mountain	Vegetation	GR	322
Bellfour	Vegetation	MW	6
Blue Canyon	Vegetation	CAL	18
Brown Darby	Vegetation	CAL	7,300
Buck Meadows	Reforestation	GR	82
Buena Vista	Reforestation	MW	288
Burnout	Reforestation	MW	387
Buzz Tail	Salvage	MW	3,399
Camp 34	Reforestation	MW	27
Camp 8	Vegetation	MW	627
Castle	Vegetation	SU	537
Cherry Plum	Reforestation	GR	60
China	Vegetation	GR	1,000
Corner	Vegetation	SU	51
Crabtree	Vegetation	SU	250
Crandall	Fuels	MW	1,447
Crockpot	Vegetation	GR	41
Crush	Vegetation	MW	632
Curtis	Vegetation	MW	126
Deer Creek	Vegetation	MW	453

Project	Purpose	RD	Acres
Deer Flat	Reforestation	MW	171
Defroster	Vegetation	MW	182
Dodge Ridge	Vegetation	MW	250
Domingo	Vegetation	CAL	60
Dorrington	Vegetation	CAL	18
Dry Meadow	Vegetation	CAL	738
Expressway	Vegetation	CAL	7
Ganns	Vegetation	CAL	13
Granite	Vegetation	GR	4,322
Grizzly	Reforestation	GR	912
Grohls	Vegetation	CAL	5
Harley	Vegetation	CAL	37
Hazel Brown	Reforestation	GR	117
Ichabod MP	Vegetation	CAL	92
Interface MP	Vegetation	CAL	663
Ixion MP	Salvage	CAL	2,528
Johnson	Vegetation	GR	94
Jordan	Reforestation	GR	130
Kibbie	Salvage	GR	243
Kim Practice	Fuels	GR	25
Leland Gully MP	Vegetation	SU	7
Leland Watershed	Watershed	SU	10
Little Hot Saw Fire	Salvage	SU	17
Lodge MP	Vegetation	SU	274
Lyland Fork MP	Vegetation	SU	724
Miller/Donnell	Vegetation	SU	27
Mineral Fire	Vegetation	SU	22
Mi-Wok Adm Thin	Vegetation	MW	40
Moss Creek	Fuels	GR	223
New Hunt Reforestation	Vegetation	MW	380
Niagara	Reforestation	SU	55
Niagara Fire Salvage	Vegetation	SU	137
Old Default	Vegetation	CAL	15
Old Gulch	Vegetation	CAL	90
Pumpkin Hollow MP	Vegetation	CAL	567
Quartz Summit Knobs	Vegetation	CAL	497
Randall	Vegetation	MW	57
Refuge Fireline	Salvage	CAL	9
Roast Pigeon	Reforestation	SU	105
Rogge-Ackerson Reforestation	Vegetation	MW	1,500
Ruby MP	Vegetation	MW	144
Ruby/Twin Rivers	Vegetation	MW	310
Sammy	Vegetation	MW	729
Sampson	Vegetation	MW	914
Shovel Grave	Vegetation	CAL	40
South 108	Vegetation	MW	1,156
South Dodge	Vegetation	MW	548
South Landing	Fuels	MW	680
Spinning Wheel PG&E	Vegetation	GR	61
Three Fires Salvage	Vegetation	GR	2,300
Twin Thin MP	Vegetation	GR	1,800

Project	Purpose	RD	Acres
Upper Cow Forest Resource	Vegetation	SU	895
West Sheer	Vegetation	SU	488
White Brush	Reforestation	SU	205
White Out MP	Salvage	SU	208
Wilson Loop	Reforestation	GR	747
Yellow Bee MP	Vegetation	SU	21
Interface Recreation Trails	Recreation	CAL	NA
Summit Ranger District Road Management	Road	SU	NA
Summit Ranger District Road Management South	Road	SU	NA
		total	**51,151**

CAL=Calaveras; **GR**=Groveland; **MW**=Mi-Wok; **SU**=Summit

Table B.01-2 Past Land Disturbance Actions: Wildfires (2000-2008)

Year	Acres
2000	421
2001	26,333
2002	884
2003	16,459
2004	3,500
2005	121
2006	238
2007	492
2008	36,973
total	**85,421**

Present Actions

For the purposes of cumulative effect analysis, present actions are land disturbance projects with completed NEPA decisions that are not yet fully implemented on the ground. Table B-3 lists the present land disturbance actions followed by brief descriptions of each. Detailed information about most projects is available on the internet [http://www.fs.fed.us/r5/stanislaus/projects/decisions.shtml].

Table B.01-3 Present Land Disturbance Actions

Project	Purpose	RD	Decision	Acres
Bear Mountain	Fuels	GR	2006	2,300
Blue Mountain Fuelbreak	Fuels	CAL	2001	2,186
China Flat	Fuels	GR	2008	1,700
Dodge Ridge Parking and Snowtubing Facilities	Special Use	SU	2004	100
Hells Hollow Fuelbreak	Vegetation	GR	2006	151
Lake Alpine Station Relocation	Facility	CAL	2005	5
Leland Helicopter	Fuels	SU	2008	101
Long Shanahan	Vegetation	GR	2007	377
Peach Grower's	Fuels	GR	2007	639
Silver Creek Bridge	Recreation	CAL	2007	1
Sourgrass	Vegetation	CAL	2008	1,393
Strawberry	Vegetation	SU	2007	2,500
		total		**11,453**

CAL=Calaveras; **GR**=Groveland; **MW**=Mi-Wok; **SU**=Summit

Bear Mountain: fire hazard reduction by thinning trees and reducing ladder and ground fuels; includes shredding, biomass, gully restoration, meadow enhancement, road decommissioning and mechanical sawlog harvest.

Blue Mountain Fuelbreak: fuelbreak construction through small timber sale.

China Flat: mastication on 62 units totaling 3,818 acres; hand thinning, piling, and pile burning on 23 units totaling 1,698 acres; underburning on all but one of the units, totaling 4,606 acres; broadcast burning on a 632 acre fuels unit, a large meadow in the Jordan Creek/Bower Cave Special Interest Area; road maintenance on approximately 39 miles of existing NFS roads within the project area.

Dodge Ridge Parking and Snowtubing Facilities: construct a parking facility to increase parking for Dodge Ridge ski resort. The snowtubing facility decision was deferred until more information could be gathered and analyzed.

Lake Alpine Station Relocation: relocate building to new site along Highway 4 at Silver Tip. Construct foundation for building, vault toilet, and parking area.

Leland Helicopter: remove merchantable trees greater than 10 inches and less than 30 inches DBH, primarily suppressed and intermediate trees. The thinned trees would be spaced at a 1/2 to 1 crown spacing between residual crowns (approximately 20 feet between crowns depending on tree size). The emphasis is on retaining the largest, healthiest and most vigorous trees. All large black oak and riparian hardwood species would be retained. Over topped black oak trees would be released where feasible. During thinning, sugar pine and ponderosa pine would be favored for retention. Trees over 30 inch DBH would only be removed where necessary for operational safety. In addition, the Forestwide Hazard Tree Guidelines would be used, allowing larger size hazard (dead and dying) trees to be removed when applicable. Thinning would be conducted on 101 acres. Biomass Treatment: Due to the high cost of biomass removal on steep slopes and the rising cost of fuel, the following options would be allowed: 1) Flown out, chipped at the landing, and removed, or 2) Hand cut, piled, and burned. Biomass treatment would be conducted on 101 acres. Jackpot Burning: Burn concentrations of biomass size material left on site and natural fuel concentrations. Activities would be conducted in the fall or spring depending on favorable weather conditions. Burning activities would be scattered throughout the 101 acres of treatment units.

Long Shanahan: mechanical thinning with sawlog and biomass removal from 23 units covering 1,310 acres. Due to the very low sawlog volumes that are not economical to remove, the mechanical thinning will be implemented immediately on only 7 units covering 350 acres (units 16125fb, 25116, 25121fb, 25131, 25148, 25154 and 25156). The remaining 16 units covering 960 acres will only be mechanically thinned under this decision, should market conditions change and the units become economical to thin for forest health improvement. All fuels reduction and other treatments to these units remain the same as described in the EA for Alternative 1. The effects would be the same as were analyzed and disclosed in the EA. 2. Hazard trees will be removed along the power lines that traverse several units. This action will occur within the planned units and will not significantly alter the planned treatments or the effects. 3. The wildlife Limited Operating Periods (LOPs) will not be applied to the following units: 16160, 16127fb, 25010, 25112, 25112a, 25117, 25121fb, 25131fb, 25134, 25141 and 25154. Small portions of these units fall within a set distance of wildlife activity centers. Based on the habitat, topography and the distance to known nests, the District Biologist determined that the LOPs are unwarranted in these units. All other units retain the LOPs as shown in the EA (p. 23). LOPs do not apply to road construction or timber hauling, which do not occur in the activity centers. 4. Logging slash along Highway 120, Smith Station Road and Sprague Road will be hand piled for burning by the Forest Service. Stumps will be cut low along these roads. The exact width of this treatment will vary with the visibility from the road. 5. Subsoiling of the major skid trails within the 350 acres of commercial timber harvest will cover no more than 17 acres.

Peach Grower's: reducing accumulated fuels and improving forest health on approximately 742 acres; this includes 626 acres of mechanical thinning for sawlog and biomass removal, 20 acres of machine pile and burn, 98 acres of hand thinning, and 645 acres of prescribed burning. Remove approximately 2.0 million board feet of sawlogs and 11,000 green tons of biomass. The project includes treatments designed to enhance wet meadows as well as temporary road construction, road reconstruction, road barrier closures, and road decommissioning. In addition, Road 1S18Y, which borders the northern end of the project boundary, will not be decommissioned.

Silver Creek Bridge: authorizes a pedestrian bridge over Silver Creek on the west side of Lake Alpine approximately 400 feet downstream from the Lake Alpine Dam and allows issuance of Special Use Authorization to NCPA for operations and maintenance of the bridge. Bridge approaches will be constructed to insure safe access to the crossing. This bridge would allow access to both ends of the dam. This bridge would be a low water crossing. The deck of the bridge would normally be dry, but during high dam releases the bridge could be topped and inundated by high flows. During these periods, NCPA would helicopter their employees to the south side of the dam. The bridge will be designed for pedestrian, snow, wind and seismic loads in compliance with the current American Association of State Highway Transportation Code (AASHTC). In addition, do not construct the 1/8 mile of trail connecting the bridge with existing trail 19E01 on the south side of the bridge.

Sourgrass: commercial thinning and biomass removal in distinct treatment units totaling approximately 999 acres; pre-commercial thinning and biomass removal in distinct treatment units totaling approximately 103 acres; prescribed burning of surface fuels over approximately 538 acres of thinned and unthinned stands

Strawberry: fuel reduction and forest health treatments on approximately 2,500 acres and about 20 miles of road system treatments as described in the EA (pp.18-19). The addition of diameter limits within the two spotted owl Protected Activity Centers (PACs) proposed for treatment in the analysis. The western PAC within stands 1, 33, and 199 will have a maximum diameter limit of 25 inches DBH and the eastern PAC within stands 96, 97, 98 and 99 will have a maximum diameter limit of 21 inches DBH.

Reasonably Foreseeable Future Actions

For the purposes of cumulative effect analysis, reasonably foreseeable future actions are land disturbance projects in preliminary planning stages without completed NEPA decisions. Table B-4 lists the reasonably foreseeable future land disturbance actions followed by brief general descriptions of the project purpose types.

Table B.01-4 Reasonably Foreseeable Future Land Disturbance Actions

Project	Purpose	RD	Decision	Acres
2 Mile	Vegetation	MW	2009	2,100
Abernathy	Fuels	GR	2011	417
Ascension	Fuels	GR	2011	99
Bailey	Vegetation	CAL	2009	1,200
Basin	Vegetation	MW	2010	469
Bear Springs	Fuels	MW	2012	627
Bear Valley Mountain Resort Expansion	Special Use	CAL	2010	1,500
Beaver	Vegetation	CAL	2014	845
Bloods	Fuels	CAL	2011	975
Boards	Vegetation	CAL	2013	1,775
Bourland	Fuels	CAL	2012	2,230
Buck Meadows	Fuels	GR	2012	854
Cascade	Vegetation	GR	2011	384

Project	Purpose	RD	Decision	Acres
Cottonwood	Vegetation	MW	2010	1,537
Coward	Fuels	GR	2011	1,292
Dodge Meadow	Fuels	MW	2011	575
Dodge Ridge	Vegetation	SU	2010	822
Eagle Creek	Vegetation	MW	2013	732
Faust (Lewis)	Vegetation	MW	2012	1,441
Fence	Vegetation	SU	2010	1,000
Fisher	Vegetation	CAL	2014	1,025
Flagpole	Fuels	CAL	2012	695
Folsom	Vegetation	CAL	2013	2,630
Fraser	Fuels	MW	2011	431
Gravel Range	Vegetation	GR	2012	391
Great Hunt Reforestation	Vegetation	MW	2010	997
Grizzly	Vegetation	CAL	2014	1,425
Hemlock	Fuels	CAL	2012	1,396
Herring	Fuels	SU	2011	749
Hunter Ridge	Fuels	MW	2012	300
Jackass Mountain	Fuels	GR	2012	254
Jawbone Station	Vegetation	GR	2013	892
Lower Blue Creek (4-08-005-CAL)	Private	NA		438
Matsen	Fuels	MW	2011	1,150
Medusa	Vegetation	CAL	2010	1,534
Middle Beaver Creek (4-07-037-TUO)	Private	NA		567
Middle Fork	Vegetation	GR	2009	520
Monotti	Fuels	GR	2010	2,562
Moran Creek (4-07-042-CAL)	Private	NA		11
Motorized Trails: add dispersed recreation access routes to the trail system	Trail	All	2010	NA
Motorized Trails: construct approximately 5 miles of new trail or trail re-routes in order to complete the OHV trails program	Trail	MW	2010	NA
Murphy, Matsen, Paper	Fuels	MW	2011	2,913
Paper	Fuels	MW	2011	927
Phase II	Vegetation	MW	2009	1,500
Pinecrest Interior	Fuels	SU	2009	950
Prather	Vegetation	CAL	2010	1,202
Reynolds Creek	Vegetation	GR	2010	2,134
Ruby Hill	Vegetation	MW	2013	1,221
Sand Bar	Vegetation	GR	2012	859
Schoettgen	Fuels	CAL	2011	564
Scott Ridge	Fuels	MW	2011	1,700
Soldier Creek	Fuels	GR	2009	2,300
Swamp Creek (4-08-020-CAL)	Private	NA		549
Teton	Fuels	SU	2009	979
Thompson	Fuels	CAL	2011	1,145
Upper Blue Creek (4-08-018-CAL)	Private	NA		172
Upper Griswold Creek (4-08-023-TUO)	Private	NA		628
Walton Cabin, Bear Springs, Hunter	Fuels	MW	2013	927
		total		**59,511**

CAL=Calaveras; **GR**=Groveland; **MW**=Mi-Wok; **SU**=Summit

Fuels: fuel treatments can be incorporated into vegetation projects or stand alone. Fuels treatment project activities include hand and machine pile, broadcast burning, understory burning or tree removal for the development of fuelbreaks.

Private: the California Division of Forestry (CAL FIRE) website lists harvest plans proposed on private lands.

Special Use: Bear Valley Mountain Resort expansion is in the initial scoping stage with the proponent proposing a number of developments.

Trail: an unknown number of unauthorized routes accessing dispersed recreation sites may be analyzed and added annually to the NFTS. The number of miles added is unknown. Approximately 5.0 miles of new motorized trails are needed to complete connections, bypass private property or address re-route recommendations.

Vegetation: vegetation projects generally have the following activities occurring on the landscape: tree removal, shredding, pre-commercial thinning, biomassing, temporary road construction, road decommissioning, road maintenance and reconstruction, and other site specific resource projects. These future projects have estimated dates of project decisions with an implementation date of one to two years later.

C. Forest Plan Direction

The Stanislaus National Forest Land and Resource Management Plan (Forest Plan), as amended, directs the management of the Stanislaus National Forest. Forest Plan Standards and Guidelines (S&Gs) that specifically apply to Motorized Travel Management are listed below with their originating source indicated as follows:

Stanislaus National Forest Land and Resource Management Plan, 1991 (**LMP 91**)

Motor Vehicle Travel Management Forest Plan Amendment, 1998 (**MVTM**)

Sierra Nevada Forest Plan Amendment, 2004 (**SNFPA**)

Forestwide Standards and Guidelines

Cultural Resources

Practices	General Direction	Standards and Guidelines
Cultural Resource Inventory and Evaluation (2-A) **LMP 91**	Complete a cultural resource inventory prior to any land disposal action or any Forest or Forest- permitted or assisted action, activity or program that has the potential of altering prehistoric or historic cultural values to identify all potentially eligible cultural properties which may be affected (36 CFR 219.24).	Field survey coverage intensity shall be determined according to the Secretary of Interior's Standards and Guidelines on Archaeology and Historic Preservation and California Office of Historic Preservation Archaeological Survey Guidelines. Follow site recording methods established by the California Office of Historic Preservation Archaeological Site Record Handbook. Follow the standards for inventory reports in the Secretary of the Interior's Standards and Guidelines on Archaeology and Historic Preservation. Perform controlled sample surveys in designated Wilderness. Consult with members of the potentially affected local Native American community to identify specific locations and issues.
	Assess the scientific, historic and ethnic significance for each cultural property before determining further treatment (36 CFR 219.24).	Use appropriate Programmatic Agreements and Treatment Plans whenever possible. Apply the National Register of Historic Places criteria in 36 CFR 60 and regulations in 36 CFR 63 to determine the eligibility of a cultural property to the National Register. Use FSM 2361, FSM 1680, and Advisory Council on Historic Preservation's "Treatment of Archaeological Properties: A Handbook", and the traditional values of local Miwok, Washo and Paiute Indian communities as guidelines for evaluating significance.
	Evaluate the effect of Forest undertakings on the resource.	Apply the Criteria of Effect in 36 CFR 800, and follow FSM 2361 for determining the effect of an undertaking.
Cultural Resource Protection (2-B) **LMP 91**	All identified cultural resources are to be protected until they are evaluated. The integrity and significant values of eligible properties and National Historic Landmarks are to be protected. When necessary, mitigative excavation or data recovery may be accomplished.	Use the guidelines in FSM 2361 and FSM 1680 for developing and implementing protective measures. Comply with 36 CFR 800 regulations and follow the guidelines in 36 CFR 66, FSM 2361, and the 13 principles in the "Treatment of Archaeological Properties" Handbook (ACHP). Conduct compliance inspections on all special use permits containing cultural resource stipulations or conditions. Protect documents, photographs and other information relevant to the administrative, social and contextual history of the Forest for research and public use. Utilize law enforcement patrols to help prevent site vandalism and conduct law enforcement investigations when cultural resources are impacted using ARPA, 36 CFR 261.9, and other applicable laws and regulations.
Cultural Resource Enhancement and	Plan interpretation, research and restoration projects for the benefit of the public and of	Work with Interpretive Services to develop high quality brochures, publications and/or audio-visual presentations. Work

Practices	General Direction	Standards and Guidelines
Interpretation (2-C) **LMP 91**	cultural resources. Treatments of cultural properties, including maintenance of historic properties, should be appropriate to their assessed values (as documented in the Statement of Significance in the Request for Determination of Eligibility and National Register nomination form), the state of knowledge and methods of cultural resource disciplines, and the public interest. The significant values of National Register and eligible historic structures shall be conserved by physical protection and maintenance or recording to professional standards if physical preservation is not possible.	with cooperators to develop high quality interpretive, stabilization, and/or restoration projects. Comply with 36 CFR 800 regulations and follow the guidelines in 36 CFR 66, FSM 2361 and the 13 principles in the "Treatment of Archaeological Properties" Handbook (ACHP). Issue permits under the Archaeological Resources Protection Act of 1979 (P.L. 96-95) for non-Federal archaeological research projects on the Forest. Encourage non-Federal research projects on the Forest. Encourage the Sierra Miwok, Washo, and Mono Lake Paiute to contribute to the Forest's cultural resource management activities, to enhance public understanding of their traditional and contemporary cultures.

Fish and Wildlife

Practices	General Direction	Standards and Guidelines
Bald Eagle (5-E) **LMP 91**	Meet the Forest's share of the bald eagle recovery plan goal of three active breeding sites.	Provide a ¼ mile buffer between target nest stands and developed recreation facilities. When nesting bald eagles are found, implement suitable restrictions on nearby activities based on the Regional habitat management guidelines and the habitat capability model for the species. Protect all historic and active nests, as required by the Bald Eagle Protection Act and the Migratory Bird Treaty Act.
Recovery Species Management (5-L) **LMP 91**	Management activities will comply with the Endangered Species Act.	Conduct a Biological Evaluation for any project which may affect a species proposed for Federal listing. Modify or mitigate projects where necessary to avoid adverse impacts to habitats for species which are candidates or proposed for Federal listing.
Peregrine Falcon (5-L) **LMP 91**	Meet the Forest's share of the peregrine falcon recovery plan goals of two active breeding territories by providing superior nesting habitat at two nest sites.	For each peregrine falcon territory, avoid high levels of human activity near suitable nesting sites. When active nesting is found, restrict logging, road building and other disturbing activities within ½ mile of the nest site between March 1 and July 31. Manage territories to enhance habitat for common prey species such as band-tailed pigeons, woodpeckers, jays and robins. Utilize opportunities to fund peregrine reestablishment through hacking or cross-fostering until the species is delisted. Protect all historic and active nests, as required by the Migratory Bird Treaty Act.

Range

Practices	Standards and Guidelines
Noxious Weed Management (9-E) **SNFPA**	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 (for example, 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. Encourage use of certified weed free hay and straw. Cooperate with other agencies and the public in developing

Practices	Standards and Guidelines
	a certification program for weed free hay and straw. Phase in the program as certified weed free hay and straw becomes available. This standard and guideline applies to pack and saddle stock used by the public, livestock permittees, outfitter guide permittees, and local, State, and Federal agencies. Include weed prevention measures, as necessary, when amending or re-issuing permits (including, but not limited to, livestock grazing, special uses, and pack stock operator permits). Include weed prevention measures and weed control treatments in mining plans of operation and reclamation plans. Refer to weed prevention practices in the Regional Noxious Weed Management Strategy. Monitor for weeds, as appropriate, for 2 years after project implementation (assuming no weed introductions have occurred). Conduct a risk analysis for weed spread associated with burned area emergency rehabilitation (BAER) treatments. The BAER team is responsible for conducting this analysis. Monitor and treat weed infestations for 3 years after the fire. Consult with American Indians to determine priority areas for weed prevention and control where traditional gathering areas are threatened by weed infestations. 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.

Recreation

Practices	General Direction	Standards and Guidelines
Recreation Opportunity Spectrum (10-B) **LMP 91**	Recreation Opportunity Spectrum (ROS) is a management concept that applies Forestwide. Every acre of National Forest land treated by this Forest Plan fits into one of the ROS classes listed below.	
1. ROS Primitive	Manage the area to be essentially free from evidence of man-induced restrictions and controls. Provide a range of primitive-recreation opportunities and experiences.	Meet the ROS objective of Primitive. Interaction between visitors is very low and the evidence of other users is minimal. Mechanized use is prohibited. Resource improvements will normally be limited to minimum, unobtrusive facilities. Road development and timber harvest are not permitted.
2. ROS Semi-primitive Non-motorized	Manage the area so that on-site controls are minimized and restrictions are subtle. Provide a range of semi-primitive non-motorized recreation opportunities and experiences.	Meet the ROS objective of Semi-primitive Non-motorized. Interaction between visitors is low but there is evidence of other users. Motorized use is normally prohibited. Resource improvements will normally be limited to minimum, unobtrusive facilities.
3. ROS Semi-primitive Motorized	Manage the area so that on-site controls and restrictions are evident but not dominant. Provide a range of semi-primitive motorized recreation opportunities and experiences.	Meet the ROS objective of Semi-primitive Motorized. Interaction between visitors is low to moderate and there is evidence of other users. Motorized use is normally allowed, but may be subject to seasonal restrictions. Resource improvements occur but are subordinate to the surrounding natural environment.
4. ROS Roaded Natural	Manage the area so there is only moderate evidence of the sights and sounds of man. Provide a range of roaded natural recreation opportunities and experiences.	Meet the ROS objective of Roaded Natural. Interaction between users is usually low to moderate with evidence of other users prevalent. Resource modification practices are evident. Conventional motorized use is provided for in construction standards And facilities designs. A full range of other resource activities is permitted to the extent that the general practice description is met.
5. ROS Rural	Manage the area to accommodate substantial modification of the natural environment. Provide a range of rural recreation opportunities and experiences.	Meet the ROS objective of Rural. Sights and sounds of man are evident. Interaction between users is moderate to high. Facilities are designed for use by large numbers of people and intensified for motorized use and parking. A full range of other resource activities is permitted to the extent that the general practice description is met.
Motor Vehicle Travel Management (10-G)	Motor Vehicle Travel Management applies Forestwide. Every acre of National Forest treated by this Forest Plan fits into either the Closed or Restricted categories as shown below.	

<table>
<tr><th>Practices</th><th>General Direction</th><th>Standards and Guidelines</th></tr>
<tr><td>MVTM</td><td colspan="2"></td></tr>
<tr><td>1. Closed Motor Vehicle Travel Management</td><td colspan="2">a. Closed to motorized use
1. Consider temporary exceptions when threat to life or property dictate otherwise.
2. Consider temporary exceptions for administrative access.
b. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to eliminate evidence of, and access by, unauthorized motorized use.</td></tr>
<tr><td>2. Restricted Motor Vehicle Travel Management</td><td colspan="2">A. Social Setting
1. Private Property:
a. Inventory, rank and acquire route rights-of-way as needed.
b. Recognize private property during route inventory and revisions.
c. Locate designated routes to avoid private property unless opportunities and agreements for a connected network of routes exist.
d. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize conflicts with private property caused by motorized use.
2. User Groups:
a. Seek partnerships with the State, industry, users and other federal and local agencies to develop a successful motorized recreation program.
1. Encourage users to work with local authorities to seek opportunities for hill climbs and motocross events on lands other than National Forest.
2. Stay in tune with motorized users. Users are essential in laying out road and trail networks and organized groups are interested in resource protection. User participation and support are essential ingredients to all motorized recreation management activities.
3. Work with user organizations and vehicle dealers to identify needs, utilize volunteers and spread a conservation ethic.
4. Strengthen work with the State and BLM to address joint management of trail networks and define roles.
5. Use Adopt-a-Trail to maintain routes.
6. Use public to monitor motorized use and report problems.
b. Monitor public concerns and preferences to identify new issues.
1. Maintain and update the Forest OHV mailing list and periodically make related information available to the public.
2. Create a file for public comments and agency responses and review for trends and issues.
c. Use public participation to complete route inventories and make recommended changes in the route system. Include both users and non-users in this process.
d. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize conflicts with other user groups caused by motorized use.
B. Resource Setting
1. Cultural Resources: Follow Forestwide Standards and Guidelines for Cultural Resources. In addition:
a. Complete cultural resource inventory and analysis as part of all site-specific motor vehicle travel management projects.
b. Complete a module for motorized use and add to the programmatic agreement for the treatment of cultural resources.
c. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize damage to cultural resources caused by motorized use.
2. Fire: Follow Forestwide Standards and Guidelines for Fire. In addition:
a. Locate routes and manage motorized use to minimize conflicts with fuel break and other fire management activities.
b. Emphasize good fire prevention practices in Forest Service generated public information material, news releases, and public service announcements.
c. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize fire losses caused by motorized use.
3. Fish and Wildlife: Follow Forestwide Standards and Guidelines for Fish and Wildlife. In addition:
a. The wildlife areas subject to special management are:
1. Peregrine Falcon</td></tr>
</table>

Practices	General Direction	Standards and Guidelines

a. Implement a limited operating period (LOP), from February 1 through July 31, on all peregrine falcon territories active within the preceding five years, for at least 0.5 miles from the nest.

1. Restrict motor vehicle activities and new road construction, during this LOP, according to a management plan for the area.

b. Prohibit new motor vehicle activity within 200 feet of lake shorelines that are used by peregrine falcons.

2. **Bald Eagle**

a. Within Designated Territories (delineated bald eagle management areas, or additional territories, based on nesting occupancy):

1. Implement a LOP, from January 1 through August 31.

a. Apply LOP restrictions to motor vehicle activities on level 1 roads and OHV routes open to the general public.

b. Allow new road construction, during the LOP, only when surveys determine no nesting activity.

c. Encourage use of existing roads and skid trails for vegetation and fire management purposes.

d. Construct new roads only for vegetation or fire management purposes; close these new roads following their management use.

2. Prohibit new motor vehicle activity in wetlands, streamside management zones, and within 200 feet of lake shorelines that are used by bald eagles.

b. Outside Designated Territories (new active bald eagle nests outside of designated management territories):

1. From January 1 through August 31, implement the following restrictions in a buffer area around the nest for a distance determined by the Wildlife Biologist on a site-specific basis.

a. Re-route existing OHV use to routes at a safe distance from the nest.

b. Close or detour existing roads in the proximity of the nest site.

c. Prohibit motor vehicle activities in the roost area.

3. **California red-legged frog**

a. Within 300 feet of streams or ponds that have potential suitable habitat:

1. Construct new roads or trails or use off-road routes for motorized vehicles only after conducting amphibian surveys to the most recent protocol for the frog.

2. Allow stream crossings only where the route, through the water, and the adjacent streamside areas are naturally resistant to tires or are hardened with rock or other materials.

4. **Spotted Owl, Fisher, Marten, Goshawk, Great Gray Owl, Western Pond Turtle**

a. Active nests of sensitive raptors not otherwise protected in specified management areas):

1. Provide special measures to protect nests discovered close to motorized trails or 4WD routes where needed for nesting success.

b. Within Fisher/Marten reproductive areas in Forest Plan Near Natural and Wildlife management areas.

1. Construct new roads or trails or use existing off-road routes for motorized vehicles only where compatible with the road/trail density standards below, and where approved in the fisher/marten area management plan.

c. In area adjacent to waters with known populations of western pond turtle:

1. Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist.

5. **Early Successional Species** (mule deer and associates)

a. Deer winter concentration areas or critical winter deer range may be closed to motorized use from 11/15 to 4/15.

b. Deer summer concentration areas or critical summer deer range may be closed to motorized use from 4/15 to 8/1.

b. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize conflicts with fish and wildlife caused by motorized use.

4. Range: Follow Forestwide Standards and Guidelines for Range. In addition:

Practices	General Direction	Standards and Guidelines

  a. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize conflicts with range caused by motorized use.

5. **Recreation**: Follow Forestwide Standards and Guidelines (as amended) for Recreation. In addition:

  a. Designate a managed system of existing motorized routes maintained to standards.
    1. Conduct route condition ratings, using the Route Condition Rating form and its instructions.
      a. Utilize interdisciplinary skills and public participation.
      b. Manage routes as follows:
        1. For routes rated Green (OK): Sign open to motorized use with width restrictions, if any. Schedule maintenance to remain in Green.
        2. For routes rated Brown (Needs maintenance): Sign open to motorized use with width restrictions, if any. Schedule maintenance to move up to Green, with priorities set to avoid moving into Orange.
        3. For routes rated Orange (Needs Major Attention): Close to motorized use. Schedule maintenance, rehabilitation or mitigation to move up to Brown, then Green; or, obliterate.
  b. **Designated Routes**: include roads, routes and trails as described below. If resource damage or unresolvable conflicts are likely, the route should be repaired, relocated or closed. Designated routes may be installed, signed and maintained by Special Use Permittees.
    1. **Off-Highway**: include Motorcycle, ATV, OHV, 4WD and Combined Use routes as described below.
      a. **Designated Motorcycle Routes**: include narrow single track trails. Designated Motorcycle Routes are open only to single track vehicles less than 24 inches wide (Motorcycles Only).
      b. **Designated ATV Routes**: include narrow double track trails. Designated ATV Routes are open only to vehicles less than 50 inches wide (Motorcycles and ATVs Only).
      c. **Designated OHV Routes**: include full width roughly graded (level 2) Forest System roads which are open to public motorized use. Designated OHV routes also include other full width routes and trails which are open to motorized use. Designated OHV Routes are open to all vehicles, but not maintained for conventional highway vehicles.
      d. **Designated 4WD Routes**: include full width roads, routes or trails which are not maintained for conventional highway vehicles; 4WD travel is recommended.
      e. **Designated Combined Use Routes**: include portions of high standard roads for Combined Use by street legal and non-street legal vehicles.
    2. **Over-Snow**: include Wheeled Over-Snow (WOS) routes and Over-Snow Vehicle (OSV) routes as described below.
      a. **Designated WOS Routes**: include surfaced roads and other routes which are open for WOS use by ATVs.
      b. **Designated OSV Routes**: include roads, routes and trails which are open to motorized use. Cross-country over snow travel, by vehicles designed specifically for that purpose, will be permitted when there is 12 inches or more of snow and no contact is made with native soil or vegetation.
  c. Provide comprehensive user information and education programs.
    1. Renew the “Host” program emphasis and provide training.
    2. Include well done entry stations and bulletin boards at staging areas and contact stations.
    3. Provide professional quality signs, maps and brochures.
    4. Emphasize a conservation ethic through literature, handouts and radio announcements with the message being the same: tread lightly, stay on roads and trails to protect our sport, our meadows and our environment.
    5. Encourage motorized use in appropriate areas.
  d. Provide comprehensive project level planning, perhaps within a watershed analysis.
    1. Incorporate control measures such as fencing and rehabilitation measures for presently disturbed areas.
    2. Involve interdisciplinary skills and public participation in route condition ratings, nominations, designations, closures, construction and maintenance.
    3. Include sign planning, installation and maintenance in contracts for construction and maintenance of routes.
    4. Strategically locate staging areas serving as trailheads near street legal access points.
    5. Consider future changes, additional designations and route developments to enhance OHV

Practices	General Direction	Standards and Guidelines
	opportunities for loop travel. 6. Consider other selected maintenance level 3, 4, and 5 Forest roads for Combined Use where this would enhance OHV opportunities. 7. Provide motorcycle and ATV trail riding opportunities in the Hull Creek, Crandall, Penny Pines, Liberty and Pilot Ridge areas. e. Prepare California Backcountry Discovery Trail (CBDT) nominations after project level analysis and sign routes that are accepted by the California Department of Parks and Recreation. 1. Provide maps and other information on CBDT segments. Include information on segments open to OSV use and other similar OSV opportunities. f. Seek opportunities to increase OSV route grooming as additional non-Forest Service funding is available. g. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize conflicts with other recreationists caused by motorized use. **6. Riparian**: Follow Forestwide Standards and Guidelines for Riparian. In addition: a. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize damage to riparian areas caused by motorized use. **7. Sensitive Plants**: Follow Forestwide Standards and Guidelines for Sensitive Plants. In addition: a. Protect sensitive plants from motorized activities which might cause the plants to become federally threatened or endangered. 1. Allow OHV use through populations of sensitive plants only where the planned impacts are considered acceptable and where proliferation of routes into adjacent parts of the population does not occur. 2. Locate OHV staging areas where associated off-site use does not damage sensitive plants. b. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize damage to sensitive plants caused by motorized use. **8. Soils**: Follow Forestwide Standards and Guidelines for Soils. In addition: a. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize soil loss caused by motorized use. **9. Special Areas**: Follow Management Area Direction (as amended) for Special Interest Areas, Research Natural Areas, and Experimental Forest. In addition: a. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize damage to special area values caused by motorized use. **10. Transportation**: Follow Forestwide Standards and Guidelines for Transportation. The existing direction to manage the road system to protect wildlife and riparian values also applies to OHV routes and OSV routes. In addition: a. Prohibit non-street legal vehicles on roads or routes not designated for OHV use. b. Consider closing to all motorized use those roughly graded roads that do not enhance motorized opportunities. c. Comply with the Highway Safety Act and prepare Combined Use orders as necessary. d. Utilize seasonal closures to protect road and route surfaces. e. Develop entrance strategies to discourage normal passenger vehicle travel on designated OHV routes. f. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize traffic conflicts caused by motorized use. **11. Vegetation**: Follow Forestwide Standards and Guidelines for Diversity. In addition: a. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize damage to vegetation caused by motorized use. **12. Visual Resource**: Follow Forestwide Standards and Guidelines for Visual Resource. In addition: a. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize damage to the visual resource caused by motorized use. **13. Water**: Follow Forestwide Standards and Guidelines for Water. In addition: a. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize damage to water quality caused by motorized use. **14. Wild and Scenic Rivers**: Follow Management Area Direction (as amended) for Wild and Scenic Rivers. In addition: a. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize damage to Wild and Scenic River values caused by motorized use.	

Practices	General Direction	Standards and Guidelines

15. Wilderness: Follow Management Area Direction (as amended) for Wilderness. In addition:

- a. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to eliminate evidence of, and access by, unauthorized motorized use.

C. Management Setting

1. Administration:

- a. Prohibit motorized use and close motorized routes in non-motorized areas.
- b. Prohibit cross-country overland OHV travel.
- c. Recognize OHV activities as legitimate uses of the National Forest and provide opportunities, where compatible the other direction and guidelines established in the Forest Plan and this Amendment.
- d. Manage OHV activities to meet the intent of the Executive Orders 11644 and 11989.
- e. Control and direct OHV use to protect resources, promote the safety of all users, and minimize conflicts among the various uses of the Forest (36 CFR 219.21 (g)).
- f. Resolve motorized activity problems presenting an immediate threat to life or property through an immediate closure to vehicle type(s) causing the problem.
- g. Include an evaluation of motorized activities in timber sale, reforestation, fuelbreak, fire suppression and other projects that may affect Motor Vehicle Travel Management. For traffic safety, roads or routes may be temporarily closed during management activities.
- h. Consider applications for organized events on a case-by-case basis.
- i. Treat different types of motorized use fairly.
  - 1. Motor vehicle travel is restricted to designated routes. Manage motorized routes as open unless signed or physically closed.
    - a. Cross country overland travel is not permitted.
    - b. Cross country over snow travel, by vehicles designed specifically for that purpose, is permitted when there is 12 inches or more of snow and no contact is made with native soil or vegetation.
  - 2. Permit motor vehicle travel up to 100 feet from roads, routes and established travel ways for direct access to campsites, parking, woodcutting, or gathering forest products provided that:
    - a. no resource damage occurs; and,
    - b. such access is not otherwise prohibited.
- j. Provide consistent signing.
  - 1. **Roads**: Forest roads are signed as described below.
    - a. **Roads maintained for conventional highway vehicles**: standard highway sign, or Forest Service sign with horizontal route number, installed at road intersections.
    - b. **Roads not maintained for conventional highway vehicles**: standard Forest Service sign, or carsonite type marker (on Designated OHV Routes), with vertical route number, installed at road intersections.
  - 2. **Off-Highway**: Forest roads, routes and trails are signed as described below.
    - a. **Designated Motorcycle Routes**: carsonite type marker with motorcycle symbol (vertical route number, if shown) installed at access points and intersections with other designated routes.
    - b. **Designated ATV Routes**: carsonite type marker with ATV or motorcycle/ATV symbol (vertical route number, if shown) installed at access points and intersections with other designated routes.
    - c. **Designated OHV Routes**: standard Forest Service sign, or carsonite type marker, with vertical route number, installed at access points and intersections with other designated routes.
    - d. **Designated 4WD Routes**: standard Forest Service sign, or carsonite type marker, with 4WD (Jeep) symbol and vertical route number, installed at access points and intersections with other designated routes.
    - e. **Designated Combined Use Routes**: yellow diamond shaped highway sign with ATV symbol in addition to standard signs indicating Combined Use by street legal and non-street legal vehicles, installed at both ends of the Combined Use segment.
  - 3. **Over-Snow**: Forest roads, routes and trails are signed as described below.
    - a. **Designated WOS Routes**: ATV symbol installed at access points from winter parking

Practices	General Direction	Standards and Guidelines
	areas. b. **Designated OSV Routes**: snowmobile symbol installed at access points from winter parking areas. 4. **Closed**: Forest roads, routes and trails that are closed to motorized use are indicated by: a. the presence of closed signs, gates or barriers. **2. Law Enforcement**: a. Provide appropriate levels of enforcement: 1. A Forest Service presence in the use area and application of law enforcement based on the need are essential. 2. Forest Service personnel riding the type of vehicles used in the area; these contact persons must be well equipped with machine and safety gear and they must be qualified riders or drivers. b. Update Forest Orders and enforce closures and other restrictions.	

Sensitive Plants

Practices	General Direction	Standards and Guidelines
Sensitive Plants Interim and Recovery Management (12-A) **LMP 91**	Provide for protection and habitat needs of sensitive plants, so that Forest activities will not jeopardize their continued existence.	Protect sensitive plants from activities which might cause them to become Federally listed as Threatened or Endangered. Identify populations of sensitive plants which occur in areas planned for timber sales or other projects. Modify planned projects to avoid or minimize adverse impacts to sensitive plants. Where projects may jeopardize a sensitive plant species perform a Biological Evaluation, botanical investigation and develop management guidelines, as necessary, for the species involved. Conduct surveys and monitoring necessary to detect potentially damaging disturbances, changes in known populations and locations of new populations.
Sensitive Plant Surveys (12-A) **SNFPA**[8]	Conduct field surveys for TEPS plant species early enough in the project planning process that the project can be designed to conserve or enhance TEPS plants and their habitat. Conduct surveys according to procedures outlined in the Forest Service Handbook (FSH 2609.25.11). If additional field surveys are to be conducted as part of project implementation, survey results must be documented in the project file.	

Soils

Practices	General Direction	Standards and Guidelines
Soil Support Services (13-A) **LMP 91**	Forest projects and activities shall be conducted to maintain or improve soil productivity. (36 CFR 219.27(a) (1), 219.27(a)(2), 219.27(b)(5), 219.27(f)). Forest Soil Quality Standards and Best Management Practices will be implemented.	**Best Management Practices** (BMPs) Implement BMPs to mitigate the environmental impacts of erosion, compaction, and soil displacement. Require special soil mitigation to use ground skidding equipment on slopes steeper than 35%. Require special soil mitigation to use ground skidding equipment on soils that erode, displace, or compact easily. Where actual or potential slope instability is identified, specific mitigating measures will be developed by an interdisciplinary team including a geologist.

[8] 1920-2, April 19, 2005; Corrected Errata - SNFPA 2004 ROD - TEPS Plant Survey Standard and Guideline

Visual Resources

Practices	General Direction	Standards and Guidelines
Visual Resource Inventory and Planning (17-A) **LMP 91**	Maintain current data files for: Visual Quality Objectives (VQOs), Visual Absorption Capability (VAC), and Existing Visual Condition (EVC). Provide visual resource recommendations to land managers and interdisciplinary team members who are assessing land altering projects with a VQO of Partial Retention or Retention.	Provide visual analysis using aerial photos, existing VAC maps, field analysis, computer perspective plots or simulations for projects with a VQO of Partial Retention or Retention. Predict future visual condition on a project basis.
Visual Quality Objectives (VQOs) (17-B) **LMP 91**	Manage areas to provide a characteristic natural appearing landscape commensurate with the description stated for each VQO practice. Resource management activities will be guided by the appropriate Landscape Management handbooks and Forest Landscape Architects' recommendations. VQOs are desired ratings outlined under the Forest Service system of Visual Resource Management. VQ0s apply Forestwide; every acre of National Forest land treated by this Forest Plan fits into one of the VQO classes listed below (No Maximum Modification):	Meet the adopted VQO for all landscape altering projects. VQOs will be compatible with the applicable ROS classes. Maintain visual quality by including mitigation measures for all activities that have the potential to alter the landscape beyond the adopted Visual Quality Objective. Specific facility and vegetative treatment within major highway view sheds will be guided by approved View shed Plans.
1. VQO Preservation	Allow ecological changes only, except for trails.	Design and locate trails, trail bridges, and other trail related improvements as unobtrusive as possible in the landscape.
2. VQO Retention	Provide a natural appearing landscape where changes are not readily evident.	**Foreground Distance Zone** Impacts of management activities in highly visible foreground areas will be reduced through special treatments. **Middleground and Background Zones** Visual diversity shall relate to the concept of a “natural appearing forested landscape” in a sequence and continuity of a view in the middleground or background. Special cutting may be applied.
3. VQO Partial Retention	Provide a natural appearing landscape where changes are evident but are subordinate to the surrounding characteristic landscape.	**Foreground Distance Zone** Where safe, maintain old-growth specimen character trees in the immediate foreground distance zone. Visual diversity shall relate to the concept of a “natural appearing forested landscape” in a sequence and continuity of a view in the foreground. Special cutting permitted. Impacts of management activities in highly visible foreground areas will be reduced through special treatments. **Middleground and Background Zones** Visual diversity shall relate to the concept of a “natural appearing forested landscape” in a sequence and continuity of a view in the middleground or background.
4. VQO Modification	Allow for modified conditions where changes are readily evident and may dominate the surrounding characteristic landscape.	

Water

Practices	General Direction	Standards and Guidelines
Water Quality Management (18-A) **LMP 91**	Comply with all applicable Federal and State water quality standards. Prevent or minimize as much as possible any water quality impacts which may be caused by Forest management activities. Achieve the goals for preventing or minimizing water pollution as stated in the Federal Clean Water Act. Implement water quality Best Management Practices (BMPs) as specified in the Management Agency Agreement with the California Water Resources Control Board for protection of non-point water pollution sources. Comply with applicable provisions of the Water Quality Control Plan (Basin Plan) of the California Central Valley Regional Water Control Board.	Implement water quality Best Management Practices (BMPs) as needed for all Forest management activities. BMPs are a system of nearly 100 practices designed to minimize or prevent water pollution from Forest management activities. They cover such activities as timber harvest, road construction, mining, recreation, fire management and grazing. Monitor the implementation and effectiveness of BMPs in selected areas to determine if they are being carried out and if they are accomplishing their objectives. Analyze cumulative watershed effects (CWE) on all applicable proposed Forest management activities to determine off-site effects on the beneficial uses of water.

Management Area Direction

Wilderness and Proposed Wilderness

Practices	General Direction	Standards and Guidelines
ROS Primitive (10-B-1) **LMP 91**	Provide for very low interaction between visitors with a range of primitive recreation experiences. Evidence of other users is minimal.	Manage to a ROS Class of Primitive. This is the adopted ROS level for management of all Wilderness. The ROS Class of Semi-Primitive Non-Motorized is an acceptable interim level for certain areas within Wilderness.
Closed Motor Vehicle Travel Management (10-G-1) **MVTM**	Closed to motorized use.	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to eliminate evidence of, and access by, unauthorized motorized use.
VQO Preservation (17-B-1) **LMP 91**	Allow ecological changes only. Trails, trail bridges, and other trail related improvements will be designed and located to be as obscure as possible.	Manage to the VQO of Preservation. This is adopted VQO level for all Wilderness.

Wild and Scenic Rivers and Proposed Wild and Scenic Rivers

Practices	General Direction	Standards and Guidelines
ROS Primitive (10-B-1) **LMP 91**	Provide for very low interaction between visitors with a range of primitive recreation experiences. Evidence of other users is minimal.	Manage to the ROS Class of Primitive. This is the adopted ROS level for all Wild Rivers within Wilderness.
ROS Semi-primitive Non-motorized (10-B-2) **LMP 91**	Provide for low interaction between visitors with a range of SPNM recreation experiences. Evidence of other users is unobtrusive.	Manage to the ROS Class of Semi-primitive Non-motorized. This is the adopted ROS level for all Wild Rivers outside of Wilderness and some Scenic or Recreational rivers.
ROS Semi-primitive Motorized (10-B-3) **LMP 91**	Provide for low to moderate interaction between visitors with a range of SPM recreation experiences. Evidence of other users is moderate.	Manage to the ROS Class of Semi-primitive Motorized. This is the level for some Scenic Rivers.
ROS Roaded Natural (10-B-4) **LMP 91**	Provide for moderate interaction between visitors with a range of roaded natural recreation experiences. Evidence of other users is moderate.	Manage to a ROS Class of Roaded Natural. This is the adopted ROS level for some Recreational Rivers and some Scenic Rivers.
Closed Motor Vehicle Travel Management (10-G-1) **MVTM**	Closed to motorized use.	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management. **Clark Fork** Headwaters - Wilderness

Practices	General Direction	Standards and Guidelines
		Clavey River Bell Creek (6 mile Wild portion) Lily Creek (9 mile Wild portion) 3N01 - Cottonwood Road (4 mile Wild portion) Cottonwood Road - Tuolumne (14 mile Wild portion) **Middle Fork Stanislaus** Kennedy Creek Clark Fork - Donnell Reservoir Sand Bar - North Fork Stanislaus **North Fork Mokelumne** Wilderness - Salt Springs Reservoir **North Fork Stanislaus** Highland Creek - Mckays (13 mile Wild portion) Mckays - Middle Fork Stanislaus **South Fork Tuolumne** **Stanislaus** **Tuolumne** Yosemite - Early Intake Cherry Creek - Lumsden Lumsden Area - Don Pedro Conduct surveys, observe conditions and carry out rehabilitation, as needed, to eliminate evidence of, and access by, unauthorized motorized use.
Restricted Motor Vehicle Travel Management (10-G-2) **MVTM**	Provide opportunities for motorized recreation compatible with Wild and Scenic River values as shown below.	Manage to Forestwide S&Gs for Restricted Motor Vehicle Travel Management. Use restrictions to protect Wild and Scenic River values. **Clark Fork** Wilderness - Middle Fork Stanislaus **Clavey River** Bell Creek (1 mile Scenic portion) Lily Creek (2 mile Scenic portion) Bell/Lily Confluence - 3N01 3N01 - Cottonwood Road (4 mile Scenic portion) Cottonwood Road - Tuolumne (2 mile Scenic portion) **Middle Fork Stanislaus** Deadman Creek Relief Reservoir - Clark Fork **North Fork Mokelumne** Highland Lake - Wilderness **North Fork Stanislaus** Highland Creek - Mckays (3 mile Recreational portion) **Merced** **Tuolumne** Early Intake - Cherry Creek Lumsden Area **Niagara Creek** Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize damage to Wild and Scenic River values caused by motorized use.
VQO Preservation (17-B-1) **LMP 91**	Provide a high quality visual setting where changes are unnoticed both within the Management Area and from the rivers.	Manage to a VQO of Preservation. This is the adopted VQO level for all Wild Rivers within Wilderness.

Practices	General Direction	Standards and Guidelines
VQO Retention (17-B-2) **LMP 91**	Provide a high quality visual setting where changes are not readily evident.	Manage to a VQO of Retention. This is the adopted VQO level for Wild, Scenic and Recreational Rivers which are outside of Wilderness. Portions of some Scenic and Recreational Rivers exist in a condition equal to Partial Retention. This is an acceptable interim level, which will be upgraded to Retention over time through natural process and/or rehabilitation.

Near Natural

Practices	General Direction	Standards and Guidelines
ROS Semi-primitive Non-motorized (10-B-2) **LMP 91**	Provide for low interaction between visitors with a range of SPNM recreation opportunities. Evidence of other use is unobtrusive.	Manage to ROS Class of SPNM.
Closed Motor Vehicle Travel Management (10-G-1) **MVTM**	Closed to motorized use.	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to eliminate evidence of, and access by, unauthorized motorized use.
VQO Retention (17-B-2) **LMP 91**	Provide a high quality visual setting where changes are not readily evident.	Manage to a VQO of Retention.

Wildlife

Practices	General Direction	Standards and Guidelines
ROS - Semi-primitive Motorized (SPM) (10-B-3) **LMP 91**	Provide for low to moderate levels of interactions between forest visitors with a range of Semi-primitive Motorized recreation experiences. Evidence of other use is moderate.	Manage to the ROS class of Semi-Primitive Motorized, consistent with wildlife values and implementation plans. This is the adopted ROS level for the Wildlife Management Areas.
ROS - Roaded Natural (RN) (10-B-4) **LMP 91**	Provide for moderate levels of inter- actions between Forest visitors with a range of roaded natural recreation experiences. Evidence of other use is moderate.	Manage to the ROS class of Roaded Natural, consistent with Wildlife values and implementation plans. This is the adopted ROS level for the Wildlife Management Areas where existing improvements represent the ROS Class of Roaded Natural.
Restricted Motor Vehicle Travel Management (10-G-2) **MVTM**	Provide opportunities for motorized recreation compatible with Wildlife values.	Manage to Forestwide S&Gs for Restricted Motor Vehicle Travel Management. Use restrictions to protect Wildlife values. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize damage to Wildlife values caused by motorized use.
VQO - Retention (17-B-2) **LMP 91**	Maintain the visual character of the VQO Retention for the pleasure of the viewing public. Design land and vegetation disturbing projects to meet Retention.	Manage to a VQO of Retention. Base size, shape and dispersion of harvest units, road construction, and other resource disturbance on meeting Retention.
VQO – Partial Retention (17-B-3) **LMP 91**	Design land and vegetation disturbing projects to meet Partial Retention, in middleground distance zones where this is the VQO.	Base size, shape, and dispersion of harvest units, road construction and other resource disturbances on meeting middleground Partial Retention.

Special Interest Areas

Practices	General Direction	Standards and Guidelines
ROS Primitive (10-B-1) ROS Semi-primitive Non-motorized (10-B-2) ROS Semi-primitive Motorized (10-B-3) ROS Roaded Natural (10-B-4) **LMP 91**	Maintain a range of recreation experiences, since classes vary between identified Special Interest Areas. Keep Recreation Opportunity Spectrum (ROS) levels at the adopted class.	Manage dispersed recreation in these areas to maintain or improve the adopted ROS classes, consistent with Special Interest Area values and implementation plans.
Closed Motor Vehicle Travel Management (10-G-1) **MVTM**	Closed to motorized use.	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management: ▪ Emigrant Road and Big Trees-Carson Valley Road Conduct surveys, observe conditions and carry out rehabilitation, as needed, to eliminate evidence of, and access by, unauthorized motorized use.
Restricted Motor Vehicle Travel Management (10-G-2) **MVTM**	Provide opportunities for motorized recreation compatible with SIA values.	Manage to Forestwide S&Gs for Restricted Motor Vehicle Travel Management. Use restrictions to protect SIA values: ▪ Column of the Giants ▪ Sonora Mono Toll Road ▪ Jordan Creek/Bower Cave ▪ Pacific Madrone ▪ Trumbull Peak ▪ Windelar Cave ▪ Bourland Trestle ▪ Bull Run ▪ Niagara Creek ▪ Jawbone Falls Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize damage to SIA values caused by motorized use.
VQO Preservation (17-B-1) **LMP 91**	Allow ecological changes only.	Manage to a VQO of Preservation. This is the adopted VQO level for Special Interest Areas within Wilderness.
VQO Retention (17-B-2) **LMP 91**	Maintain a near natural visual character. Provide a high quality visual setting where changes are not readily evident.	Manage to a VQO of Retention. This is the adopted VQO level for Special Interest Areas outside of Wilderness.

Research Natural Areas

Practices	General Direction	Standards and Guidelines
ROS Semi-primitive Non-motorized (10-B-2) **LMP 91**	Close RNAs to all mechanized use, except wheelchairs needed for barrier free access. Provide for low interaction between visitors with a range of SPNM recreation experiences. Evidence of other uses is unobtrusive.	Manage to ROS class of SPNM. This is the adopted ROS level for RNAs.
Closed Motor Vehicle Travel Management (10-G-1) **MVTM**	Closed to motorized use.	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to eliminate evidence of, and access by, unauthorized motorized use.
VQO Preservation (17-B-1) **LMP 91**	Allow only ecological changes.	Manage to a VQO of Preservation. This is adopted VQO level for RNAs.

Experimental Forest

Practices	General Direction	Standards and Guidelines
ROS Roaded Natural (10-B-4) **LMP 91**	Provide for low to moderate interaction between Forest visitors with a limited range of Roaded Natural recreation experiences. Evidence of other uses is moderate.	Manage to the ROS Class of Roaded Natural. This is the adopted ROS level for the Experimental Forest.
Restricted Motor Vehicle Travel Management (10-G-2) **MVTM**	Provide opportunities for motorized recreation compatible with Experimental Forest values.	Manage to Forestwide S&Gs for Restricted Motor Vehicle Travel Management. Use restrictions to protect Experimental Forest values. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize damage to Experimental Forest values caused by motorized use.
VQO Retention (17-B-2) VQO Partial Retention (17-B-3) **LMP 91**	Maintain a range of near natural through modified visual conditions, since the VQOs vary within an Experimental Forest. Keep VQOs at the adopted levels.	Manage to the adopted VQO level consistent with Experimental Forest values. Coordinate activities with PSW Forest and Range Experiment Station.

Scenic Corridor

Practices	General Direction	Standards and Guidelines
ROS - Roaded Natural (RN) (10-B-4) **LMP 91**	Provide for moderate interaction between visitors with a range of roaded natural recreation experience. Evidence of other use is moderate.	Manage to a ROS Class of Roaded Natural. This is the adopted ROS level for scenic corridors.
Restricted Motor Vehicle Travel Management (10-G-2) **MVTM**	Provide opportunities for motorized recreation compatible with Scenic Corridor values.	Manage to Forestwide S&Gs for Restricted Motor Vehicle Travel Management. Use restrictions to protect Scenic Corridor values. Conduct surveys, observe conditions and carry out rehabilitation, as needed, to mitigate and minimize damage to Scenic Corridor values caused by motorized use.
VQO - Retention (17-B-2) **LMP 91**	Maintain the visual character of Foreground Retention areas for the pleasure of the viewing public, where this is the VQO. Design land and vegetation disturbance projects to meet Retention, in Middleground distance zones where these is the VQO.	Manage to a VQO of Retention. Base size, shape, and dispersion of harvest units, road construction, and other resource disturbances on meeting Retention, where this is the adopted VQO.
VQO - Partial Retention (17-B-3) **LMP 91**	Design land and vegetation disturbance projects to meet Partial Retention, in Middleground distance zones where this is the VQO.	Base size, shape and dispersion of harvest units, road construction and other resource disturbances on meeting Partial Retention, where this is the adopted VQO.

General Forest (GF91)

Practices	General Direction	Standards and Guidelines
ROS Roaded Natural (RN) (10-B-4) **LMP 91**	Provide for moderate interaction between visitors with a range of Roaded Natural recreation experiences. Evidence of other use is moderate.	Manage to an ROS Class of Roaded Natural. This is the adopted ROS level for General Forest (GF91).
Restricted Motor Vehicle Travel Management (10-G-2) **MVTM**	Provide opportunities for motorized recreation compatible with General Forest (GF91) values.	Manage to Forestwide S&Gs for Restricted Motor Vehicle Travel Management. Use restrictions to protect General Forest (GF91) values.
VQO - Modification (M) (17-B-4) **LMP 91**	Management activities may visually dominate the surrounding characteristic landscape, but should borrow the form, line, color and texture of the natural surroundings.	Manage to a VQO of Modification. This is the adopted VQO level for General Forest (GF91).

Developed Recreation Sites

Practices	General Direction	Standards and Guidelines
ROS Roaded Natural (10-B-4) **LMP 91**	Provide for moderate interaction between forest visitors with a range of roaded natural recreation experiences. Evidence of other use is moderate. Retain site qualities that will not degrade future development opportunities on proposed sites.	Manage to the ROS Class of Roaded Natural. This is the adopted ROS level for developed recreation sites. Allow dispersed recreation on proposed sites in the interim and perform other multiple use activities that are compatible with preserving or improving site quality.
ROS Rural (10-B-5) **LMP 91**	Provide for moderate to high interaction between forest visitors with a range of rural recreation experiences. Evidence of other use is moderate to high	Manage to ROS Class of Rural. This is an acceptable level for certain developed sites. Administer facilities to accommodate large numbers of people for motorized use and parking.
Restricted Motor Vehicle Travel Management (10-G-2) **MVTM**	Provide opportunities for motorized recreation compatible with Developed Recreation Site values.	Manage to Forestwide S&Gs for Restricted Motor Vehicle Travel Management. Use restrictions to protect Developed Recreation Site values. Limit vehicle use to roads and parking areas. Allow administrative use of OHVs and OSVs in connection with operation of the sites. Allow non-street legal vehicle use for the purpose of accessing designated routes from staging areas.
VQO Partial Retention (17-B-3) **LMP 91**	Provide a natural appearing forest setting within the constraints of existing site character and its kind of use.	Manage to a VQO of Partial Retention. This is the adopted VQO for developed recreation sites. Maintain or construct recreation facilities and roads within the site in order to be as obscure as possible when viewed from within or immediately adjacent to the site. Plant and maintain the optimum amount of vegetation in order to keep a natural appearing setting that functionally and aesthetically satisfies visitors when viewed from within or immediately adjacent to the site.
VQO Modification (17-B-4) **LMP 91**		This is an acceptable VQO for certain developed sites, but preferably should be upgraded to Partial Retention where physical developments allow, by applying Partial Retention Standards and Guidelines to all areas of the developed site.

Winter Sports Sites

Practices	General Direction	Standards and Guidelines
ROS Roaded Natural (10-B-4) ROS Rural (10-B-5) **LMP 91**	Developed winter sports sites are so large and diverse that a range of ROS classes exist. Maintain recreation experience levels at the ROS class of Roaded Natural in outlying portions of the winter sports site.	Maintain lifts and other auxiliary facilities with the least impact on visitor experience. Use existing vehicle routes for permittee maintenance and administration.
Restricted Motor Vehicle Travel Management (10-G-2) **MVTM**	Provide opportunities for motorized recreation compatible with Winter Sports Site values.	Manage to Forestwide S&Gs for Restricted Motor Vehicle Travel Management. Use restrictions to protect Winter Sports Site values. Limit vehicle use to roads and parking areas. Allow administrative use of OHVs and OSVs in connection with operation of the sites.
VQO Partial Retention (17-B-3) **LMP 91**	Provide a natural appearing forest setting within the context of developed winter sports sites.	Through the master plan process, mitigate impacts to insure optimum visual quality after construction of facilities. Model expanded lifts, runs, and other improvements with potential impacts by computer graphic simulations and field checks. Prepare vegetative management plans for these sites. Manage to a VQO of Partial Retention. This is the adopted VQO level for developed winter sports sites.
VQO Modification (17-B-4) **LMP 91**		This is an acceptable VQO, but preferably should be upgraded to Partial Retention, where physical developments allow, by applying Partial Retention Standards and Guidelines to all areas of the winter sports sites.

Land Allocations (SNFPA)

Protected Activity Centers (PACs)

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.

Fisher and Marten Den Sites

Mitigate impacts where documented evidence of disturbance to the den 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 recreation and other developments for their potential to disturb dens.

Riparian Conservation Areas

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.

Maintain and restore the 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.

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 in 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.

Prior to activities that could adversely affect streams, determine if relevant stream characteristics are within the range of natural variability. If characteristics are outside 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.

Prevent disturbance to streambanks and natural lake and pond shorelines caused by resource activities (for example, 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 off-highway vehicle routes.

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.

D. Glossary

36 CFR 212	2005 Travel Management Rule which replaced CFR 295
36 CFR 261	Establishes prohibitions necessary to manage and control use on National Forest Development Trails.
36 CFR 293	Prohibits motorized use in Wilderness and Primitive Areas.
Adaptive Management	A system of management practices based on clearly identified intended outcomes and monitoring to determine if management actions are meeting those outcomes; and, if not, to facilitate management changes that will best ensure that those outcomes are met or re-evaluated. Adaptive management stems from the recognition that knowledge about natural resource systems is sometimes uncertain (36 CFR 220.3).
Administrative Unit	A National Forest, a National Grassland, a purchase unit, a land utilization project, Columbia River Gorge National Scenic Area, Land Between the Lakes, Lake Tahoe Basin Management Unit, Midewin National Tallgrass Prairie, or other comparable unit of the National Forest System.
Adopt-a-Trail	Trail maintenance program where individuals or group volunteer to adopt and maintain specific routes.
All Terrain Vehicle (ATV)	A type of off-highway vehicle that travels on three or more low pressure tires; has handle bar steering; is less than or equal to 50 inches in width; and has a seat designed to be straddled by the operator.
All Vehicles	All vehicle types are allowed to use the road or trail (36 CFR 212).
Alluvial	Pertaining to processes or materials associated with transportation or deposition by running water.
Anadromous Fish	Species of fish that mature in the sea and migrate into streams to spawn. Salmon is an example.
Andic	Specific physical and chemical properties of soils formed in volcanic materials.
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.
Aquatic	Growing or living in or frequenting water; taking place in or on water.
Aquatic Diversity Area	A watershed generally ranging from 13,000-600,000 acres selected for special consideration and management because of relatively good water quality, free-flowing character (without dams) and/or the presence of the best remaining populations of native fish and amphibians in the Sierra Nevada.
Aquatic Ecosystem	A stream channel, lake or estuary bed, the water itself, and the biotic (living) communities that occur therein.

Arc Macro Language (AML)	AML is an ARC/INFO computer programming language.
ARC/INFO	The name of a Geographic Information System software program.
Area	A discrete, specifically delineated space that is smaller, and in most cases much smaller, than a Ranger District.
Area of Potential Effects (APE)	This is the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.
Arterial Roads	Classified roads that provide service to large land areas; arterial roads are usually developed and operated for long-term land and resource management purposes and constant service.
Aspect	The direction a slope faces. For example, a hillside facing east has an eastern aspect.
Biological Diversity (Biodiversity)	The number and abundance of species found within a common environment. This includes the variety of genes, species, ecosystems, and the ecological processes that connect everything in a common environment.
Biota	The plant and animal life of a particular region.
Biotic Potential	Factors that influence the ability of an animal to utilize its environment, including: reproductive rates, dispersal ability, habitat and life requisite specificity, and adaptability. Combine, these factors assign biotic potential of the animal.
Blue Oak Woodlands	An ecosystem dominated by blue oak, valley oak, interior live oak (tree form), or Oregon white oak.
Buffer	Used in the context of GIS; a buffer is a zone of a specified distance around a feature in a coverage.
California Wildlife Habitat Relationships (CWHR)	A system of classifying vegetation in relation to its function as wildlife habitat. Tree-dominated habitat is classified according to tree size and canopy closure.
Canopy	The part of any stand of trees represented by the tree crowns. It usually refers to the uppermost layer of foliage, but it can be used to describe lower layers in a multi-storied forest.
Chief	The Chief, Forest Service, Department of Agriculture (36 CFR 212).
Classified Roads	Roads wholly or partially within or adjacent to National Forest System lands that are determined to be needed for motor vehicle access, such as State roads, County roads, privately owned roads, National Forest System roads, and roads authorized by the Forest Service that are intended for long-term use.
Code of Federal Regulations (CFR)	A codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government.
Collaboration	Managers, scientists and citizens working together to plan, implement

	and monitor National Forest management. The intention is to engage people who have information, knowledge, expertise and an interest in the health of National Forest ecosystems and nearby communities.
Collector Roads	Classified roads serving smaller land areas than arterial roads; collector roads collect traffic from local roads and usually connect to forest arterial roads or State and County highways. They are operated for either constant or intermittent service depending on land use and resource management objectives.
Connected Actions	Actions that: (i) automatically trigger other actions which may require environmental impact statements; (ii) cannot or will not proceed unless other actions are taken previously or simultaneously; or, (iii) are interdependent parts of a larger action and depend on the larger action for their justification. (40 CFR 1508.25)
Connectivity (of Habitats)	The linkage of similar but separated vegetation stands by patches, corridors, or "stepping stones" of like vegetation. This term can also refer to the degree to which similar habitats are linked.
Coverage	A digital map or layer of data in the ARC/INFO software program.
Council on Environmental Quality (CEQ)	The Council on Environmental Quality established by Title II of NEPA (40 CFR 1508.6).
Critical Aquatic Refuge (CAR)	A relatively small watershed, ranging in size from about 3,000 to 85,000 acres, that is sometimes nested within an emphasis watershed and has localized populations of rare and/or at-risk populations of native fish and/or amphibians.
Critical Habitat	Areas designated for the survival and recovery of federally listed threatened or endangered species.
Critical Refuge	A relatively small watershed, ranging in size from about 3,000 to 85,000 acres, that is sometimes nested within an emphasis watershed and has localized populations of rare and/or at-risk populations of native fish and/or amphibians.
Cryptogamic Soil Crusts (Microbiotic Soil Crusts)	Arid and semi-arid soil surface communities consisting of green algae, cyanobacteria, diatoms, non-lichenized fungi, lichens, bryophytes, bacteria, protozoans in various combinations. They stabilize soil surfaces, concentrate certain mineral and organic nutrients, alter water infiltration while consistently reducing sedimentation, and facilitating seed germination and seedling establishment.
Cumulative Impact	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 other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).
Decommission	Activities that result in the stabilization and restoration of unneeded roads or trails to a more natural state (FSM 7703.2(1)).
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, ADA, OSHA, 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.
Degradation	Reduction in quality. The process whereby the water quality and chemical, physical or biological integrity of a water body is decreased. Habitat quality can be changed by certain management activities. If the quality is reduced then habitat degradation has occurred.
Draft Environmental Impact Statement (DEIS)	A detailed written statement as required by section 102(2) (C) of the NEPA (40 CFR 1508.11) that is released to governmental agencies and the general public for review and comment.
Demographic Stochasticity	Random fluctuations in birth and death rates.
Designated Road, Trail or Area	A National Forest System road, trail or area that is designated for motor vehicle on a motor vehicle use map (36 CFR 212).
Desired Future Conditions	Land or resource conditions that are expected to result based on goals and objectives.
Digital Elevation Model (DEM)	A digital GIS file typically used to represent terrain relief.
Early Forest Succession	The biotic (or life) community that develops immediately following the removal or destruction of vegetation in an area. For example, grasses may be the first plants to grow in an area that was burned.
Ecology	The interrelationships of living things to one another and to their environment, or the study of these interrelationships.
Ecosystem	An arrangement of living and non-living things and the forces that move them. Living things include plants and animals. Non-living parts of ecosystems may be rocks and minerals. Weather and wildfire are two of the forces that act within ecosystems.
Endangered Species	Those plant or animal species that are in danger of extinction throughout all or a significant portion of their range. Endangered species are identified by the Secretary of the Interior in accordance with the Endangered Species Act of 1973.
Endemic	An organism that evolved in and is restricted to a particular locality. The Little Kern golden trout found only in the Sierra Nevada region is an example.
Environmental Justice	The state (or condition) which all populations are provided the opportunity to comment before decisions are rendered on, are allowed to share in the benefits of, are not excluded from, and are not affected in a disproportionately high and adverse manner by government programs and activities affecting human health or the environment.

Environmental Impact Statement (EIS)	A detailed written statement as required by section 102(2) (C) of NEPA (CFR 1508.11).
Environmentally Preferable Alternative	The alternative that will best promote the national environmental policy as expressed in NEPA section 101 (42 USC 4321). Ordinarily, the environmentally preferable alternative is that which causes the least harm to the biological and physical environment; it also is the alternative which best protects and preserves historic, cultural, and natural resources. In some situations, there may be more than one environmentally preferable alternative (36 CFR 220.3).
Environmental Stochasticity	Random variation in environmental attributes such as temperature, precipitation, and fire frequency.
Ephemeral Stream	Streams that flow only as the direct result of rainfall or snowmelt. They have no permanent flow.
Equivalent Roaded Acres	A standardized unit of measure for land disturbance. A road prism is considered the reference to which other types of land disturbing activities are measured. A road is given an ERA coefficient of 1.0 (1 acre of road is equal to 1.0 ERA). Other disturbances such as logging, site preparation and wildfires are equated to a road surface by ERA coefficients that reflect their relative level of contribution to changes in runoff and sediment regimes in the watershed.
Escarpment	A long, more or less continuous cliff or relatively steep slope produced by erosion or by faulting.
Executive Order 11644	Directs federal agencies to establish policies and provide for procedures that will ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands.
Fauna	The animal life of an area.
Flora	The plant life of an area.
Focal Species	A species of concern.
Forest Road or Trail	A road or trail wholly or partly within or adjacent to and serving the National Forest system that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources (36 CFR 212).
Forest Transportation Atlas	A display of the system of roads, trails, and airfields of an administrative unit.
Forest Transportation Facility	A forest road or trail or an airfield that is displayed in a forest transportation atlas, including bridges, culverts, parking lots, marine access facilities, safety devices, and other improvements appurtenant to the forest transportation system (36 CFR 212).
Forest Transportation System	The system of National Forest System roads, National Forest System trails, and airfields on National Forest System lands (36 CFR 212).
Fuelbreak	A system of linear or mosaic patch treatments of forest or shrub vegetation designed and treated to reduce fire spread, intensity, and

	create barriers to fire spread.
Fuels	Plants and woody vegetation, living and dead that are capable of burning.
Fuels Management	The planned manipulation and/or reduction of living and dead forest fuels for forest management and other land use objectives.
Fuels Treatment	The treatment of fuels that left untreated would otherwise interfere with effective fire management or control. For example, prescribed fire can reduce the amount of fuels that accumulate on the forest floor.
Fuelwood	Wood cut into short lengths for burning in a fireplace, woodstove or fire pit.
Functional Classification	The grouping of roads by the character of service they provide (American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, 2001).
Geographic Information Systems (GIS)	A computer system capable of storing, manipulating, analyzing, and displaying geographic information.
Green Sticker Vehicle (non-highway legal)	A motor vehicle built since 2003 that is in compliance with the 1998 California Air Resources Board off highway vehicle exhaust pursuant to California Vehicle Code Book Division 16.5 prior to 2003 and also registered pursuant to California Section 38160. Currently, the registration identification for California comes in the form of a green sticker. These driven cycles, sand buggies, dune buggies, all terrain vehicles (ATV), or any motor vehicle commonly referred to as a jeep or four wheel drive (4WD).
Habitat	The area where a plant or animal lives and grows under natural conditions.
Herbaceous	A plant having little or no woody tissue.
Heritage Program	The comprehensive Forest Service program of responsibilities with regard to historic preservation. A pro-active program to manage prehistoric and historic cultural resources and cultural traditions for the benefit of the public through preservation, public use, and research.
Highway	Highway is a way or a place of whatever nature publicly maintained and open to the use of the public for purposes of vehicular travel (CA Vehicle Code Section 360). However, the 38000 Division of the California Vehicle Code (the Off Highway Motor Vehicle section) states that for purposes of this division (38000) the term “highway” does not include fire trails, logging roads, service roads regardless of surface composition, or other roughly graded trails and roads upon which vehicular travel by the public is permitted (CA Vehicle Code 38001).
Highway Legal Only	Full width roads open to highway legal vehicles only.
Highway Licensed Vehicle (street legal vehicle)	Any motor vehicle that is licensed or certified under California State law for general operations on all public roads within the State. Operators of all highway legal vehicles are subject to State traffic laws, including requirements for operator licensing,

Hydrologically Connected Segment (HCS)	Locations near water where drainage off a route is likely to enter a watercourse
Hydrologically Sensitive Area (HSA)	see Riparian Conservation Area
Image	A graphic representation of a person or thing, typically produced by an electronic device. Common examples include remotely sensed data and photographs.
Indigenous	Any species of plant or animals native to a given land or water area by natural occurrence.
Interdisciplinary Team	A diverse group of professional resource specialists who analyze the effects of Alternatives on natural and other resources. Through interaction, participants bring different points of view and a broader range of expertise.
Intermittent Stream	A stream that flows only at certain times of the year when it receives water from streams or from some surface, such as melting snow.
Irretrievable	A term that applies to the loss of production, harvest, or use of natural resources. For example, some or all of the timber production from an area is lost irretrievably while an area is serving as a winter sports site. The production lost is irretrievable, but the action is not irreversible. If the use changes, it is possible to resume timber production.
Irreversible	A term that describes the loss of future options. Applies primarily to the effects of use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity that are renewable only over long periods of time
Juvenile Return Rates	Rate at which juvenile birds return to the nesting grounds. Generally reported as percentage of migratory juvenile birds returning to the nesting grounds, after wintering elsewhere (e.g., tropics), from total number of hatched birds marked with leg bands in the previous year. Juvenile return rates may indirectly indicate ability of young birds to survive migration.
Lahars	Landslide or mudflow material of pyroclastic (hot ash or tephra) on the flank of a volcano or the deposit formed by such a landslide or mudflow.
Landscape	A large land area composed of interacting ecosystems that are repeated due to factors such as geology, soils, climate, and human impacts.
Late Forest Succession	The stage of forest succession in which most of the trees are mature or over mature.
Long-Term Risk	A risk to be experienced within the next 50 to 100 years.
Maintained for Public Use	A Memorandum of Understanding with the Federal Highway Administration defines National Forest system roads open to the public as those roads open to unrestricted use by the general public in standard passenger cars, including those roads open on a seasonal basis or for emergencies.
Maintenance	The upkeep of the entire forest 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 (36 CFR 212).
Management Action	Any activity undertaken as part of the administration of the National Forest.
Meadow	Areas of moist low lying and usually level grasslands. Generally, the water table is just below the surface of the soil and the most abundant vegetation is usually favored by wet but not constantly flooded soil.
Mesic	Moderately moist climates or environments. Vegetation: generally refers to vegetation found in moist environments. Soils: refers specifically to soils with mean annual temperatures of 8 to 15 degrees centigrade.
Mitigation	Avoiding the impact altogether by not taking a certain action or parts of an action. Minimizing impacts by limiting the degree or magnitude of the action and its implementation. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action. Compensating for the impact by replacing or providing substitute resources or environments.
Mixed Use	Designation of an NFS high-clearance road for use by both highway-legal and non-highway legal motor vehicles on Maintenance Level 2 roads.
Montane Hardwood Forests	For the purposes of this analysis, it refers to vegetation communities dominated by California black oak, canyon live oak, Pacific madrone, or tanoak.
Mosaic	Areas with a variety of plant communities over a landscape. For example, areas with trees and areas without trees occurring over a landscape.
Motor Vehicle	Any vehicle which is self propelled, other than: (1) a vehicle operated on rails; and (2) any wheelchair or mobility device, including one that is battery-operated, that is designed solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area (36 CFR 212).
Motor Vehicle Use Map	A map reflecting designated roads, trails and areas on an administrative unit or a Ranger District of the National Forest system (36 CFR 212).
Multiple Use	The management of all the various renewable surface resources of the National Forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources; and harmonious and coordinated management of the

	various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output. (Multiple-Use Sustained-Yield Act; Public Law 86–517)
National Environmental Policy Act (NEPA)	Codifies the national policy of encouraging harmony between humans and the environment by promoting efforts to prevent or eliminate damage to the environment, thereby enriching our understanding of ecological systems and natural resources. It declares the federal government to be responsible for: (a) coordinating programs and plans regarding environmental protection; (b) using an interdisciplinary approach to decision-making; (c) developing methods to ensure that non-quantifiable amenity values are included economic analyses; and (d) including in every recommendation, report on proposals for legislation, or other major federal actions significantly affecting the quality of the environment a detailed environmental impact statement (EIS).
National Forest System	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 U.S.C. 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 (36 CFR 212).
National Forest System Route	Roads and trails constructed with engineering design by Forest Service experts and with consideration of resource impacts classified as National Forest System roads or trails.
National Forest System 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 authority (36 CFR 212).
National Forest System 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 authority (36 CFR 212).
Natural Resource	A feature of the natural environment that is of value in serving human needs.
Natural Succession	The natural replacement, in time, of one plant community with another. Conditions of the prior plant community (or successional stage) create conditions that are favorable for the establishment of the next stage.
Nitrogen oxides (NOx)	A general term pertaining to compounds of nitric oxide (NO) nitrogen dioxide (NO2) and other oxides of nitrogen. Nitrogen oxides are typically created during combustion processes and are major contributors to smog formation and acid deposition.
Noxious Weeds	Aggressive, non-native plant species that have been introduced. They can be difficult to manage, poisonous, toxic, parasitic, or carrier of insects or disease. Examples of noxious weeds would be scotch broom, yellow star thistle, and cheatgrass.

Off Highway Vehicle (OHV)	Any motor vehicle designed for or capable of cross country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain (36 CFR 212).
OHV Recreation	Recreation activities that are conducted, using off high vehicles. Activities include riding ATVs, hunting, riding motorcycles, driving for pleasure, rock crawling (36 CFR 212).
Old Forest (Old Growth)	Areas that contain large, old trees relative to the species-specific, environmentally-constrained growth capacity of the site.
Open to Public Travel	Except during scheduled periods, extreme weather conditions, or emergencies, open to the general public for use with a standard passenger auto, without restrictive gates or prohibitive signs or regulations, other than for general traffic control or restrictions based on size, weight, or class of registration (23 CFR 660.103).
Over Snow Vehicle (OSV)	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 (36 CFR 212).
Paleoecological	The study of ancient or prehistoric ecosystems.
Patch	An area of vegetation, similar in structure and composition.
Perennial Stream	A stream that typically has running water on a year-round basis.
Polygon	Used in a GIS to represent an area, a polygon is a digital feature class defined by arcs, or lines, that make up its boundary. A polygon would be used to represent areas such as lakes and land parcels on a map.
Preferred Alternative	The alternative(s) which the Agency believes would best fulfill the purpose and need for the proposal, consistent with the Agency's statutory mission and responsibilities, giving consideration to environmental, social, economic, and other factors and disclosed in an EIS.
Prescribed Fire or Burn	A type of fuel treatment whereby fire is intentionally set in wildland fuels under prescribed conditions and circumstances.
Proposed Action	A proposal made by the Forest Service to authorize, recommend, or implement an action to meet a specific purpose and need.
Protected Activity Centers (PACs)	Designated areas that are afforded protection to specific species by restricting certain management activities. For example, California spotted owl PACs protect owl habitat and breeding areas by restricting timber harvest.
Public Involvement	The use of appropriate procedures to: inform the public, obtain early and continuing public participation, and consider the views of interested parties in planning and decision-making.
Public Land	Land for which title and control rests with a government – Federal, state, regional, county, or municipal.
Public Road	Roads under the jurisdiction of and maintained by a public authority that are open to public travel (23 U.S.C 101(a)).
Quiet Recreation	Recreation activities which are non-motorized and require human power. Examples include hiking, bicycling, wildlife viewing, swimming,

	snow shoeing, and cross-country skiing. The area in which the recreationists participate is relatively free of human intrusion. Natural sounds can be heard easily.
Reactive Organic Gas (ROG)	A photochemically reactive chemical gas composed of non-methane hydrocarbons that may contribute to the formation of SMOG; volatile organic compounds.
Reasonably Foreseeable Future Actions	Those Federal or non-Federal activities not yet undertaken, for which there are existing decisions, funding, or identified proposals. Identified proposals for Forest Service actions are described in 220.4(a) (1) (36 CFR 220.3).
Record of Decision (ROD)	A concise public record of the responsible official's decision to implement an action when an environmental impact statement (EIS) has been prepared.
Remote Sensing	Acquiring information about a geographic feature without contacting it physically. Methods include aerial photography and satellite imaging.
Resilience	The ability of an ecosystem to maintain diversity, integrity, and ecological processes following a disturbance.
Responsible Official	The Agency employee who has the authority to make and implement a decision on a proposed action (36 CFR 220.3).
Riparian Area	The area along a watercourse or around a lake or pond.
Riparian Conservation Area (RCA)	Identified areas within a certain distance from streams, special aquatic features or riparian vegetation. RCA width and protection measures are determined through project level analysis.
Riparian Ecosystem	The ecosystem around or next to water areas that support unique vegetation and animal communities as a result of the influence of water.
Road	A motor vehicle route over 50 inches wide, unless identified and managed as a trail (36 CFR 212).
Road Construction or Reconstruction	Supervising, inspecting, actual building and incurrence of all costs incidental to the construction or reconstruction of a road.
Road Improvement	Activities that result in an increase of an existing road's traffic service level, expand its capacity, or change its original design function.
Road Management Objective (RMO)	RMOs establish the appropriate vehicle classes and uses for each road segment (36 CFR 212).
Obliteration	A form of decommissioning that re-contours and restores natural slopes.
Road Realignment	Activities that result in a new location for an existing road or portions of an existing road, including treatment of the old roadway.
Road Reconstruction	Activities that result in road realignment or road improvement, as defined below:
Roadless Areas	For the purposes of this EIS, a generic term that includes inventoried roadless areas.
Route	A road or trail.

Satellite Image	A picture of the earth taken from a satellite in orbit around the earth.
Schedule of Proposed Actions (SOPA)	A Forest Service document that informs the public about those proposed and ongoing Forest Service actions for which a record of decision, decision notice or decision memo would be or has been prepared. The SOPA also identifies a contact for additional information on any proposed actions (36 CFR 220.3).
Scope	The range of actions, alternatives and impacts to be considered in an environmental impact statement (40 CFR 1508.25).
Scoping	An early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action (40 CFR 1501.7).
Sensitive Species	Plant or animal species which are susceptible to habitat changes or impacts from activities. The official designation is made by the USDA Forest Service at the regional level and is not part of the designation of threatened or endangered species made by the U.S. Fish And Wildlife Service.
Seral Stage	The stage of succession of a plant or animal community that is transitional. If left alone, the seral stage will give way to another plant or animal community that represents a further stage of succession.
Shared Use	Motorized and non-motorized recreationists share the same trails.
Short-Term Risk	A risk to be experienced within the next 10 to 15 years. For example, prescribed burns can disturb habitat in the short-term, but in the long-term the fire resiliency of the habitat may be improved.
Silvicultural System	The cultivation of forests; the result is a forest of a distinct form. Silvicultural systems are classified according to harvest and regeneration methods and the type of forest that results.
Silviculture	The art and science that promotes the growth of single trees and the forest as a biological unit.
SMOG	A combination of smoke and other particulates, ozone, hydrocarbons, nitrogen oxides and other chemically reactive compounds which under certain conditions of weather and sunlight may result in a murky brown haze. The primary source of smog in California is motor vehicles.
Snag	A standing dead tree. Snags are important as habitat for a variety of wildlife species and their prey.
Spatial Data	A GIS contains spatial data. The spatial data represents geographic features associated with real-world locations.
Species	A class of individuals having common attributes and designated by a common name; a category of biological classification ranking immediately below the genus or subgenus; comprising related organisms or populations potentially capable of interbreeding.
Stand	A group of trees that occupies a specific area and is similar in species, age and condition.
Standards and Guidelines (S&Gs)	The primary instructions for land managers. Standards address mandatory actions, while guidelines are recommended actions necessary to a land management decision.

Stand-Replacing Fire	A fire that burns with sufficient intensity to kill the majority of living vegetation over a given area (grass and brush fires are stand replacement fires for that vegetation type, in forest vegetation types when 75- 80% of the stand is killed by fire are also considered stand replacement fires).
Stewardship	Caring for the land and its resources in order to pass healthy ecosystems on to future generations.
Suitability	The appropriateness of certain resource management to an area of land. Suitability can be determined by environmental and economic analysis of management practices.
Sulfur Oxides (SOx)	Pungent colorless gases formed primarily by the combustion of sulfur containing fossil fuels, especially coal and oil. Considered a major air pollutant.
Sustainability	The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time.
Sustainable	The yield of a natural resource that can be produced continually at a given intensity of management is said to be sustainable. Recreation activities are sustainable if the human activity does not reduce ecologic sustainability.
Taxa	The name applied to any one group or entity in the scientific classification system.
Temporary Road or Trail	A road or trail necessary for emergency operations or authorized by contract, permit, lease or other written authorization that is not a forest road or trail and that is not included in a forest transportation atlas.
Thermic	A soil with a mean annual soil temperature of greater than or equal to 15 degrees centigrade, but less than 22 degrees centigrade and a difference between the mean summer and winter soil temperatures of greater than 5 degrees centigrade measured at 50 cm below the surface.
Threatened Species	Those plant or animal species likely to become endangered throughout all or a specific portion of their range within the foreseeable future as designated by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973.
Total Organic Gases (TOG)	Gaseous organic compounds including relative organic gases and the relatively unreactive organic gases such as methane.
Traffic Management Strategies	These strategies are: encourage, accept, discourage, eliminate, and prohibit. The ‘encourage’ strategy directs forest visitors to important destinations via desirable routes. The discourage strategy informs potential users of road conditions that may detract from the experience they seek when visiting a National Forest. The ‘eliminate’ and prohibit strategies are used to close roads with physical barriers or regulatory signs and orders (FSH 7709.59-25.31).
Trail	A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail (36 CFR 212).
Trail Management Objective (TMO)	TMOs establish the appropriate vehicle classes and uses for each trail segment (36 CFR 212).

Trail Vehicle	Vehicles designated for trail use, such as bicycles, snowmobiles, trail bikes, trail scooters, and all terrain vehicles (FSM 2353.05).
Travel Management Atlas	An atlas that consists of a forest transportation atlas and a motor vehicle use map or maps.
Unauthorized Road	A road that is not a NFTS road or a temporary road. It is not included in a forest transportation atlas.
Unauthorized Trail	A trail that is not a NFTS trail. It is not included in a forest transportation atlas.
Understory	The trees and woody shrubs growing beneath branches and foliage formed collectively by the upper portions of adjacent trees.
Unroaded Area	Any area, without the presence of a classified road, of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition. Unroaded areas do not overlap with inventoried roadless areas.
Visual Quality	The forest visual resources; terrain, geological features, or vegetation.
Watershed	The entire region drained by a waterway, lake, or reservoir. More specifically, a watershed is an area of land above a given point on a stream that contributes water to the streamflows at that point.
Wetlands	Areas that are inundated by surface or ground water with a frequency sufficient to support (and that under normal circumstances do or would support) a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.
Wheeled Over Snow Routes	Specific routes identified as an exception to the normal season of use restrictions allowing for over snow travel by ATVs when 12 inches or more of snow is present; these routes are dual designated as Snow Trails.
Wilderness and Wild and Scenic River	Wilderness and Wild and Scenic Rivers are Congressionally mandated areas withdrawn from location and entry under the US mining laws.
Wildland	An area in which development is essentially non-existent, except for roads, railroads, powerlines and similar transportation facilities.
Xeric	A soil moisture regime common to Mediterranean climates that have moist cool winters and warm dry summers. A limited amount of water is present but does not occur at optimum periods for plant growth.

E. Law Enforcement

Forest Service Law Enforcement and Investigations (LEI) personnel are responsible for protecting the public, employees, natural resources, and other property under the agency's jurisdiction. Additionally, LEI investigates and enforces applicable laws and regulations that affect the National Forest System (NFS) lands, and prevents criminal violations. The new Travel Management Rule (TMR) is one such regulation.

Subpart B 212.51 of the TMR requires designation of roads, trails, and areas open to motor vehicle use, and the prohibition of cross-country wheeled motorized vehicle travel by the public. In addition, this section of the rule requires identifying season of use and type of vehicle use. This is a considerable change in public motorized access management from previous conditions where most Forests were managed as "open to cross-country travel." The implementation of designated routes and areas for motorized vehicles will be the responsibility of all agency employees, especially in the area of education and enforcement. The law enforcement program is primarily responsible for issuing violations to enforce Subpart B 212.51 of the rule.

The national LEI budget is funded by appropriated dollars from Congress to provide law enforcement services on the NFS lands. The Travel Management program is one of many Forest programs to benefit from federal law enforcement funding. For the past few years, law enforcement funding increased and that translated into an increase in field law enforcement personnel[9]. Stanislaus patrol staffing has recently increased from three officers to five officers. LEI staff work in co-operation with National Forest line officers to accomplish their resource management objectives, yet LEI is administratively separated to maintain legal and investigatory independence.

To enhance enforcement of CFR 212.51, Region 5 Forest Recreation Programs applied for and received grant dollars (green sticker funding) from the State of California Off-Highway Motor Vehicle Recreation Division Grants Program. These State funds are earmarked specifically for enforcement of off-highway vehicle laws and regulations on the various Forests, and are performed primarily by Forest Protection Officers (FPOs). In addition, Law Enforcement Officers (LEOs) support the FPOs as needed, especially if serious violations occurred. In recent years, State law enforcement grants ranged from 3-4 million dollars annually with similar funding anticipated for the 2008-2009 grant cycle. In the past three years, the Stanislaus NF has received a total of $436,000 for OHV and OSV law enforcement from the State of California.

Authority and Jurisdiction

The Forest Service exercises its law enforcement authority when violation of laws or regulations occurs on NFS lands or when incidents affect the NFS. The existing authorities for enforcement are completely adequate and no new laws will be needed to enforce CFR 212.51.

Every National Forest annually updates a law enforcement plan. All Forest Service employees have a duty to know and understand their authorities and responsibilities, and to properly enforce laws and regulations relating to the Forest within their authority and capability. LEI and agency personnel provide a regular and recurring presence on vast amounts of public land, roads, trails, and areas taking appropriate action if illegal activity is discovered. Violations involving motorized vehicles are primarily enforced FPOs, which patrol off-highway use roads, trails, and areas. These include violations such as operating a motor vehicle in violation of federal regulations and California Vehicle Code (CVC), parking improperly, resource damage to soils, vegetation or wildlife, and disorderly or

[9] Region 5 Law Enforcement budget figures increased for the past 4 years and the number of law enforcement officers increased by 65.

unruly behavior. LEOs use discretion when deciding what type of action to initiate when handling violations to the following federal laws that pertain specifically to motor vehicle use.

- The Act of June 4, 1897 (Title 16 United States Code 551) is the authority for issuing regulations at Title 36 Code of Federal Regulations, Part 261 (36 CFR 261). Specific OHV travel management regulations are in sections 261.9 – Property, 261.13 –Motor Vehicle Use, and 261.15 Use of Vehicles Off-Road. These CFRs cover a wide array of misdemeanor infractions.
- The Act of March 3, 1905 (Title 16 United States Code 559) authorizes all employees of the Forest Service to make arrests for violation of the laws and regulations pertaining to National Forests. Normally, arrest authority is limited to trained law enforcement personnel. (Any employee may take immediate action when necessary to protect life and prevent serious damage to or destruction of property, escape of a suspect, or loss of material evidence when such action can be done with reasonable safety.)

The legal foundation for enforcement on the Stanislaus National Forest was established by Congress as “proprietary jurisdiction”. This term means that the Federal Government has acquired some degree of right or title to an area in a State, but has not obtained any measure of the State’s authority over the area. The legal scope of the Forest Service is limited to laws established for that property, or National Forest. However, enforcement agencies with State authority in California retain their full legal authority on the Stanislaus Forest. Notably, for enforcement of violations committed by motor vehicle operators, the California Highway Patrol and the four county Sheriffs have separate authority and jurisdiction to enforce OHV laws under the California Vehicle Code.

In November of 2008, the Regional Forester signed a new regional order that allows Forest Service officers to enforce the OHV section (CVC 38000) of the California Vehicle Code on National Forest Roads.

Cooperation

The Forest Service shares responsibility and cooperates with local, State, and other Federal agencies in the execution of its law enforcement program. The authority for cooperation among agencies, especially as it pertains to CFR 212.51, is within the following laws:

- The Act of August 10, 1971 (Title 16 United States Code 551a) authorizes the Secretary of Agriculture to cooperate with, and provide reimbursement to, any State or political subdivision thereof, for the enforcement of their laws within NFS. This law does not deprive any State or local law enforcement agency from exercising its criminal and civil jurisdiction on lands that are part of the NFS.
- The California Penal Code, Section 830.8 provides that Forest Service law enforcement personnel may exercise State Peace Officer authority where the sheriff of the county wherein the officer works provided specific written permission for the officer.
- The CVC, Section 38301 allows State law enforcement officer to enforce any of the Federal CFRs related to motor vehicles on NFS lands.[10]

Each Forest maintains close working relationships with many State and local law enforcement agencies with law enforcement responsibilities in or adjacent to the Forest boundary. Significant cooperating agencies relative to enforcing CFR 212.51 include the local county sheriff departments, the California Department of Fish and Game, California Highway Patrol, California Department of Forestry and Fire Protection, and occasionally one or more Federal agencies depending on the

[10] CVC Section 38301. (a) It is unlawful to operate a vehicle in violation of special regulations which have been promulgated by the governmental agency having jurisdiction over public lands, including, but not limited to, regulations governing access, routes of travel, plants, wildlife habitat, water resources and historical sites.

violation. Forest Service law enforcement personnel cooperate fully with these agencies in carrying out their law enforcement responsibilities by providing assistance; liaison, advice, and information.

Forests maintain Cooperative Law Enforcement Agreements with their respective county sheriff's office. In Region 5, the total cost for the 2008 Cooperative Law Enforcement Agreements is \$891,397.[11] These dollars are for performance of duties in addition to the normal activities in which the sheriff's deputies handle crimes against persons and their property that may occur within the NFS boundary. In these agreements, both parties recognize that public use of NFS lands is usually located in areas that are remote or sparsely populated and the enforcement of State and local law is related to the administration and regulation of NFS lands. Within the Cooperative Law Enforcement Agreements, an Operating Plan is developed outlining the supplemental work to be performed by the cooperating agency. Operating plans may provide:

- Supplemental patrols in areas of high use.
- Supplemental patrols on weekends or during particular months of high use.
- Additional officers for large group gatherings or events (enduros)
- Vehicle checkpoints for vehicle registration spark arrestors, and other miscellaneous items.

Implementation and Tracking

Implementation of the Forest Service law enforcement program is continually adapting as law enforcement personnel assess the changing patterns of visitor use and attitudes, and the trends in violations, especially for property and resource damage. One method of assessment is the analysis of Law Enforcement and Investigations Management Attainment Reporting System (LEIMARS) data. LEIMARS tracks all known violations of criminal law or regulation on NFS lands (FSH 5309.11, chapter 40 and FSM 5340). Additionally, imbedded in LEIMARS is the Case Tracking System, which tracks all felony and serious misdemeanor cases. These tracking systems:

- Capture and record information on location, volume, damages, and type of violations occurring on NFS lands.
- Provide a retrieval system of data on incidents and violations that is responsive to the needs of all organizational levels.
- Provide agency managers with a means to identify and monitor law enforcement activities.
- Specifically identify problem areas and periods of activity.
- Provide a method to record and analyze incidents involving violations or suspected violations on NFS lands.

Trends in violations can be analyzed and appropriate action(s) taken, if needed. Appropriate action(s) may involve one or more techniques or adaptive strategies. In the law enforcement community, this is often referred to as the "three E strategy" of engineering, education, and enforcement. With the changes to how the public accesses and travels on NFS lands, it is anticipated that the law enforcement program will use a combination of strategies, especially during the first five years of implementation of the MVUM.

[11] Region 5 Law Enforcement Cooperative Agreement 2008 spreadsheet.

Implementation Strategy

Engineering - Education - Enforcement

The Engineering strategy is designed to prevent or reduce inadvertent violations, resource damage, and crime vulnerability. The strategy's goal is to remove the opportunity to commit a violation. LEI personnel work with each Forest, particularly the recreation and engineering programs, to implement some or all of the following specific tactics:

- Proper design of improvements and facilities.
- Facility security measures such as installation of barricades, gates, and other natural obstacles.
- Forest signing, both directional and informational, to assist the public to ensure they stay on designated trails, and out of the wilderness and other sensitive areas.
- Physically close and rehabilitate decommissioned roads and trails.

The Educational strategy focuses on specific user groups, school groups, recreation users, and the public. The goal is to develop responsible and concerned public land use attitudes in forest users; it's violation prevention. Forest LEOs and FPOs make regular contacts in the field informing the users of the regulations and need for the prohibition. The LEI personnel work with each Forest, particularly the recreation and public information programs, to identify and implement some or all of the following specific tactics.

- Motor vehicle use maps (MVUMs) are easily available to public.
- Post route markers and signs.
- Distribute maps and brochures promoting responsible use.
- Conduct environmental interpretation activities in local communities, at schools, and with special interest groups.
- Use of all forms of the media (television, radio, and newspapers), especially prior to, and during, the high use periods.
- Ensure all employees understand the Travel Management Rule.
- Utilize high visibility prevention patrols and public information checkpoints, especially during the peak use periods.
- Encourage cooperating law enforcement agencies to make visitor contacts and provide violator information to Forest Officers.
- Ride with other agency officers to demonstrate solidarity to the public.
- Issue news releases of arrests and successful prosecutions, including offender names, criminal penalties, and court ordered restitution.

The Enforcement strategy is to affect crime prevention measures that are designed to reduce specific criminal activity, deter potential and repeat offenders, maximize enforcement actions and visibility, and increase prosecutorial successes. All enforcement actions should result in a better understanding of regulations pertaining to the management of NFS lands. LEI personnel work with each Forest, to identify and implement some or all of the following specific tactics:

- Schedule officers to work during the identified problem periods, including holidays and weekends.
- Utilize high profile "saturation patrols" and stationary surveillance posts in the identified problem areas.

- Utilize the most effective and efficient means of patrol, including foot, horseback, all-terrain vehicle, snowmobile, watercraft, and aircraft.
- Aerial over-flights to enforce restriction under CFR 212.51.
- Enlist the aid of volunteers.
- Initiate an awards program.
- Supplement patrols with cooperating law enforcement agencies in areas of concern.
- Use technical investigative equipment (cameras, monitors, sensors) to assist officers with detecting and monitoring violations at known or suspected violation sites.
- Conduct planned and approved compliance checkpoints.
- Follow-up on complaints to document violations, damages, and identify suspect vehicles or persons.
- Require cooperating law enforcement agencies to assist with reporting and/or enforcing violations within their authority.
- Patrol with other cooperating law enforcement agency officers.
- Conduct unpredictable patrol schedules.
- Conduct special enforcement actions (unmarked vehicle deployment, surveillance, traffic check-points).
- Utilize LEIMARS and Central Violations Bureau databases along with the State motor vehicle data, to identify repeat offenders for enhanced prosecution.
- Pursue court ordered restitution or civil collections for resource and property damages.
- Encourage prosecutorial and judicial support.
- Execute bench warrants related of off-highway vehicle violations.

Assumptions

Based on many years of enforcing off-highway vehicles, implementing change in access and enforcement of CFR 212.51, from a law enforcement perspective, assumes the following to be true. Additionally, these assumptions are based on several case studies in R5 (see Case Example below). These assumptions may change in time with analysis of the LEIMARS database.

Enforcement Assumptions

- Enforcement of the laws and regulations related to CFR 212.51are 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 CFR 212.51 in the first couple of years and the number of violations will decline as the users understand and comply with the rules.
- Users in communities adjacent to the Forest will comply within 1-2 years.
- Frequent users but further in distant from the Forest will comply within 2-3 years.
- Infrequent users regardless of distant may take up to 5 years to comply.
- Law enforcement officer and agency personnel’s presence and enforcement actions will positively affect OHV users’ behaviors and attitudes.

- The MVUM clearly defines the designated routes, season of use, and type of use; therefore, making violations unequivocal.
- Once the MVUM is published, the designated network of roads and trails with signs, and user education programs, will reduce the number of violations.
- FPOs spend a large percentage of their time on Travel Management issues, and depending on the Forest the estimate range from 30 to 50 percent. LEOs spend approximately 10-20% of their time on enforcement of off-highway vehicle issues.[12]

Agency Funding Assumptions

- Appropriated program funding levels and number of law enforcement personnel does not affect enforcement of CFR 212.51. All laws and regulations are enforced equally.
- Appropriated funds will remain level or increase slightly in the next five years.
- The State of California Off-Highway Motor Vehicle Recreation Division Grants Program (green sticker funding) enhances and provides additional law enforcement presence in the field at the Forest level.

Public Attitude and Compliance Assumptions:

- Forest users want to do the right thing and will obey the rule[13], once they understand the rule and motor vehicle use map.
- User compliance[14] is based on the State of California Off-Highway Motor Vehicle Recreation Division data and is anticipated to be:
  - 95% of the users are fully compliant.
  - 2-3% of the users thinks about and may violate a law.
  - 1-2% of the users will violate the law.

Measure of Success

Measuring the success of the compliance with CFR 212.51 will be done using the LEIMARS database. An analysis of the data may alert a Forest to a particular problem area for violations such as a group campsite area that may be surrounded by flat meadow areas inviting riders to potentially violate the regulation. A successful program will see a positive change in the following measures:

- Measure 1: A reduction in the number of off-route travel violations.
- Measure 2: A reduction in the number of resource damage violations

12 Barnett, G. 2004-2005 Law Enforcement Workload Analysis.
13 Tyler, Tom R. *Why People Obey the Law,* Princeton University Press, 2006, p. 320
14 User compliance was computed by using the State Vehicular Recreation Area Fiscal year 2006/2007 data: 4.2M SVRA visitors divided by the 210,000 citations written, is approximately 5 percent non-compliant, and 95% compliant.

Case Example

Law Enforcement History of the Interface OHV Area

The Interface OHV use area is an area of Forest Service land that is within a mile or two of the mountain communities of Avery, Hathaway Pines, Arnold, and White Pines. In the late 1990s and early 2000s, this area experienced an increase in use by OHV riders originating from these communities. In some cases the riders would start from their residence and ride onto National Forest land. Sometimes they would trailer their machines a short ways to the end of a road to begin riding. Because of this use, many nearby residents who had moved to the area because of the solitude of the forested area and the nearby National Forest began to object to the OHV use, especially the noise.

After a series of contentious meetings, the Forest Service completed an EIS, signed by Forest Supervisor Tom Quinn in late 2003. He selected a compromise alternative that closed the area nearest to the residential area to OHV use (Penny Pines), provided for use in an interim area (Valley View), until such time that an area that was more acceptable to all parties (Summit Level area above White Pines) was prepared with trails, signs and trailheads. In the spring of 2006, the trails on Summit Level became available to OHV riders and the Valley View area was closed to motorized use. Riders had about 2½ years to adjust to the decision and move to the new area. During the several years of transition, the area was actively patrolled by Forest Service FPOs and LEOs and by an OHV deputy from Calaveras S.O. The Calaveras OHV manager spent a lot of time and money installing trail signs, posting information signs, maintaining gates and closing closed routes.

Thus, over a period of about 2½ years OHV users had to adapt to 3 significant changes in the location of the riding areas and designated routes, yet the users became compliant with the new system. Initially there remained strong feeling against the decision to close Valley View to motorized use. There was a backlash against those who had supported the closure, and continued to be problems with local residents riding on closed trails, signs destroyed and gates torn down[15]. By 2007, OHV users adapted to the new system of trails and roads with few enforcement issues. The Penny Pines and Valley View areas area became a quiet place for hiking, biking and exercising animals.

Jay H. Power
Stanislaus National Forest

[15] The person who apparently orchestrated much of the resistance moved out of the area in about early 2007.

F. Maintenance and Mitigation Definitions

This appendix provides definitions for the routine maintenance, mitigations and other requirements included in the alternatives. Appendix I (Route Data) lists the routes with mitigations and other requirements by alternative. Specific mitigations must be completed prior to designation of the route for public motorized use.

Maintenance

Drainage Features: re-shape existing waterbars or drain dips, repair and maintain drainage structures, remove inlet/outlet debris.

Maintenance (annual): maintenance and repair of a route annually due to less favorable soil type, steeper tread gradient or higher trail use.

Maintenance (routine): routine maintenance and repair activities repeated once every 3 to 5 years on a typical OHV route. The maintenance and repair cycle depends on route type, trail use, soil type, and tread gradient.

Trail Corridor Clearance (brushing): removal of small trees or vegetation from trail corridor.

Trail Corridor Clearance (logging out): removal of trees or other vegetation that has fallen across trail corridor.

Trail Sign: installation, repair or replacement of signs and markers.

Trail Tread Clearance: rock and debris removal from the traveled way.

Tread Grading: reshaping, leveling, and smoothing of trail tread to fill ruts or rills and remove tread bumps, potholes, or washboard.

Mitigation

Mitigation activities may use one or more of the following hand tools or mechanized equipment depending on route location and accessibility:

- **Mechanized equipment**: ATV, auger, chainsaw, compactor, pole saw, rock rake, tractor, trailer, etc.
- **Hand tools**: hand saw, McLeod, pick, posthole digger, pruning shear, rake, shovel, etc.

Barriers

Brush Barrier: small trees or brush placed along side travel way to restrict vehicle traffic to desired location or to block restored routes. Requires no digging and deadfall adjacent to trail is usually used.

Fence Barrier (pipe): pipe fence constructed using vertical posts with welded horizontal rails, installed 30 inches above ground surface. Requires digging up to 8 inch wide by 24 inch deep hole for installation of post.

Fence Barrier (wood): wood fence constructed using 4 to 6 inch vertical posts with horizontal rails bolted through posts, 30 inches above ground surface. Requires digging up to 8 inch wide by 24 inch deep hole for installation of post.

Log Barrier: logs placed in a shallow trench along a travel way restricting vehicle traffic to desired locations.

Low Impact Barrier: low resource impact, vehicle barrier constructed by placing full-length railroad ties on top of 24 inch ties, held in place by driving rebar through ties into ground approximately 24 inches. Requires no digging of holes, but sometimes leveling of ground is required for placement.

Rock Barrier: large rock boulders, usually 36 to 48 inch diameter, placed in shallow holes along a travel way to restrict vehicle traffic to desired locations.

Drainage

Boardwalk/Puncheon: trail tread reinforcement structure resembling a low bridge and constructed over wet or otherwise unstable soil.

Bridge: structure built above and across a stream or drainage allowing vehicles to cross without entering watercourse and allows for natural flow and minimal impacts to streambed channel.

Causeway/Turnpike: tread reinforcement technique, for crossing damp soils, placing parallel logs or timbers allowing for trail tread build up elevated 4 to 8 inches above the natural surface.

Collector Ditch: drainage structure which intercepts water flowing toward a trail and channels it parallel to the trail to the next drainage or underneath through a culvert.

Culvert (arched): bottomless culvert allowing natural flow and minimal impacts to streambed channel. Culvert is cut in half lengthwise and installed under trail tread.

Culvert (standard): plastic or metal pipe placed in drainages to carrier water under trail tread.

Drain Dip (hardened): drain dip with additional tread surface hardening (e.g., rock ballast, tread blocks, soil cement or geosynthetic products).

Drain Dip (standard): Constructed erosion control technique which reverses the grade of a trail for a distance of 15-20 feet before returning to the prevailing grade. The change in grade forces water to run off the trail surface rather than gaining additional velocity and volume.

Drain Dip (terrain): grade reversal using natural dips in trail, planned into the trail during initial route or re-route layout.

Waterbar: constructed soil, rock or log berm that diverts water from the trail tread. Waterbars are more abrupt for motorized travel than drain dips.

Hardening

Concrete Blocks: pre-cast interlocking concrete blocks measuring approximately 17 inches wide, 23 inches long, 3.5 inches high with 4 inch square holes. The blocks weigh approximately 60 pounds with a minimum compressive strength of 4000 psi. This technique can be used for low water stream fords or tread hardening.

Drainage Hardening: treating drainage or wet area crossing with concrete blocks, rock ballast, logs or timbers.

Geosynthetics: synthetic material used in place of concrete tread blocks to harden trail tread. This includes geotextiles (construction fabrics), geonets, sheet drains, geogrids and geocells. These materials become a permanent part of the trail and are usually covered with soil or rock to prevent deterioration by ultraviolet light or damage by trail users.

Mechanical Hardening: compaction of native soils using mechanized equipment (i.e., jackhammer, wacker, tractor or roller).

Padding: fabric placed on native surface and covered with a layer of soil to protect sensitive resources.

Rock Ballast: three to six inch crushed rock fill material used to form the trail bed.

Soil Cement: trail tread treatment mixing a calculated amount of cement with the native soil. This is not recommended for use on a trail with tread gradient greater than 3% as the surface may become slippery with dust and vegetation litter such as needles.

Recreation

Cattlegaurd: motorcycle/ATV cattleguard (width 60 inches or less) installed along existing fence line, causing minimal ground disturbance as structure requires leveling of surface only.

Trail Resting: closing of a specific trail for up to three years to allow natural recovery of trail tread and adjacent resources and then re-opened for motorized use.

Trail Rotation: trail rotation from motorized to non-motorized use each week or other pre-determined schedule (e.g., one week motorized, one week non-motorized).

Signing

Combined Use: prepare and implement sign plan for identified portions of high standard (passenger car) roads for Combined Use by street legal and non-street legal vehicles.

Custom: install directional, regulatory and educational signing prescribed by various specialists for protection of sensitive resources. (e.g., route markers, vehicle restriction signs, and directional signing through specific areas of concern).

Mixed Use: prepare and implement sign plan for identified portions of certain (high clearance) roads available for use by both highway legal and non-highway legal motor vehicles.

Standard: install directional, regulatory, educational, and caution signs specific to OHV route management. (e.g., route markers, hazard signing, vehicle restriction signs, and stop signs).

Traveled Way

Climbing Turn: large turning arc with an outside berm and continuous smooth grade utilizing existing side slope.

Full Bench: trail resting entirely on an excavation into a steep side slope, no fill is used to support the trail.

Partial Bench: trail resting partially on an excavation into side slope and fill is used to support remainder of trail down slope of route.

Switchback: sharp hillside turn, usually of about 180 degrees, intended to lessen the grade of a trail traversing a steep slope.

Trail Softening: adding material to traveled way to minimize rider injury when adverse contact with trail surface occurs (e.g., sand, pea gravel, small wood chips/shavings).

Tread Grading: reshaping, leveling, and smoothing of trail tread to fill ruts or rills and remove tread bumps, potholes, or washboard.

Weather

Season of Use – pre-determined dates routes are open to motorized use (e.g., April 1 – November 30).

Wet Weather Closure – closure determined by individual storm events. Enacted when an area/route receives a pre-determined amount of precipitation and reopened after a preset time of drying occurs (i.e., 1 inch of rain within 24 hours, closed until 72 hours of continuous drying).

Other Requirements

RLF Surveys: conduct surveys to determine presence/absence of the California red-legged frog using the United States Fish and Wildlife Service (USFWS) protocol.

RLF USFWS Consultation: Forest Service consultation with the USFWS to comply with Section 7 of the Endangered Species Act.

SHPO Consultation: Forest Service consultation with the State Historic Preservation Officer (SHPO) to comply with Section 106 of the National Historic Preservation Act.

G. References

Allen, A.W. 1982. Habitat suitability index models: marten. USDI Fish and Wildlife Service FWS/OBS-82/ 10.11 9 p.

Allen, A.W. 1987. The relationship between habitat and furbearers. In: Novak, M., Baker, J.A., Obbard, M.E., Malloch, B., editors. Wild furbearer management and conservation in North America. Ontario Ministry of Natural Resources and the Ontario Trappers Association.

Andren, H. 1994. Effects of habitat fragmentation on birds and mammals in landscapes with different proportions of suitable habitat: a review. Oikos 71:355-366.

Andrew, J.M., and J.A. Mosher. 1982. Bald Eagle nest site selection and nesting habitat in Maryland. Journal of Wildlife Management 46: 383-390.

Anthony, R.G., and F.B. Isaacs. 1989. Characteristics of bald eagle nest sites in Oregon. Journal of Wildlife Management 53(1): 148-159.

Aubry, K.B., and J.C. Lewis. 2003. Extirpation and reintroduction of fishers (Martes pennanti) in Oregon: implications for their conservation in the Pacific states. Biological Conservation 114: 79–90.

Aubry, K.B., McKelvey, K.S., and J.P. Copeland. 2007. Distribution and broadscale habitat relations of the wolverine in the contiguous United States. Journal of Wildlife Management 71(7):2147-2158.

Banci, V. 1994. Chapter 5: Wolverine In: Ruggiero, L. F., Aubry, K.B., Buskirk, S.W., Lyon, J.L., Zielinski, W.J., editors. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. Gen. Tech. Rep. RM-254. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. p. 99-127.

Barbour, M.G. 1977. Terrestrial Vegetation of California. Wiley Interscience. New York, NY

Bard, E.C. 2004. Using Ecological Theory to Guide the Implementation of Augmentative Restoration, Montana State University, web accessed September 1, 2008. http://etd.lib.montana.edu

Barr, C.B., 1991. The Distribution, Habitat, and Status of the Valley Elderberry Longhorn Beetle Desmocerus californicus dimorphus Fisher (Insecta: Coleoptera: Cerambycidae). , U.S. Fish and Wildlife Service, Sacramento, CA.

Beier, P. and J.E. Drennan. 1997. Forest structure and prey abundance in foraging areas of northern goshawks. Ecological Applications 7(2): 564-571.

Berger, L., Speare, R., Daszak, P., Green, D.E., Cunningham, A., Goggin, C.L., Slocombe, R., Ragan, M.A., Hyatt, A.D., McDonald, K.R., Hines, H.B., Lips, K.R., Marantelli, G., and H. Parkes. 1998. Chytridiomycosis causes amphibian mortality associated with population declines in the rain forests of Australia and Central America. Proceedings of the National Academy of Sciences of the United States of America 95:9031-9036.

Billings, W.D. 1990. Bromus tectorum, a biotic cause of ecosystem impoverishment in the Great Basin. Pages 301-322 in G.M. Woodwell, editor. The earth in transition: patterns and processes of biotic impoverishment. Cambridge University Press, New York.

Blakesley, J.A. 2003. Ecology of the California spotted owl: breeding dispersal and associations with forest stand characteristics in northeastern California. Dissertation, Colorado State University, Fort Collins, CO.

Bobzien, S. and D. DiDonato. 2007. The status of the California tiger salamander (Ambystoma californiense), California red-legged frog (Rana draytonii), foothill yellow-legged frog (Rana boylii), and other aquatic herpetofauna in the East Bay Regional Park District, California. East Bay Regional Park District, 2950 Peralt Oaks Court, Oakland, CA 94605. 87 p.

Bolster, B.C. 1998. Western red bat, Lasiurus blossevillii. Ecology, Conservation and Management of Western Bat Species: Bat Species Accounts. Western Bat Working Group Meeting, February 9-13, 1998, Reno, Nv.

Borisenko, A. N., and M. P. Hayes. 1999. Status of the foothill yellow-legged frog (Rana boylii) in Oregon. Final Report under contract ORFO080197-1 to the The Nature Conservancy under contract 1448-13420-7-M262 to the U.S. Fish and Wildlife Service. 39 p.

Boroski, B., Mossman, B., and S. Archie. 1998. Water use patterns of mule deer (Odocoileus hemionus) and the effects of human disturbance. Journal of Arid Environments 38 (4) 561-569.

Bossard, C. et. al. 2000. Genista monspessulana. p. 203- 208 in Invasive plants of California's wildlands. Bossard, D.D., J.M. Randall, and M.C. Hoshovsky (Eds.) University of California Press, Berkeley, CA.

Bradford, D.F., Tabatabai, F., and D.M. Graber. 1993. Isolation of remaining populations of the native frog, Rana muscosa, by introduced fishes in Sequoia and Kings Canyon National Parks, CA. Conservation Biology 7: 882-888.

Brown, P.E., Berry, R.D., and C. Brown. 1994. Foraging behavior of Townsend's big-eared bats (Plecotus townsendii) on Santa Cruz Island. P. 367– 369 in Fourth California Islands Symposium (W. L. Halvorson and G. J. Maender, eds.). Santa Barbara Museum of Natural History, Santa Barbara, CA.

Brody, A.J., and M.R. Pelton. 1989. Effects of roads on black bear movements in western North Carolina. Wildlife Society Bulletin 17: 5-10.

Brown, G. and P. Reed. 2000. Validation of a Forest Values Typology for Use in National Forest Planning. Forest Science. 46(2):240-247.

Buehler, D.A., Mersmann, T.J., Fraser, J.D., and J.K.D. Seegar. 1991. Effects of human activity on bald eagle distribution on the northern Chesapeake Bay. Journal of Wildlife Management. 55:282-290.

Buskirk, S.W., and R.A. Powell. 1994. Habitat ecology of fishers and American martens. In Martens, sables and fishers: biology and conservation. Edited by S.W. Buskirk, A.S. Harestad, M.G. Raphael, and R.A. Powell. Cornell University Press, Ithaca, N.Y. p. 283–296.

Buskirk, S.W., and L.F. Ruggiero. 1994. Chapter 2: American marten In: Ruggiero, L.F., Aubry, K.B., Buskirk, S.W., Lyon, L.J., and W.J. Zielinski, editors. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. Gen. Tech. Rep. RM-254. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. p. 7-37.

Cadi, A. and P. Joly. 2003. Competition for basking places between the endangered European pond turtle (Emys orbicularis) and the introduced red-eared slider (Trachemys scripta elegans). Canadian Journal of Zoology 81:1392-1398.

California Dept. of Conservation, Division of Mines and Geology, 2000. A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos. Open-File Report 2000-19. Scale 1:750,000.

CalFlora 2008. Web-based Botanical Database; www.calflora.org

Call, D.R., Gutierrez, R.J. and J. Verner. 1992. Foraging habitat and home range characteristics of California spotted owls in the Sierra Nevada. Condor 94 p. 880-888.

Carr, L.W., and L. Fahrig. 2001. Effect of road traffic on two amphibian species of different vagility.

CDFG. 1951. The Jawbone Deer Herd. p.1-136.

CDFG, USDA 1980. The Tuolumne Deer Herd Management Plan. p. 1-58.

CDFG, USDA, YNP. 1981. Management Plan for the Yosemite Deer Herd. p. 1-44.

CDFG. 1984. Stanislaus Deer Herd Management Plan. p. 1-59

CDFG. 2007a California Nature Serve, Invasive Species. Accessed by web July 1, 2008 www.natureserve.org

CDFG. 2007b. Stanislaus Deer Herd Fawn Survivorship Pilot Study Progress Report. p. 1-18.

CDFG 2007c. Nature Serve

CDFG. 2007d. RAREFIND database. Electronic database managed by the Natural Diversity Data Base, Natural Heritage Division, California Department of Fish and Game. Sacramento, CA. Accessed on July 1, 2008 http://www.dfg.ca.gov

CDFG 2008. California Natural Diversity Database (CNDDB), Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication. Accessed on January 14, 2008 from http://www.dfg.ca.gov/whdab/pdfs/SPPlants.pdf

CEQ. 2005. (Council on Environmental Quality) Guidance on the Consideration of Past Actions in Cumulative Effects Analysis. June 24, 2005.

Chandler, S.K., Fraser, J.D., Buehler D.A., and J.K.D. Seegar. 1995. Perch trees and shoreline development as predictors of Bald Eagle distribution on Chesapeake Bay. Journal of Wildlife Management. 59:325-332. Collins, S.L. 1981.

Chin, A., D.M. Rohrer, D.A. Marion, and J.A. Clingenpeel. 2004. Effects of All-terrain Vehicles on Stream Dynamics. In: Ouachita and Ozark Mountains Symposium: Ecosystem Management Research. Guldin, J.M. tech. comp. General Technical Report: SRS-74. USDA Forest Service, Southern Research Station. Asheville, N.C.

Claar, J.J., Anderson, N., and D. Boyd. 1999 Carnivores. In: Joslin, G., and H. Youmans, cords. Effects of recreation on Rocky Mountain Wildlife: a review for Montana. Helena, MT: Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society: 7.1-7.63.

Clinton, B.D. and J.M. Vose. 2003. Differences in surface water quality draining four road surface types in the southern Appalachians, S. J. Applied Forestry 27(2), p. 100–106.

CNPS. 2006. Inventory of Rare and Endangered Plants, 7th Edition. Rare Plant Scientific Advisory Committee. Accessed on April 15, 2008 from http:/www.cnps.org/inventory

Collins, K.M. 1980. Aspects of the biology of the Great Gray Owl, Strix nebulosa, Forster. M.S. Thesis, University of Manitoba, Winnipeg, Canada.

Cooper, D.J. 1996. Water and Soil Chemistry, Floristic, Phytosociology of the extreme rich Highcreek fen in South Park Colorado. Canadian Journal of Botany 74:1111, NRC Research.

Copeland, J.P. 1996. Biology of the Wolverine in central ldaho. Masters Thesis, University of ldaho. Moscow, Id.

Copeland, J.P., Peek, J.M., Groves, G.R., Milquist, W.E., McKelvey, K.S., McDaniel, G.W., Long, C.D., and C.E. Harris. 2007. Seasonal habitat associations of the wolverine in central Idaho. Journal of Wildlife Management 71:2201–2212.

Cordell, H.K. 1999. Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trends. USDA Forest Service, Southern Research Station. Athens, Ga. 449 p.

CREP. 2008. Clavey River Watershed Assessment. Volume I (Assessment) and Volume II (Appendices). Clavey River Ecosystem Project. Sonora, CA.

CVRWQCB. 1998. The Water Quality Control Plan (basin plan) for the California Regional Water Quality Control Board, Central Valley Region. Fourth Edition. The Sacramento River Basin and the San Joaquin River Basin. Revised September 2004 (with Approved Amendments). Sacramento, CA.

Daszak, P., Cunningham, A.A., and A.D. Hyatt. 2003. Infectious disease and amphibian population declines. Diversity and Distributions 9:141-150.

Davidson, C., Shaffer, H.B., and G.M. Fellers. 2002. Spatial tests of the pesticide drift, habitat destruction, UV-B, and climate-change hypotheses for California amphibian declines. Conservation Biology 16(6):1588-1601.

Davidson, C. and R.A. Knapp. 2007. Multiple stressors and amphibian declines: dual impacts of pesticides and fish on yellow-legged frogs. Ecological Applications 17(2):587-597.

Daw, S.K. and S. DeStefano. 2001. Forest characteristics of northern goshawk nest stands and post-fledging areas in Oregon. Journal of Wildlife Management 65(1): 59-65.

Dean Runyan Associates. 1994. “Campers in California - Travel Patterns and Economic Impacts.” Portland, Or. July 1994. 31 p.

Dean Runyan Associates. 1996. “California Travel Impacts by County, 1991-1994.” Portland, Or. March 1996. 105 p.

Dean Runyan Associates. 1999. “California Travel Impacts by County, 1992-1997.” Portland, Or. February 1999. 104 p.

Delaney, D.K., Grubb, T.G., and P. Beier. 1999. Effects of helicopter noise on Mexican spotted owls. Journal of Widlife Management. 63(1): 60-76.

Delaney, D. K. and T.G. Grubb. 2001. Effects of Off-Highway Vehicle Noise on Northern Spotted Owls: Sound Data Results. A report to the Mendocino National Forest. Contract Number 43-91Z9-0055.

Delaney, D.K. and T.G. Grubb. 2003. Effects of Off-Highway Vehicle Noise on Northern Spotted Owls: 2002 Results. A Report to the State of California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division Contract Number 4391Z9-0-0055

Di Tomaso, J.M. 2001. Yellow starthistle information. UC Weed Research and Information Center Website, University of California, Davis. Accessed August 1, 2008 from http://wric.ucdavis.edu/yst.

Di Tomaso, J. M. 2008. Biology and impact of yellow starthistle. Yellow Starthistle Management guide available on the cal-ipc.org website

Dougherty, C.K., and G.R. Smith. 2006. Acute effects of road de-icers on the tadpoles of three anurans. Applied Herpetology 3(2), p. 87-93.

Ellis, D.H. 1982. The Peregrine Falcon in Arizona: habitat utilization and management recommendations. Institute for Raptor Studies, Research Report l, Tucson, Az.

English, D.B.K., Kocis, S.M., Zarnoch, S.J., and J.R. Arnold. 2002. Forest Service National Visitor Use Monitoring Process: Research Method Documentation. General Technical Report SRS-57. Southern Research Station, Asheville, NC.

Fahrig, L., Pedlar, J.H., Shealagh, E. Pope, P.Taylor, D. and J.F. Wegner. 1995. Effect of Road Traffic on Amphibian Density. Biological Conservation. Vol. 73. p. 177-182.

Fellers, G. M., Green, D.E., and J. E. Longcore. 2001. Oral chytridiomycosis in the mountain yellow-legged frog (Rana muscosa). Copeia 2001:945-953.

Fellers, G. M., McConnell, L.L., Pratt, D., and S. Datta. 2004. Pesticides in mountain yellow-legged frogs (Rana muscosa) from the Sierra Nevada mountains of California, USA. Environmental Toxicology and Chemistry 23(9):2170-2177.

FGDC. 2004. Federal Standards for Delineation of Hydrologic Unit Boundaries. Federal Geographic Data Committee. FGDC Proposal. Version 2.0.

Foltz, R.B. 2006. Erosion from all terrain vehicle (ATV) trails on National Forest lands. American society of Agricultural and Biological Engineers, 2006 Annual International Meeting, Paper 068012, 10 p.

Frazier, J.W., Holdeman, S.J. and S.L. Grant 2006. Streamscape Inventory Technical Guide. USDA Forest Service, Stanislaus National Forest, Resource Management Program Area. Sonora, CA. 32 p.

Frazier, J.W., S.L. Grant 2006. Clavey River Watershed Analysis Road Inventory-Hydrologically Connected Segments. USDA Forest Service, Stanislaus National Forest, Resource Management Program Area. Sonora, CA. 8 p.

Freel, M. 1991. A literature review for management of the marten and fisher on National Forests in California. USDA, Forest Service. Los Padres National Forest.

Foppen, R.and R. Reijnen. 1994. The effects of traffic on breeding bird populations in woodland: II. Breeding dispersal of male willow warblers in relation to the proximity of a highway. Journal of Applied Ecology 31:95-101.

Forman, R.T.T. and L.E. Alexander. 1998. Roads and their major ecological effects. Annual Review of Ecology and Systematics 29:207-31.

Fowler, C., Valentine, B., Sanders, S., and M. Stafford. 1991. Suitability Index Model: Willow Flycatcher (Empidonax traillii). Document, USDA Forest Service, Tahoe National Forest. 15 p.

Gaines, W.L., Singleton, P.H., and R.C. Ross. 2003. Assessing the cumulative effects of linear recreation routes on wildlife habitats on the Okanogan and Wenatchee National Forest, general technical report PNW-GTR-586. Portland, Or. USDA Forest Service.

Gellman, S.T., and W.J. Zielinski. 1996. Use by bats of old growth red-wood hollows on the north coast of California. Journal of Mammalogy 77:255-265.

Gillespie, G. R. 2002. Impacts of sediment loads, tadpole density, and food type on the growth and development of tadpoles of the spotted tree frog Litoria spenceri: an in-stream experiment. Biological Conservation 106:141-150.

Gobster, P. H. 1999. An ecological aesthetic for forest landscape management Landscape Journal 18(1): 54-64.

Gorman, J. B. 1954. Biosystematic studies of the salamanders of the Genus Hydromantes. PhD dissertation, University of California, Berkeley. 89 p.

Green, D. E. and C. Kagarise Sherman. 2001. Diagnostic histological findings in Yosemite toads (Bufo canorus) from a die-off in the 1970s. Journal of Herpetology 35(1):92-103.

Green, G. A., Bombay, H. L., and M.L. Morrison. 2003. Conservation assessment of the Willow Flycatcher in the Sierra Nevada. White Mountains Research Station, 3000 E. Line St., Bishop, CA, 93514.

Green, G.A., Campbell, L.A., and D.C. Macfarlane. Submitted. A conservation assessment for fishers (Martes pennanti) in the Sierra Nevada of California. USDA Forest Service, Pacific Southwest Region, Vallejo, CA. 72 p.

Grinnell, G.B., Dixon, J.S., and J.M. Linsdale. 1937. Furbearing mammals of California. Vol. I. Berkeley, Calif.: University California Press. 375 p.

Grinnell, J., and T.I. Storer. 1924. Animal life in the Yosemite; an account of the mammals, birds, reptiles, and amphibians in a cross-section of the Sierra Nevada. Univ. California Press, Berkeley.

Grubb, T.G., and R.M. King. 1991. Assessing human disturbance of breeding bald eagles with classification tree models. Journal of Wildlife Management 55:500-511.

Grubb, T.G., Bowerman, W.W., Giesy, J.P., and G.A. Dawson. 1992. Responses of breeding bald eagles, Haliaeetus leucocephalus, to human activities in Northcentral Michigan. Canadian Field-Naturalist 106:443-453.

Grubb T.G. 1995. Food habits of bald eagles breeding in the Arizona desert. Wilson Bulletin 10: 258-274.

Grubb, T.G., Pater, L.L., and D.K. Delaney. 1998. Logging truck noise near nesting northern goshawks. Res. Note RMRS-RN-3. For Collins, CO: USDA Forest Service, Rocky Mountain Research Station. 2 p.

Haas, J. 2008. Middle Fork Fuel Reduction Biological Evaluation. Stanislaus National Forest, Sonora, CA,

Hagans, D. K., Weaver, W.E., and M.A. Madej. 1986. Long-term on-site and off-site effects of logging and erosion in the Redwood Creek Basin, northern California. p. 38–65 In: Papers presented at the American Geophysical Union meeting on cumulative effects. National Council for Air and Stream Improvement, New York, Technical Bulletin 490.

Hargis, C.D., Bissonette, J.A., and D.L Turner. 1999. The influence of forest fragmentation and landscape pattern on American martens. Journal of Applied Ecology 36:157-172.

Hawkins, C.P, Norris, R.H., Hogue, J.N., and Feminella, J.W. 2000. Development and evaluation of predictive models for measuring the biological integrity of streams. Biological Applications. 10(5), 2000, p. 1456-1477.

Hayes, M.P. and M.R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (Rana aurora draytonii) and the foothill yellow-legged frog (Rana boylii): implications for management. Proceedings of the Symposium on Management of Amphibians, Reptiles and Small Mammals in North America. Gen. Tech. Rpt. RM-166, Rocky Mountain Research Station, USDA Forest Service. Fort Collins, CO. p. 144-158.

Hays, D. W., and R. Milner. 1999. Peregrine falcon (Falco peregrinus). In E. M. Larsen and N. Nordstrom, editors. Management Recommendations for Washington's Priority Species, Volume IV: Birds: http://www.wdfw.wa.gov/hab/phs/vol4/peregrin.htm

Hewings, G. October 1985. Regional Input Output Analysis.

Hickey, J.J. 1969. Peregrine Falcon Populations: Their Biology and Decline. The University of Wisconsin Press. Madison, WI.

Hickman, J. C. 1993. The Jepson Manual, Higher Plants of California. University of California Press. Berkeley and Los Angeles, CA. 1400 p.

Hine, R.L., Les, B.L., and B. F. Hellmich. 1981. Leopard frog populations and mortality in Wisconsin, 1974-76. Wisconsin Department of Natural Resources Technical Bulletin 122. 39 p.

Holland, D.C. 1991. A synopsis of the ecology and status of the western pond turtle (Clemmys marmorata) in 1991. Report to USFWS National Ecology Research Center, San Simeon Field

Holland, D.C. 1994. The Western Pond Turtle: Habitat and History. Final Report. Portland, Or: U.S. Department of Energy, Bonneville Power Administration.

Ingles, L.G. 1965. Mammals of the Pacific states. Stanford Univ. Press, Stanford, CA. 506 p.

Jennings, M.R., and M.P. Hayes. 1985. Pre-1900 overharvest of California red-legged frogs (Rana aurora draytonii): The inducement for bullfrog (Rana catesbeiana) introduction. Herpetologica, 41:94-103.

Jennings, M.R., and M.P. Hayes. 1994. Amphibian and reptile species of special concern in California. California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova.

Jockusch, E L., Wake, D.B., and K. P. Yanev. 1998. New species of slender salamanders, Batrachoseps (Amphibia: Plethodontidae), from the Sierra Nevada of California. Natural History Museum of Los Angeles County Contributions in Science 472:1-17.

Johnson, B.K., Kern, J.W., and M.J. Wisdom. 2000. Resource selection and spatial separation of mule deer and elk during spring. Journal of Wildlife Management 64(3): 685-697.

Jones, J.A., Swanson, F.A., Wemple, B.C., and K.U. Snyder. 2000. Effects of roads on hydrology, geomorphology, and disturbance patches in stream networks. Conservation Biology 14:76-85.

Kagarise Sherman, C. and M.L. Morton. 1984. The toad that stays on its toes. Natural History 93:72-78.

Kagarise Sherman, C. and M.L. Morton. 1993. Population declines of Yosemite toads in the eastern Sierra Nevada of California. Journal of Herpetology 27:186-198.

Kaplan, S. 1993. The role of natural environment Aesthetics in the restorative Experience. In managing urban and high use recreation settings, edited by Paul H. Gobster, p 46-49. St. Paul: USDA Forest Service, North Central Forest Experiment

Kattelmann, R. Hydrology and Water Resources. 1996. In: Sierra Nevada Ecosystem Project: Final report to Congress, Vol. II. Centers for Water and Wildland Resources, University of California, Davis.

Keane, J.J. 1999. Ecology of the northern goshawk in the Sierra Nevada, California. Ph.D. dissertation. University of California, Davis.

Knapp, R.A. 1993. Non-native trout in natural lakes of the Sierra Nevada: An analysis of their distribution and impacts on native aquatic biota. Sierra Nevada Ecosystem Project: Final Report to Congress, Volume III, Chapter 8, p. 363-407. Davis: University of California, Centers for Water and Wildland Resources.

Knapp, R.A. 1996. Non-native trout in natural lakes of the Sierra Nevada: An analysis of their distribution and impacts on native aquatic biota. Sierra Nevada Ecosystem Project: Final Report to Congress, Volume III, Chapter 8, p. 363-407. Davis: University of California, Centers for Water and Wildland Resources.

Knapp, R. A., and K. Matthews. 2000. Non-native fish introductions and the decline of the mountain yellow-legged frog (Rana muscosa) from within protected areas. Conservation Biology 14:428-438.

Knight, R.L. and K.J. Gutzwiller. 1995. Wildlife and Recreationists: Coexistence through Management and Research. Island Press, Washington, DC. 372 p.

Knight, R.L., and S.K. Skagen. 1988. Effects of recreational disturbance on birds of prey: a review. Washington, D.C.: National Wildlife Federation. p. 355-359.

Kucera T.E, Zielinski, W.J., and H.R. Barrett. 1995. Current distribution of the American marten, Martes americana, in California. California Fish and Game 81:96-103.

Kunz, T.H., and R.A. Martin. 1982. Plecotus townsendii. Mammalian Species. 175:1-6.

Kupferberg, S. J. 1996. Hydrologic and geomorphic factors affecting conservation of a river-breeding frog (Rana boylii). Ecological Applications 6:1332-1344.

Kus, B.E. 1999. Impacts of Brown-headed Cowbird parasitism on productivity of the endangered Least Bell’s Vireo. Studies in Avian Biology 18: 160–166.

Lannoo, M. editor. 2005. Amphibian declines: The conservation status of the United States species. University of California Press. 1094 p.

LeNoir, J., McConnell, L., Fellers, G., Cahill, T., and J. Seiber. 1999. Summertime transport of current-use pesticides from California’s Central Valley to the Sierra Nevada Mountain Range, USA. Environmental Toxicology and Chemistry 18(12):2715-2722.

Leopold, A., Sowls, L.K., and D.L. Spencer. 1947. A Survey of Over-Populated Deer Ranges in the United States.

Lind, A.J., Welsh, H.H., and R.A. Wilson. 1996. The effects of a dam on breeding habitat and egg survival of the foothill yellow-legged frog (Rana boylii) in northwestern California. Herpetological Review 27(2):62-67.

Lind, A.J. 2005. Reintroduction of a declining amphibian: determining an ecologically feasible approach for the foothill yellow-legged frog (Rana boylii) through analysis of decline factors, genetic structure, and habitat associations. Ph.D. Dissertation, University of California, Davis. (March) 169 p.

Lips, K.R. 1998. Decline of a tropical montane amphibian fauna. Conservation Biology 12(1):106-117.

Mack, R.N. 1989. Temperate grasslands vulnerable to plant invasions: characteristics and consequences. p. 155-179 in J.A. Drake, H.A. Mooney, F. Di Castri, R.H. Groves, F.J. Kruger, M. Rejmanek, and M. Williamson, editors. Biological invasions: a global perspective. Wiley, Chichester, United Kingdom.

Magill, A. 1990. Assessing Public Concern for Landscape Quality: A Potential Model to Identify Visual Thresholds. USDA Forest Service Pacific Southwest Research Station Research Paper PSW.

Maharaj, V. and J. Carpenter. 1999. The Economic Impacts of Fishing, Hunting and Wildlife Viewing on National Forest Lands. American Sportfishing Association. April 1999. 41 p.

Marra, P., and R.L. Holberton. 1998. Corticosterone levels as indicators of habitat quality:effects of habitat segregation in a migratory bird during the non-breeding season. Oecologia 116:284-292.

Martin, D.L. 1992. Sierra Nevada Anuran Guide. Canorus Ltd. Ecological Research Team. Canorus Ltd. Press. San Jose, CA. 28 p.

Martin, D.L. 2008. Decline, movement, and habitat utilization of the Yosemite toad (Bufo canorus): an endangered anuran endemic to the Sierra Nevada of California. PhD dissertation. University of California, Santa Barbara. 393 p.

Maslow, A. H. 1943. A Theory of Human Motivation: Psychological Review 50, 370-396.

Maurer J.R. 2000. Nesting habitat and prey relations of the northern goshawk in Yosemite National Park, CA. Thesis, University of California. Davis, USA.

Maxell, B.A., and D.G. Hokit. 1999. Amphibians and reptiles. P. 2.1-2.30 In: J. Joslin and H. Youmans, committee chairs. Effects of recreation on Rocky Mountain wildlife: a compendium of the current state of understanding in Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of the Wildlife Society.

McGarigal, K. 1988. Human-eagle interactions on the Lower Columbia River. M.S. Thesis, Oregon State University, Corvallis, Or. 115 p.

Mikkola, H. 1983. Owls of Europe. Buteo Books, Vermillion, South Dakota.

Miller, S.G., Knight, R.L., and K.C. Miller. 1998. Influence of recreational trails on breeding bird communities. Ecological Applications 8:162-169.

Moen, C.A., and R.J. Gutierrez. 1997. California spotted owl habitat selection in the central Sierra Nevada. Journal of Wildlife Management 61:1281-1287.

Morton, M.L. 1981. Seasonal changes in total body lipid and liver weight in the Yosemite toad. Copeia 1981(1):234-238.

NCI - National Cancer Institute, 2007. Asbestos Exposure: Questions and Answers http://www.cancer.gov/cancertopics/factsheet/Risk/asbestos.

Newcombe, C.P., and J.O.T. Jensen. 1996. Channel suspended sediment and fisheries: a synthesis for quantitative assessment of risk and impact. North American Journal of Fisheries Management 16: 693-727.

Newcombe, C.P., and D.D. MacDonald. 1991. Effects of suspended sediments on aquatic ecosystems. North American Journal of Fisheries Management 11:72-84.

Pacific Gas and Electric Company. 2002. Spring Gap-Stanislaus Project (FERC project No. 2130). Volume II, Application for New License. Exhibit E – Water Use and Quality. Pacific Gas and Electric Company. San Francisco, CA.

Pauchard, P.B. and Alaback. 2005. Edge type defines alien plant species invasions along Pinus contorta burned, highway and clearcut forest edges. Forest Ecology and Management. Available online at www.sciencedirect.com

Perrine, J.D. 2005. Ecology of red fox (Vulpes vulpes) in the Lassen Peak region of California. USA. Phd dissertation. University of California, Berkeley.

Perry, C. and R. Overly. 1977. Impact of roads on big game distribution in portions of the Blue Mountains of Washington, 1972 -1973. Bull. 11. Olympia, Wa: Washington Department of Game Applied Research Section. 39 p.

Philpott, W. 1997. Summaries of the life histories of California bat species. White paper. Pineridge Ranger District, Sierra National Forest. Prather, CA. 32 p.

Pierson, E.D., Rainey W.E., and D.M. Koontz. 1991. Bats and mines: experimental mitigation for Townsend's big-eared bat at the McLaughlin Mine in California. P. 31–42 in Proceedings V: issues and technology in the management of impacted wildlife. Thorne Ecological Institute, Aspen, CO.

Pierson, E.D., and W.E. Rainey. 1998. The distribution, status and management of Townsend's bigeared bat (Corynorhinus townsendii) in California. California Department of Fish and Game, Bird and Mammal Conservation Program Report 96-7:1–49.

Potter 1998. Forested communities of the upper montane in central and southern Sierra Nevada. Albany, CA: Pacific Southwest Research Station, Forest Service, USDA Pp. 1-1391. General Technical Report PSW-GTR-169.

Powell, R.A. 1979. Mustelid spacing patterns: variations on a theme by Mustela Zhurnal Tierpsychologie 50:153-165.

Powell, 2001. National management strategy for motorized off-highway vehicle use on Dixie National Forest, Escalante and Teasdale Ranger Districts.

Pringle, C.M., Naiman, R.J., Bretschko, G., Karr, J.R., Oswood, M.W., Webster, J.R., Welcomme, R.L., and M.J. Winterbourn. 1988. Patch dynamics in lotic systems: the stream as a mosaic. Journal of the North American Benthological Society 7:502-524.

Rathbun, G. B., N. J. Scott, Jr., and T. G. Murphey. 2002. Terrestrial habitat use by Pacific pond turtles in a Mediterranean climate. The Southwestern Naturalist 47(2):225-235.

Reed, P. and G. Brown. 2003. Values Suitability Analysis: A Methodology for Identifying and Integrating Public Perceptions of Forest Ecosystem Values in National Forest Planning. Journal of Environmental Planning and Management. 46(5):643-658.

Reed, R.A., Johnson-Barnard, J., and W.L. Baker. 1996. Contribution of roads to forest fragmentation in the Rocky Mountains. Conservation Biology 10:1098-1106.

Reese, D.A. and H.H. Welsh. 1997. Use of Terrestrial Habitat by Western Pond Turtles, Clemmys marmorata: Implications for Management. Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles.

Reese, D.A. and H. H. Welsh. 1998. Habitat use by western pond turtles in the Trinity River, California. The Journal of Wildlife Management 62(3):842-853.

Reid, L.M., and T. Dunne. 1984. Sediment production from forest road surfaces. Water Resources Research 20:1753–1761.

Richardson, E.V., Simons, B., Karaki, S., Mahmood, M., and M.A. Stevens. 1975. Highways in the river environment: hydraulic and environmental design considerations training and design manual. U.S. Department of Transportation, Federal Highway Administration, Washington, DC.

Rocchio. 2006. Rocky Mountain Alpine-Montane Wet Meadow Ecological System

Roche, C.T. and Roche, B.F. Jr. 1988. Weed Technology, Yellow Starthistle p. 20. Forest Service.

Rooney, P. 2003. Distribution of Ecologically-Invasive Plants along off-Road Vehicle Trails. University of Wisconsin-Madison, Department Publication, Abstract

Rost, G.R., and J.A. Bailey. 1979. Distribution of mule deer and elk in relation to roads. Journal of Wildlife Management 43(3):634-641

Ruggiero, L.F.., Aubry, K.B., Buskirk, S.W., Lyon, J.L, and W.J. Zielinski. 1994. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. Gen. Tech. Rep. RM-GTR-254. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 184 p.

Schempf, P.F., and M. White. 1977. Status of six furbearer populations in the mountains of northern California. USDA Forest Service, Region 5, Vallejo, CA. 51 p.

Schwartz, M. K., Aubry, K.B., McKelvey, K.S., Pilgrim, K.L., Copeland, J.P., Squires, J.R., Inman, R.M., Wisely, S.M., and L.F. Ruggiero. 2007. Inferring geographic isolation of wolverines in California using historical DNA Journal of Wildlife Management 71(7): 2170-2179.

Scott, M.J. and Pratini, N. 1995. Habitat fragmentation: The sum of the pieces is less than the whole. California Agriculture volume 49 (6): 56. Accessed on line www.nal .USDAgov

Seamans, M.E. 2005. Population Biology of the California Spotted Owl in the Central Sierra Nevada. Dissertation, University of Minnesota, 152 p.

Skagen, R.L., Knight, and G.H. Orians. 1991. Human disturbance of an avian scavenging guild. Ecological Applications 1:215-225.

Sheley, R.L. and Larson. 1995. Interference between cheatgrass and yellow starthistle at three soils depths. Journal of Range Management, Volume 48, p. 392- 397 Oregon State University Press. Corvallis, OR

Shepard. 1998. Coming Home to the Pleistocene: Island Press. 206 p.

Sherburne, S.S., and J.A. Bissonette. 1994. Marten subnivean access point use: response to subnivean prey levels. Journal of Wildlife Management 58: 400-405.

Sherwin, R. 1998. Species Accounts: Pallid Bat. . Western Bat Working Group Meeting, February 9-13, 1998, Reno, Nv.

Sherwin, R.E., Stricklan, D., and D.S. Rogers. 2000. Roosting Affinities of Townsend’s Big-Eared Bat (Corynorhinus Townsendii) in northern Utah. Journal of Mammalogy. Vol. 81, No. 4; p. 939–947.

Sierra Business Council. 1999. Sierra Nevada Wealth Index, Understanding and Tracking our Region’s Wealth, 1999.

Sparling, D., Fellers, G., and L. McConnell. 2001. Pesticides and amphibian population declines in California, USA. Environmental Toxicology and Chemistry 20(7):1591-1595.

Spencer W.D., Barrett, R.H., and W.J. Zielinski. 1983. Marten habitat preferences in the northern Sierra Nevada. Journal of Wildlife Management. 47:1181-1186.

Squires, J.R., and R.T. Reynolds. 1997. Northern goshawk (Accipiter gentilis). p. 24-32 in A. Poole and F. B. Gill, editors. The birds of North America, number 298. The American Ornithologists' Union, Washington, DC, USA, and The Academy of Natural Sciences, Philadelphia, PA, USA.

Squires J.R., Copeland J.P., Ulizio T.J., Schwartz M.K., and L.F. Ruggiero. 2007. Sources and patterns of wolverine mortality in western Montana. Journal of Wildlife Management Vol. 71, No. 7 p. 2213–2220.

Stalmaster, M.V. 1987. The bald eagle. Universe Books, New York, N.Y. 227 p.

Stalmaster, M.V. and J.R. Newman. 1978. Behavioral responses of wintering bald eagles to human activity. Journal of Wildlife Management 42:506-513.

Stebbins, R.C. 1972. California amphibians and reptiles. Univ. California Press, Berkeley. 152 p.

Stebbins, R.C. 1985. Field Guide to Western Reptiles and Amphibians. Houghton Mifflin, Boston, MA. 336 p.

Storer, T.I. 1930. Notes on the range and life-history of the Pacific fresh-water turtle, Clemmys marmorata. University California Publications in Zoology 32:429-441.

Strand, R.G. 1967. Geologic Map of California, Olaf P. Jenkins Edition Mariposa Sheet, 1:250,000. California Geologic Survey, Sacramento, CA.

Stynes, D.J., and E.M. White. 2005. Spending profiles of National Forest visitors. NVUM Four Year Report.station, General technician Report NC-163.

Stynes, D.J., and E.M. White. 2006. Reflections on Measuring Recreation and Travel Spending. Journal of Travel Research, Vol. 45, No. 1, 8-16.

Swarthout, E.C.H. and R.J. Steidl. 2001. Flush responses of Mexican spotted owls to recreationists. Journal of Wildlife Management 65(2): 312-317.

Switalski, T.A. 2004 et al; Bissonette, J.A.; DeLuca, T.H.; Luce, C.H.; Madej, M.A. 2004. Frontiers in Ecology and the Environment, Benefits and Impacts of Road Removal, Vol. 2, No. 1 p. 21-28, Ecological Society of America Publisher

Timossi, I. 1990. California's statewide wildlife habitat relationships system. Calif. Dept. Fish and Game. Sacramento, CA.

Trombulak, S.C. and Frissell C.A. 2000. Review of ecological effects of roads on terrestrial and aquatic communities. Conservation Biology 14(1):18-30

Tuan, Y. 1974. Topophilia: A Study of Environmental Perception, Attitudes, and Values. New York: Columbia University Press.

Tuan, Y. 1993. Passing Strange and Wonderful: Aesthetics, Nature, and Culture. Island Press, Shearwater Books, Washington, DC.

USDA 1974. Agriculture Handbook Number 462. National Forest Landscape Management Volume2. Chapter 1 – The visual management system. 47 p.

USDA 1985a. National Forest Landscape Management, Volume 2, Chapter 6: Fire. USDA Forest Service Agricultural Handbook No. 608.

USDA 1985b. Clavey River Wild Trout Habitat Management Plan. Pacific Southwest Region. Stanislaus National Forest. Sonora, CA.

USDA 1988. Cumulative Off-Site Watershed Effects Analysis. Soil and Water Conservation Handbook. Chapter 20. Region 5 Forest Service Handbook Amendment 1 7/88. San Francisco, CA.

USDA 1991a. National Soil Management Handbook.

USDA 1991b. Final Environmental Impact Statement; Stanislaus National Forest Land and Resource Management Plan; Record of Decision. October 1991. Forest Service, Stanislaus National Forest, Sonora, CA.

USDA 1991c. Final Environmental Impact Statement; Stanislaus National Forest Land and Resource Management Plan; Appendix E Wild and Scenic River Study. October 1991. Forest Service, Stanislaus National Forest, Sonora, CA.

USDA 1991d. Final Environmental Impact Statement; Stanislaus National Forest Land and Resource Management Plan. October 1991. Forest Service, Stanislaus National Forest, Sonora, CA.

USDA 1995a. Landscape Aesthetics: A Handbook for Scenery Management. USDA Forest Service Agriculture Handbook Number 701.

USDA 1995b. Soil Survey Stanislaus National Forest Area California. Supervisor's Office, 19777 Greenley Rd., Sonora, CA.

USDA 1995c. Handbook 2509.18 – Soil Management Handbook. Forest Service, Region 5, Supplement No. 2509.18-95-1. 10 p.

USDA 1995d. Forest Service Manual (FSM) 2080.5

USDA 1996. Programmatic Agreement Among the USDA Forest Service, Pacific Southwest Region, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Identification, Evaluation and Treatment of Historic Properties Managed by the National Forests of the Sierra Nevada, California. On file, USDA Forest Service, Pacific Southwest Region, Vallejo, CA.

USDA 1997. Ecological Subregions of California, Section and Subsection Descriptions. Forest Service, Pacific Southwest Region. R5-Em-TP-005.

USDA 1998. Motor Vehicle Travel Management Forest Plan Amendment, Environmental Assessment and Decision Notice. Stanislaus National Forest. Sonora, CA. February, 1998.

USDA 1999. Soil Interpretations. Forest Service. San Francisco, CA.

USDA 2000a. Water Quality Management for Forest System Lands in California. Best Management Practices. Pacific Southwest Region.

USDA 2000b. Forest Service Roadless Area Conservation Final Environmental Impact Statement Biological Evaluation for Threatened, Endangered and Proposed Species and Sensitive Species. Written by Seona Brown and Ron Archuleta and signed on 11/13/2000. Unpublished. 90 p.

USDA 2001. Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement, Volume 3. Forest Service, Pacific Southwest Region. Vallejo, CA.

USDA 2002. Central Stanislaus Watershed Analysis. Stanislaus National Forest. Sonora, CA. June, 2002. 706 p.

USDA 2003a. Cumulative Watershed Effects Excel Based Analysis Model. Stanislaus National Forest. Sonora, CA.

USDA 2003b. Interface Recreation Trails Environmental Impact Statement; Appendix C, Noise. November 2003. Stanislaus National Forest. Sonora, CA.

USDA 2003c. Stanislaus National Forest Roads Analysis. Stanislaus National Forest. Sonora, CA.

USDA 2004a. Pacific Southwest Region. National Visitor Use Monitoring Results for Stanislaus National Forest. 25 p.

USDA 2004b. Off- Highway Vehicle Use on National Forests: Volume and Characteristics of Visitors. 25 p.

USDA 2004c. Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement and Record of Decision. http://www.fs.fed.us/r5/snfpa/final-seis/.

USDA 2005a. Stanislaus National Forest, Forest Plan Direction. Forest Service, Pacific Southwest Region, Stanislaus National Forest. Sonora, CA. July 2005. 178 p. http://www.fs.fed.us/r5/stanislaus/publications/forest-plan-direction-07-2005.pdf

USDA 2005b. Forest Service Manual 4060; Research Facilities and Areas; Amendment 4000-2005-3. November 4, 2005. Forest Service, Washington, DC. 29 p.

USDA 2005c. Pacific Southwest Region. Business Plan for the Stanislaus National Forest – A Window of Opportunity. R5-MB-092. 40 p.

USDA 2005d. Policy for Section 106 of the NHPA Compliance in Travel Management: Designated Routes for Motor Vehicle Use. On file, USDA Forest Service Pacific Southwest Region, Vallejo, CA.

USDA 2006a. Programmatic Agreement among the USDA Forest Service, Pacific Southwest Region, USDA Forest Service, Intermountain Region's Humboldt-Toiyabe National Forest, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Designating Motor Vehicle Routes and Managing Motorized Recreation on the National Forests in California. On file, USDA Forest Service, Pacific Southwest Region, Vallejo, CA.

USDA 2006b. Stanislaus National Forest OHV Wildlife Habitat Protection Plan.

USDA 2007a. Forest Service Handbook 1909.12 Land Management Planning Handbook; Chapter 70, Wilderness Evaluation Amendment 1909.12-2007-1. January 31, 2007. Forest Service, Washington, DC. 25 p.

USDA 2007b. Stanislaus National Forest. Recreation Facility Analysis- 5 year Program of Work. 30 p.

USDA 2007c. Update to Regional Foresters Sensitive Animal Species List. Dated October 15, 2007. http://www.fs.fed.us/biology/tes/

USDA 2007d. Condition Check List for Fens in Montane and Subalpine Zones of the Sierra Nevada).

USDA 2007e. Sierra Nevada Forests Management Indicator Species Amendment Final Environmental Impact Statement. http://www.fs.fed.us/r5/snfmisa/feis/dat/feis-entire.pdf

USDA 2008a. Cultural Resource Management Report (05-16-1305) Forest-wide OHV Survey Project. On file, USDA Forest Service, Stanislaus National Forest, Sonora, CA.

USDA 2008b. Pacific Southwest Regional Office – Minerals and Geology, A General Guide for Serpentine and Ultramafic Bedrock in Region 5 – Areas More Likely To Contain Natural Occurring Asbestos. US Forest Service, Vallejo, CA.

USDI. 1982. Pacific Coast American peregrine falcon recovery plan.U. S. Fish and Wildlife Service and the Pacific Coast American Peregrine Falcon Recovery Team.

Van Dyke, F.G., Brooke, R.H., Shaw, H.G., Ackerman, B.B., Hemker, T.P., and F.G. Lindzey. 1986. Reactions of mountain lions to logging and human activity. J. of Wildlife Management 50: 95-102.

van Riper III, C., and J.V. Wagtendonk. 2006. Home range characteristics of great gray owls in Yosemite National Park, CA. Journal of Raptor Research 40 (2): 000-000.

Verner, J. 1994. Current Management Situation: Great Gray Owls. In: Flammulated, Boreal, and Great Gray Owls in the United States: A Technical Conservation Assessment. USDA Forest Service, Rocky Mountain Research Station, General Technical Report RM-253, pg. 155-213.

V. T. Vredenburg, Bingham, R., Knapp, R., Morgan, J.A.T., Moritz, C., and D. Wake. 2006. Concordant molecular and phenotypic data delineate new taxonomy and conservation priorities for the endangered mountain yellow-legged frog. P. 361-374

Wagner, D.L., Bortugno, E.J., et. al., 1990. Geologic Map of the San Francisco-San Jose Quadrangle, California, 1:250,000. Regional Geologic Map Series. Map No. 5A (Geology), California Geologic Survey, Sacramento, CA.

Wagner, D.L., Jennings, C.W., et. al., 1981. Geologic Map of the Sacramento Quadrangle, California, 1:250,000. Regional Geologic Map Series. Map No. 1A (Geology), California Geologic Survey, Sacramento, CA.

Wally, M.J., and M.R. Eames. 2000. Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-scale Trends and Management Implications. Volume 1 – Overview. Gen. Tech. Rep. PNW-GTR-485. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 3 vol. (Quigley, Thomas M., tech. ed.; Interior Columbia Basin Ecosystem Management Project: Scientific Assessment).

Wasser, S.K., Bevis, K., King, G., and E. Hanson. 1997. Noninvasive physiological measures of disturbance in the northern spotted owl. Conservation Biology 4:1019-1022.

Waters, T.F. 1995. Sediment in streams: sources, biological effects and control. American Fisheries Society, Bethesda, Maryland, Monograph 7.

Welsh H.H. Jr. 1994. Bioregions: an ecological and evolutionary perspective and a proposal for California. California Fish and Game 80:97-124.

Welsh, H.H., Jr., and L.M. Ollivier. 1998. Stream amphibians as indicators of ecosystem stress: a case study from California's redwoods. Ecological Applications 8:1118-1132.

Welsh, M.J. 2008. Sediment production and delivery from forest roads and off-highway vehicle trails in the Upper South Platte River watershed, Colorado. Masters Thesis, Colorado State University, Fort Collins, CO.

Whitson, T.D., L.C. Burrill, S.A. Dewey, D.W. Cudney, B.E. Nelson, R.D. Lee and R. Parker. 1996. Weeds of the west. 5th Ed. The Western Society of Weed Science in cooperation with the Western United States Land Grant Universities Cooperative Extension Services. Jackson, Wyoming.

Williams, T. T. 2004. The Open Space of Democracy Orion Society. 2004. 107 p.

Winter, J. 1981. Some aspects of the ecology of the Great Gray Owl in the central Sierra Nevada. USDA Forest Service, Stanislaus National Forest. For Final Report, Contract 43-2276.

Winter, J. 1982. Further investigations on the ecology of the Great Gray Owl in the central Sierra Nevada. USDA Forest Service. Stanislaus National Forest. Final Report. Contract 43-2348.

Wisdom, M.J., Holthausen, R.S., Wales, B.C., Hargis, C.D., Saab, V.A., Lee, D.C., Hann, W.J., Rich, T.D., Rowland, M.M., Murphy, W.J., and M.R. Eames. 2000. Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-scale Trends and Management Implications. Volume 1 – Overview. Gen. Tech. Rep. PNW-GTR-485. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 3 vol. (Quigley, Thomas M., tech. ed.; Interior Columbia Basin Ecosystem Management Project: Scientific Assessment).

Zeiner, D.C., Laudenslayer, W.F. Jr. and K.E. Mayer. 1988. California's wildlife. Volume 1. Amphibians and Reptiles. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game, Sacramento, CA.

Zeiner, D.C., Laudenslayer, W.F. Jr., Mayer, K.E., and M.W. editors. 1990. California's wildlife. Volume 3: mammals. California statewide wildlife habitat relationships system. The Resources Agency, Department of Fish and Game, Sacramento, CA.

Zielinski, W.J., Kucera, T.E., and R.H. Barrett. 1995. Current distribution of the fisher, Martes pennanti, in California. California Fish and Game 81(3):104-112.

Zielinski, W.J., Truex, R.L., Schmidt, G., Schlexer, R., Schmidt, K.N., and R.H. Barrett. 2004. Home range characteristics of fishers in California. Journal of Mammalogy 85:649–657.

Zielinski, W.J., Truex R.L., Schlexer F.V., Campbell L.A., and C. Carroll. 2005 Historical and contemporary distributions of carnivores in forests of the Sierra Nevada, CA, USA. Journal of Biogeography 32:1385-1407.

Zweifel, R.G. 1955. Ecology, distribution, and systematics of frogs of the Rana boylei group. University of California Publications in Zoology 54: 207-292.

H. Resource Analysis Summary

Each resource specialist assessed every unauthorized route proposed as an addition to the NFTS in any alternative at a level sufficient to support their effects analysis and identify any necessary site-specific mitigation. Table H.01-1 presents a summary of this resource analysis with each specialist indicating one of the four options listed below for every route. The project record contains additional details.

1. The route was considered; a field visit was not necessary; the effects of adding the route to the NFTS are acceptable (meet law, regulation, and policy; routine maintenance is assumed).
2. The route was considered, a field visit was made and the effects are acceptable (meet law, regulation, and policy; routine maintenance is assumed).
3. The route was considered, a field visit was made and site-specific mitigation is prescribed to reduce the effects to acceptable (meet law, regulation, and policy; routine maintenance is assumed).
4. The route was considered, a field visit was made and a determination was made that the effects could not be mitigated. The route is not recommended by the specialist for inclusion.

Table H.01-1 Resource Analysis Summary

Route	RD	MI	SYS	Alternative					Site Specific Review						
				1	2	3	4	5	BOT	CR	GEO	REC	SOIL	WAT	WLF
16EV191	CAL	0.13	UNT	ATV			ATV	ATV	2	2	1	2	4	4	1
17EV130	CAL	0.81	UNT	MC			MC		2	3	1	2	3	1	1
17EV275	CAL	0.01	UNT	ALL			ALL		2	1	1	2	1	1	1
17EV275	CAL	0.02	UNT	MC			MC		2	1	1	2	1	1	1
17EV278	CAL	1.06	UNT	ATV			ATV		2	1	1	2	3	1	1
17EV279	CAL	1.08	UNT	ATV			ATV		2	1	1	2	3	1	1
17EV280	CAL	0.48	UNT	MC			MC		1	1	1	2	3	1	1
17EV307	CAL	0.09	UNT	ALL			ALL		1	1	1	2	1	1	1
18EV286	CAL	0.39	UNT	ATV			ATV	ATV	2	1	1	2	2	1	1
18EV287	CAL	1.34	UNT	ALL			ALL		2	2	1	2	2	1	1
18EV288	CAL	1.96	UNT	MC			MC		2	2	1	2	3	3	1
18EV289	CAL	0.53	UNT				4WD		2	1	1	2	2	1	1
18EV292	CAL	0.08	UNT	4WD			ALL	4WD	1	1	1	2	1	1	1
18EV293	CAL	0.06	UNT	4WD			4WD		2	1	1	2	1	1	1
18EV295	CAL	0.30	UNT	4WD			4WD		2	1	1	2	1	1	1
18EV295A	CAL	0.06	UNT	4WD			4WD		2	1	1	2	1	1	1
18EV297	CAL	0.08	UNT	4WD			4WD	4WD	2	2	1	2	1	1	1
18EV298	CAL	0.18	UNT	4WD			4WD	4WD	2	2	1	2	1	1	1
18EV299	CAL	0.14	UNT	4WD			4WD	4WD	2	1	1	2	1	1	1
18EV300	CAL	0.08	UNT	4WD			4WD	4WD	2	2	1	2	1	1	1
18EV301	CAL	0.09	UNT	4WD			4WD	4WD	2	2	1	2	1	1	1
18EV303	CAL	0.10	UNT	4WD			4WD	4WD	2	2	1	2	1	1	1
19EV110	CAL	0.09	UNT	4WD			4WD	4WD	2	2	1	2	1	1	1
19EV111	CAL	0.32	UNT	4WD			4WD		2	2	1	2	1	1	1
19EV111A	CAL	0.14	UNT	4WD			4WD	4WD	2	2	1	2	1	1	1
19EV112	CAL	0.04	UNT	4WD			4WD	4WD	2	1	1	2	1	1	1
19EV113	CAL	0.04	UNT	4WD			4WD		2	1	1	2	1	1	1
20EV100	CAL	0.09	UNT	4WD			4WD		2	1	1	2	1	1	1
20EV101A	CAL	0.05	UNT	4WD			4WD	4WD	2	2	1	2	1	1	1
61602E	CAL	0.23	UNR				4WD		2	1	1	2	1	1	2
61618A	CAL	0.04	UNR	ALL			ALL		2	1	1	2	1	1	1

Route	RD	MI	SYS	Alternative					Site Specific Review						
				1	2	3	4	5	BOT	CR	GEO	REC	SOIL	WAT	WLF
FR10176	CAL	0.09	UNT	4WD			4WD		1	1	1	2	1	1	1
FR14617	CAL	0.04	UNT	ALL			ALL	ALL	2	1	1	2	1	1	1
FR8437	CAL	0.13	UNT	4WD			4WD	4WD	1	1	1	2	1	1	1
FR8784	CAL	0.07	UNT	4WD			4WD	4WD	1	1	1	2	1	1	1
FR9084	CAL	0.17	UNT	4WD			4WD		2	1	1	2	1	1	1
FR9090	CAL	0.17	UNT	4WD			4WD		1	1	1	2	1	2	1
FR9438	CAL	0.10	UNT	4WD			4WD	4WD	1	1	1	2	1	3	1
FR9439	CAL	0.16	UNT	4WD			4WD	4WD	1	2	1	2	1	1	1
FR9440	CAL	0.04	UNT	4WD			4WD	4WD	1	1	1	2	1	1	1
FR9441	CAL	0.18	UNT	4WD			4WD	4WD	1	2	1	2	1	3	1
FR9501	CAL	0.09	UNR	4WD			4WD		1	2	1	2	1	1	1
FR98607	CAL	0.05	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98622	CAL	0.04	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98623	CAL	0.05	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98624	CAL	0.20	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98625	CAL	0.06	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98627	CAL	0.06	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98630	CAL	0.04	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98631	CAL	0.06	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98633	CAL	0.10	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98634	CAL	0.05	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98636	CAL	0.11	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98637	CAL	0.07	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98638	CAL	0.04	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98639	CAL	0.14	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98643	CAL	0.08	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98644	CAL	0.06	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98646	CAL	0.05	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98647	CAL	0.04	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98660	CAL	0.05	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98661	CAL	0.12	UNT	4WD			4WD		1	2	1	2	1	1	1
FR98662	CAL	0.07	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98663	CAL	0.05	UNT	4WD			4WD		1	2	1	2	1	1	1
11808B	GR	0.03	UNT	4WD			4WD		1	4	1	3	1	1	1
11908M	GR	0.13	UNT	4WD			4WD		1	1	1	2	4	1	1
17EV182	GR	1.62	UNT	ALL			ALL	ALL	2	1	1	3	1	1	2
17EV183	GR	0.64	UNT	ALL			ALL	ALL	2	1	1	3	3	1	2
17EV184	GR	0.60	UNT	MC			MC		2	1	1	3	3	1	2
17EV192	GR	0.63	UNT	ALL			ALL		2	3	1	2	2	4	3
17EV192A	GR	0.06	UNT	ALL			ALL		2	4	1	2	2	2	3
17EV192B	GR	0.15	UNT	ALL			ALL		1	1	1	2	2	2	3
17EV194	GR	0.39	UNT	ATV			ATV		1	1	1	2	2	2	3
17EV195	GR	0.50	UNT	ALL			ALL		2	1	1	2	2	2	3
17EV196	GR	0.19	UNT	ATV			ATV		1	1	1	2	2	1	3
17EV197	GR	0.35	UNT	ATV			ATV		1	1	1	3	3	3	3
17EV197	GR	0.46	UNT	ATV			ATV		1	1	1	3	3	2	3
17EV197A	GR	0.05	UNT	ATV			ATV		1	1	1	2	1	1	2
17EV317	GR	0.06	UNT	ATV			ATV		1	1	4	2	1	1	1
17EV318	GR	0.13	UNT	ATV			ATV		2	1	1	2	1	1	1
17EV319	GR	0.21	UNT	ATV			ATV		2	1	1	2	2	1	1
17EV320	GR	0.13	UNT	ATV			ATV		2	1	1	2	1	1	1
17EV321	GR	0.05	UNT	ALL			ALL		1	1	4	2	1	1	1
17EV322	GR	0.04	UNT	ATV			ATV		2	1	1	2	1	1	1
17EV323	GR	0.03	UNT	ATV			ATV		2	1	1	2	1	1	1
17EV324	GR	0.03	UNT	ATV			ATV		2	1	1	2	1	1	1
17EV325	GR	0.03	UNT	ATV			ATV		2	1	1	2	1	1	1

Route	RD	MI	SYS	Alternative					Site Specific Review						
				1	2	3	4	5	BOT	CR	GEO	REC	SOIL	WAT	WLF
17EV326	GR	0.02	UNT	ATV			ATV		2	1	1	2	1	1	1
17EV327	GR	0.30	UNT	ATV			ATV		1	1	1	2	3	1	2
17EV328	GR	0.06	UNT	ATV			ATV		1	1	1	2	1	1	1
17EV329	GR	0.05	UNT	ATV			ATV		1	1	1	3	1	1	1
17EV330	GR	0.10	UNT	ATV			ATV		1	1	1	2	2	1	1
17EV331	GR	0.11	UNT	ALL			ALL		1	1	1	2	2	1	1
17EV332	GR	0.05	UNT	ALL			ALL		1	1	1	3	1	1	1
17EV901	GR	0.37	UNT	ALL			ALL		1	3	1	3	3	1	2
18EV268	GR	0.51	UNT	ATV			ATV		1	1	1	2	3	1	1
18EV269	GR	0.16	UNT	ALL			ALL		1	1	1	2	2	1	1
18EV34	GR	1.27	UNT	ATV			ATV		1	1	1	2	2	1	1
1N1829	GR	0.08	UNT	ALL			ALL		1	1	1	2	1	1	1
1S1727	GR	0.87	UNT	ATV			ATV		1	3	1	2	3	1	2
1S1728	GR	0.47	UNT	4WD			4WD		2	1	4	2	4	4	1
1S1734A	GR	0.86	UNT				4WD		2	1	1	2	3	1	3
1S1736	GR	0.46	UNT	ATV			ATV		1	3	1	2	3	1	1
1S17E35B	GR	0.34	UNT	ATV			ATV		1	1	1	2	3	1	3
1S17M	GR	1.13	UNT	ATV			ATV		2	1	1	2	1	4	3
1S1811	GR	0.56	UNT				4WD		1	1	1	2	4	1	1
1S1822B	GR	0.05	UNT	4WD			4WD		1	1	1	2	1	1	2
1S1822C	GR	0.31	UNT				4WD		1	1	1	2	3	4	1
1S1824	GR	0.36	UNT				ALL		2	1	1	2	1	1	1
1S1902	GR	0.24	UNT	4WD			4WD		1	1	1	2	1	1	2
1S1907A	GR	0.39	UNT				4WD		1	4	1	2	1	1	1
1S1909	GR	0.25	UNT	4WD			4WD		1	1	1	2	1	1	1
1S1913	GR	0.72	UNT				ALL		2	1	1	2	1	1	1
1S1920	GR	0.81	UNT				ALL		2	1	1	2	1	1	1
1S1929	GR	0.15	UNT	4WD			4WD		1	1	1	2	1	1	1
1S1929C	GR	0.19	UNR	4WD			4WD		1	1	1	2	1	1	1
1S1930	GR	1.69	UNT	ALL			ALL	ALL	1	1	1	2	4	1	1
1S1933	GR	0.37	UNT	4WD			4WD		1	3	1	2	1	1	2
2N1820	GR	0.34	UNT	ALL			ALL		1	1	1	3	4	4	1
2N1905	GR	0.25	UNT	ALL			ALL	ALL	1	1	1	2	3	1	1
2S1804	GR	0.94	UNT	ATV			ATV		1	1	1	2	4	4	1
2S1906	GR	0.42	UNT	4WD			4WD		1	1	1	3	3	1	1
FR10178	GR	0.64	UNR	4WD			4WD		2	2	1	2	1	1	3
FR10200	GR	0.37	UNT				ALL		2	1	1	2	3	1	2
FR14721	GR	0.12	UNR	4WD			4WD		1	2	1	2	1	1	2
FR4688	GR	0.73	UNR	ALL			ALL	ALL	1	1	1	2	2	1	1
FR5540	GR	0.47	UNT	4WD			4WD		1	1	1	2	1	1	1
FR6468	GR	0.04	UNR	ALL			ALL		1	1	1	2	1	1	2
FR6468	GR	0.18	UNR	ALL			ALL		1	1	1	2	1	1	1
FR6468	GR	0.02	UNR	ALL			ALL		1	1	1	2	1	1	1
FR6550	GR	2.27	UNR	ALL			ALL		1	1	1	2	3	1	1
FR8165	GR	0.05	UNT	4WD			4WD		1	4	1	2	1	1	1
FR83630	GR	0.21	UNR				ALL		1	1	1	2	2	1	1
FR8472	GR	0.18	UNT	4WD			4WD		1	1	1	2	1	1	1
FR8516	GR	0.05	UNT	4WD			4WD		2	1	1	2	1	1	3
FR8601	GR	0.47	UNR	4WD			4WD		2	3	1	2	1	1	1
FR8762	GR	0.13	UNT	4WD			4WD		1	1	1	2	1	1	1
FR8843	GR	0.86	UNT	4WD			4WD		1	2	1	2	1	1	2
FR8986	GR	0.51	UNT	4WD			4WD		1	1	1	2	1	1	1
FR9140	GR	0.04	UNT	4WD			4WD		1	1	1	2	1	1	1
FR9359	GR	0.13	UNR	4WD			4WD		1	1	1	2	1	1	1
FR98472	GR	0.67	UNT	4WD			4WD		1	2	1	2	2	1	1
FR98476	GR	0.50	UNT	4WD			4WD		1	1	1	2	3	1	1

Route	RD	MI	SYS	Alternative					Site Specific Review						
				1	2	3	4	5	BOT	CR	GEO	REC	SOIL	WAT	WLF
FR98477	GR	0.13	UNT	4WD			4WD		1	2	1	2	1	1	1
FR98479	GR	0.06	UNT	4WD			4WD		1	1	1	2	2	1	1
FR98481	GR	0.03	UNT	4WD			4WD		2	4	1	2	1	1	3
FR98482	GR	0.06	UNT	4WD			4WD		1	4	1	2	1	1	1
FR98483	GR	0.03	UNT	4WD			4WD		1	1	1	2	1	1	2
FR98484	GR	0.04	UNT	4WD			4WD		1	1	1	2	1	1	2
FR98485	GR	0.08	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98486	GR	0.21	UNT	4WD			4WD		2	1	4	2	2	1	2
FR98488	GR	0.05	UNT	4WD			4WD		2	1	1	2	1	1	3
FR98491	GR	0.19	UNT	4WD			4WD		1	2	4	2	1	1	1
FR98492	GR	0.09	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98493	GR	0.02	UNT	4WD			4WD		1	4	1	2	1	1	1
FR98494	GR	0.02	UNT	4WD			4WD		1	2	1	2	1	1	1
FR98495	GR	0.05	UNT	4WD			4WD		1	1	1	2	2	1	1
FR98496	GR	0.28	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98501	GR	0.08	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98502	GR	0.02	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98503	GR	0.09	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98504	GR	0.07	UNT	4WD			4WD		1	2	1	2	1	1	1
FR98506	GR	0.14	UNT	4WD			4WD		1	1	1	2	1	1	2
FR98507	GR	0.05	UNT	4WD			4WD		1	4	1	2	1	1	2
FR98508	GR	0.06	UNT	4WD			4WD		2	2	1	2	1	1	3
FR98509	GR	0.03	UNT	4WD			4WD		2	1	1	2	1	1	3
FR98510	GR	0.04	UNT	4WD			4WD		2	1	1	2	1	1	3
FR98511	GR	0.15	UNT	4WD			4WD		1	1	1	2	1	1	3
FR98513	GR	0.03	UNT	4WD			4WD		2	2	1	2	1	1	3
FR98514	GR	0.04	UNT	4WD			4WD		2	2	1	2	1	2	3
FR98515	GR	0.09	UNT	4WD			4WD		2	1	1	2	1	1	2
FR98520	GR	0.03	UNT	4WD			4WD		1	1	1	2	1	1	2
FR98522	GR	0.04	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98523	GR	0.08	UNT	4WD			4WD		1	2	1	2	1	1	1
FR98524	GR	0.03	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98529	GR	0.13	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98530	GR	0.07	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98531	GR	0.03	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98533	GR	0.10	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98535	GR	0.03	UNT	4WD			4WD		2	1	1	3	1	1	1
FR98537	GR	0.09	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98538	GR	0.14	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98539	GR	0.10	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98540	GR	0.03	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98541	GR	0.07	UNT	4WD			4WD		1	4	1	2	1	1	1
FR98544	GR	0.08	UNT	4WD			4WD		1	2	1	2	1	1	1
FR98545	GR	0.05	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98546	GR	0.03	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98547	GR	0.08	UNT	4WD			4WD		1	2	1	2	1	1	1
FR98548	GR	0.04	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98549	GR	0.39	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98550	GR	0.17	UNT	4WD			4WD		1	1	1	2	2	1	2
FR98551	GR	0.02	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98552	GR	0.03	UNT	4WD			4WD		1	4	1	2	1	1	2
FR98553	GR	0.14	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98554	GR	0.04	UNT	4WD			4WD		1	4	1	2	1	1	2
FR98555	GR	0.02	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98560	GR	0.06	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98563	GR	0.86	UNT	4WD			4WD		1	1	1	2	1	1	1

Route	RD	MI	SYS	Alternative					Site Specific Review						
				1	2	3	4	5	BOT	CR	GEO	REC	SOIL	WAT	WLF
FR98566	GR	0.05	UNT	4WD			4WD		2	2	1	2	1	2	3
FR98575	GR	0.13	UNT	4WD			4WD		1	1	1	2	1	3	3
FR98577	GR	0.03	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98580	GR	0.13	UNT	4WD			4WD		1	1	1	2	2	1	1
FR98581	GR	0.11	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98582	GR	0.06	UNT	4WD			4WD		1	2	1	2	1	1	1
FR98583	GR	0.07	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98584	GR	0.06	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98585	GR	0.06	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98586	GR	0.06	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98587	GR	0.04	UNT	4WD			4WD		1	1	4	2	1	1	1
FR98591	GR	0.05	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98592	GR	0.08	UNT	4WD			4WD		1	2	1	2	1	3	1
FR98593	GR	0.09	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98670	GR	0.20	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98671	GR	0.09	UNT	4WD			4WD		1	4	1	2	1	1	2
FR98672	GR	0.07	UNT	4WD			4WD		1	1	1	2	1	2	1
FR98674	GR	0.06	UNR	4WD			4WD		1	2	1	2	1	1	1
FR98675	GR	0.06	UNR	4WD			4WD		1	1	1	2	1	1	1
FR98676	GR	0.06	UNR	4WD			4WD		1	1	1	2	1	1	1
FS08490	GR	0.09	UNT	4WD			4WD		1	1	1	2	1	1	1
22	MW	0.08	UNT	ATV			ATV	ATV	2	1	1	2	2	1	1
16E182	MW	0.27	UNT	ALL			ALL		1	1	1	3	1	3	1
16E183	MW	1.26	UNT	ALL			ALL	ALL	2	2	1	2	2	1	1
11715A	MW	0.52	UNR	4WD			4WD		2	1	1	2	2	1	1
15EV38	MW	0.60	UNT	4WD			4WD		3	2	1	3	3	1	2
15EV43C	MW	0.69	UNT	ATV			ATV		2	1	1	3	4	1	1
15EV43G	MW	0.51	UNT	ATV			ATV		2	1	1	3	3	1	1
15EV46	MW	0.28	UNT	ATV			ATV		2	2	1	3	3	1	1
15EV47	MW	0.63	UNT	MC			MC		1	1	1	3	2	1	1
15EV47A	MW	0.12	UNT	ALL			ALL		2	1	1	3	3	1	1
15EV48	MW	0.64	UNT	ALL			ALL		2	2	1	3	3	1	1
15EV54	MW	0.18	UNT	ALL			ALL		2	2	1	2	4	2	1
16E182A	MW	0.19	UNT	ALL			ALL		1	1	1	3	1	4	1
16EV01	MW	0.05	UNT	4WD			4WD		1	1	1	2	3	1	1
16EV101	MW	1.90	UNT	MC			MC		1	1	1	3	3	2	1
16EV106	MW	1.50	UNT	MC			MC		2	1	1	3	1	1	1
16EV108	MW	0.74	UNT	MC			MC		3	1	1	3	3	1	1
16EV109	MW	1.14	UNT	MC			MC	MC	2	1	1	2	3	1	1
16EV109	MW	0.61	UNT	MC			MC	MC	2	1	1	2	3	2	1
16EV110	MW	1.15	UNT	MC			MC		2	1	1	2	2	1	1
16EV111	MW	0.44	UNT	MC			MC	MC	2	1	1	3	1	1	1
16EV112	MW	0.17	UNT	MC			MC		2	1	1	2	3	1	1
16EV115	MW	2.40	UNT	MC			MC		2	1	1	2	2	1	1
16EV117	MW	0.21	UNT	MC			MC	MC	2	1	1	2	1	1	1
16EV123	MW	0.33	UNT	ATV			ATV		2	1	1	2	1	1	1
16EV124	MW	0.15	UNT	ATV			ATV		2	1	1	2	1	1	1
16EV133	MW	0.43	UNT	MC			MC	MC	2	1	1	2	3	1	2
16EV136	MW	1.19	UNT	MC			MC	MC	2	1	1	2	3	1	1
16EV137	MW	0.45	UNT	MC			MC	MC	2	1	1	3	3	1	2
16EV141	MW	0.87	UNT	MC			MC	MC	2	1	1	3	3	3	1
16EV152	MW	0.56	UNT	ATV			ATV		2	1	1	2	1	1	2
16EV152	MW	0.33	UNT	ATV			ATV		2	1	1	2	2	1	2
16EV154	MW	1.13	UNT	MC			MC		2	2	1	2	1	1	2
16EV155	MW	0.06	UNT	ALL			ALL		2	1	1	2	2	1	2
16EV160	MW	1.31	UNT	MC			MC		2	2	1	3	1	3	2

Route	RD	MI	SYS	Alternative					Site Specific Review						
				1	2	3	4	5	BOT	CR	GEO	REC	SOIL	WAT	WLF
16EV176	MW	0.04	UNT	MC			MC	MC	2	4	1	2	3	1	1
16EV176	MW	0.50	UNT	MC			MC	MC	2	1	1	2	2	1	1
16EV177	MW	0.27	UNT	MC			MC	MC	2	1	1	2	3	1	2
16EV178	MW	0.66	UNT	MC			MC		2	1	1	2	3	1	1
16EV207	MW	0.03	UNT				MC		2	1	1	2	1	1	1
16EV209	MW	0.14	UNT				ATV		3	1	1	2	1	1	2
16EV210	MW	0.09	UNT	4WD			4WD		2	1	1	2	1	1	2
16EV211	MW	0.08	UNT	4WD			4WD		2	1	1	2	1	1	2
16EV213	MW	0.06	UNT	4WD			4WD		2	1	1	2	1	1	2
16EV222	MW	0.31	UNT				MC		2	1	1	3	3	2	1
16EV223	MW	1.35	UNT	ATV			ATV		2	1	1	2	3	1	1
16EV229	MW	0.37	UNT	MC			MC		2	1	1	3	3	2	1
16EV230	MW	0.78	UNT	MC			MC		2	2	1	3	3	2	1
16EV236	MW	0.96	UNT	MC			MC	MC	2	1	1	2	2	1	1
16EV237	MW	0.09	UNT	4WD			4WD		2	2	1	2	1	1	1
16EV240	MW	0.11	UNT				MC		2	1	1	2	1	1	1
16EV243	MW	0.31	UNT	MC			MC		2	3	1	2	1	2	1
16EV244	MW	0.49	UNT	MC			MC	MC	2	1	1	2	1	1	1
16EV247	MW	0.68	UNT	MC			MC	MC	2	1	1	2	1	1	2
16EV248	MW	0.93	UNT	MC			MC		2	1	1	3	4	1	1
16EV249	MW	0.28	UNT	MC			MC	MC	2	1	1	3	2	1	1
16EV251	MW	0.32	UNT	MC			MC		1	1	1	3	1	1	1
16EV253	MW	0.89	UNT	MC			MC		2	1	1	3	1	2	2
16EV254	MW	0.51	UNT	MC			MC	MC	2	1	1	3	3	3	2
16EV255	MW	0.43	UNT	MC			MC	MC	2	1	1	3	3	2	1
16EV256	MW	0.24	UNT	ALL			ALL	ALL	2	1	1	2	1	1	1
16EV257	MW	1.37	UNT	MC			MC		1	1	1	2	2	1	2
16EV257A	MW	0.03	UNT	MC			MC		1	1	1	2	2	1	2
16EV258	MW	0.47	UNT				MC		2	1	1	2	2	2	2
16EV258	MW	0.09	UNT	MC			MC		2	1	1	3	2	2	2
16EV259	MW	0.45	UNT				MC	MC	2	1	1	2	1	2	2
16EV259	MW	0.09	UNT	MC			MC	MC	2	1	1	2	1	2	2
16EV259A	MW	0.17	UNT	MC			MC		2	3	1	2	1	1	2
16EV262	MW	0.09	UNT	MC			MC		2	1	1	2	1	1	1
16EV263	MW	0.02	UNT	4WD			4WD		2	1	1	2	1	2	1
16EV265	MW	0.12	UNT	MC			MC		3	1	1	3	1	2	2
16EV266	MW	0.21	UNT	MC			MC		2	3	1	3	1	1	1
16EV266A	MW	0.03	UNT	MC			MC		2	1	1	3	1	1	1
16EV267	MW	0.27	UNT	MC			MC		2	1	1	2	3	1	1
16EV268	MW	0.38	UNT	MC			MC		2	1	1	2	1	1	1
16EV269	MW	0.22	UNT	MC			MC		2	2	1	3	1	2	1
16EV272	MW	0.53	UNT	MC			MC		2	2	1	2	1	1	1
16EV273	MW	0.19	UNT				ATV		2	3	1	2	2	1	1
16EV292	MW	0.14	UNT	4WD			4WD		2	2	1	2	1	1	1
16EV296	MW	0.36	UNT	MC			MC		2	1	1	2	2	1	1
16EV299	MW	0.40	UNT				ATV		2	1	1	2	3	1	1
16EV299B	MW	0.26	UNT				ATV		2	1	1	2	3	1	1
16EV302	MW	0.31	UNT	MC			MC	MC	2	1	1	2	1	2	1
16EV303	MW	0.20	UNT	MC			MC	MC	2	2	1	2	2	1	1
16EV304	MW	0.09	UNT	MC			MC	MC	2	1	1	2	2	1	1
16EV305	MW	0.54	UNT	PER			PER	PER	2	1	1	2	3	1	1
16EV306	MW	0.16	UNT	MC			MC		2	1	1	2	2	1	1
16EV318	MW	0.45	UNT	4WD			4WD		2	1	1	2	3	1	1
16EV54	MW	2.36	UNT	MC			MC		2	1	1	3	1	3	1
16EV78	MW	0.19	UNT	ATV			ATV		2	1	1	2	1	1	1
16EV79	MW	0.61	UNT	MC			MC		2	2	1	2	1	1	1

Route	RD	MI	SYS	Alternative					Site Specific Review						
				1	2	3	4	5	BOT	CR	GEO	REC	SOIL	WAT	WLF
16EV79	MW	0.85	UNT	MC			MC		2	2	1	2	1	1	1
16EV81	MW	0.54	UNT	MC			MC		2	3	1	2	1	1	1
17EV101	MW	1.06	UNT				MC		2	1	1	2	3	1	1
17EV104	MW	0.87	UNT	MC			MC		2	1	1	2	1	1	2
17EV11	MW	0.48	UNT	ALL			ALL		1	2	1	2	3	1	1
17EV11	MW	0.91	UNT	ALL			ALL		1	2	1	2	4	1	1
17EV117	MW	0.55	UNT	MC			MC		1	1	1	2	2	1	1
17EV117	MW	0.57	UNT	MC			MC		2	1	1	2	2	1	1
17EV118	MW	1.37	UNT	MC			MC		2	1	1	2	3	2	2
17EV12	MW	0.83	UNT				ALL		1	2	1	2	4	1	1
17EV120	MW	0.11	UNT	MC			MC		2	1	1	2	3	1	2
17EV121	MW	0.50	UNT	PER			PER		2	1	1	2	3	1	2
17EV122B	MW	0.29	UNT	PER			PER		2	1	1	2	1	1	2
17EV122B	MW	0.05	UNT	PER			PER		2	1	1	2	1	1	2
17EV14	MW	0.74	UNT	ALL			ALL		1	3	1	3	2	3	1
17EV15	MW	0.35	UNT				ATV		1	1	1	2	1	1	1
17EV153	MW	0.31	UNT	ALL			ALL		2	1	1	2	1	1	1
17EV153	MW	0.25	UNT	ALL			ALL		2	1	1	2	1	1	1
17EV157	MW	0.11	UNT	ALL			ALL	ALL	2	1	1	2	1	1	1
17EV15B	MW	0.79	UNT	ATV			ATV		1	3	1	2	1	1	1
17EV160	MW	0.15	UNT	ALL			ALL	ALL	2	1	1	2	1	1	1
17EV162	MW	0.19	UNT	ATV			ATV		2	1	1	2	1	1	1
17EV202	MW	0.38	UNT	4WD			4WD		2	1	1	2	1	1	1
17EV205	MW	0.25	UNT	ATV			ATV	ATV	1	1	1	2	4	1	1
17EV210	MW	1.09	UNT	ATV			ATV		2	1	1	2	3	1	2
17EV210A	MW	0.32	UNT	MC			MC	MC	2	1	1	2	1	1	2
17EV212	MW	1.19	UNT				4WD		2	2	1	2	4	1	1
17EV220	MW	0.33	UNT	4WD			ALL	4WD	2	1	1	2	1	1	1
17EV220B	MW	0.05	UNT	4WD			ALL	4WD	2	1	1	2	1	1	1
17EV23	MW	0.47	UNT				4WD		2	1	1	2	1	1	1
17EV231	MW	0.32	UNT	4WD			4WD		2	1	1	2	4	1	1
17EV233	MW	0.13	UNT				ATV		1	1	1	4	1	3	1
17EV233	MW	0.25	UNT				ATV		1	2	1	4	1	1	1
17EV235	MW	0.59	UNT	MC			MC	MC	2	1	1	2	2	1	1
17EV236	MW	0.26	UNT	ATV			ATV		2	1	1	3	3	1	1
17EV237	MW	0.16	UNT	ATV			ATV	ATV	1	1	1	2	1	1	1
17EV238	MW	0.68	UNT	ALL			ALL	ALL	1	1	1	2	1	1	2
17EV238A	MW	0.29	UNT	ALL			ALL	ALL	1	1	1	2	2	1	2
17EV239	MW	0.24	UNT	ALL			ALL	ALL	1	1	1	2	1	1	1
17EV240	MW	0.19	UNT	ALL			ALL	ALL	1	1	1	2	1	1	1
17EV241	MW	0.27	UNT	ATV			ATV	ATV	1	2	1	2	1	1	1
17EV245	MW	0.07	UNT	4WD			ALL	4WD	1	1	1	2	1	1	1
17EV249	MW	0.12	UNT	4WD			ALL		1	4	1	2	3	1	1
17EV249A	MW	0.10	UNT	4WD			ALL		1	4	1	2	1	1	1
17EV254	MW	0.12	UNT				ALL		1	2	1	2	1	1	1
17EV255	MW	0.48	UNT				ATV		2	1	1	2	3	1	1
17EV261	MW	0.18	UNT	4WD			ALL	4WD	1	1	1	2	1	1	1
17EV261A	MW	0.07	UNT	4WD			ALL	4WD	1	1	1	2	1	1	1
17EV263	MW	0.18	UNT				ALL		1	1	1	2	1	1	1
17EV264	MW	0.14	UNT	ALL			ALL		1	1	1	2	1	1	1
17EV266	MW	0.26	UNT				ALL		1	1	1	2	1	1	1
17EV267	MW	0.22	UNT	4WD			ALL		1	4	1	2	1	2	1
17EV268	MW	0.39	UNT	4WD			ALL		1	4	1	2	1	3	1
17EV28	MW	1.38	UNT				ATV		1	1	1	3	3	3	1
17EV281	MW	0.27	UNT	ALL			ALL	ALL	1	1	1	2	1	1	2
17EV282	MW	0.10	UNT	ALL			ALL	ALL	1	1	1	2	1	1	2

Route	RD	MI	SYS	Alternative					Site Specific Review						
				1	2	3	4	5	BOT	CR	GEO	REC	SOIL	WAT	WLF
17EV283	MW	0.20	UNT	MC			MC	MC	1	1	1	2	1	1	1
17EV289	MW	0.66	UNT	ATV			ATV		1	1	1	2	4	1	1
17EV28A	MW	0.08	UNT	ALL			ALL	ALL	1	1	1	2	1	1	1
17EV290	MW	0.40	UNT	ALL			ALL	ALL	1	1	1	2	1	1	1
17EV293	MW	0.79	UNT	ALL			ALL		1	1	1	2	2	1	1
17EV297	MW	0.49	UNT				ATV		1	1	1	3	4	4	1
17EV299	MW	0.59	UNT	ATV			ATV		1	1	1	2	1	2	1
17EV300	MW	0.23	UNT	ALL			ALL	ALL	2	1	1	2	1	1	1
17EV303	MW	0.83	UNT	ALL			ALL		2	1	1	2	1	1	1
17EV306	MW	0.14	UNT				4WD		1	1	1	4	1	1	1
17EV34	MW	0.27	UNT	ALL			ALL		1	1	1	2	1	1	1
17EV37	MW	0.93	UNT	ATV			ATV		2	1	1	2	2	1	1
17EV45	MW	1.68	UNT	ATV			ATV		1	1	1	2	3	1	1
17EV50	MW	2.27	UNT				ATV		2	2	1	2	1	1	1
17EV51	MW	3.06	UNT				ATV		1	4	1	2	1	1	1
17EV51	MW	0.84	UNT	ATV			ATV	ATV	1	2	1	3	1	2	1
17EV53	MW	2.97	UNT	ALL			ALL		2	1	1	2	1	1	1
17EV54	MW	0.50	UNT	ATV			ATV		2	1	1	2	1	1	1
17EV58	MW	1.19	UNT	ALL			ALL		2	2	1	2	1	1	1
17EV60	MW	0.51	UNT	ALL			ALL		2	1	1	2	1	1	1
17EV60	MW	0.55	UNT	ATV			ATV		2	1	1	2	1	1	1
17EV67	MW	0.28	UNT	ATV			ATV	ATV	1	2	1	3	1	2	2
17EV67A	MW	0.36	UNT	ATV			ATV	ATV	2	1	1	2	2	2	1
17EV71	MW	1.14	UNT	ATV			ATV		1	2	1	3	1	1	1
17EV75	MW	0.46	UNT	ATV			ATV	ATV	1	2	1	2	3	1	1
17EV78	MW	0.30	UNT	ATV			ATV		2	1	1	2	2	1	1
17EV79	MW	1.29	UNT	ATV			ATV		1	1	1	2	2	1	1
17EV80	MW	0.23	UNT	ATV			ATV	ATV	1	1	1	3	2	2	1
17EV85	MW	2.01	UNT	MC			MC		1	1	1	2	2	1	1
17EV88	MW	1.53	UNT	ALL			ALL		2	1	1	2	1	1	1
17EV91	MW	1.03	UNT	ATV			ATV		2	1	1	2	2	1	1
18EV100	MW	0.08	UNT	ALL			ALL		1	1	1	2	1	3	1
18EV100	MW	0.31	UNT	ATV			ATV		1	1	1	4	1	4	1
18EV101A	MW	0.17	UNT				ATV		1	1	1	2	1	1	1
18EV101B	MW	0.53	UNT				ATV		1	1	1	3	1	2	1
18EV105	MW	0.69	UNT	MC			MC		2	3	1	3	1	3	1
18EV106	MW	0.41	UNT	ALL			ALL		2	1	1	2	4	1	1
18EV110	MW	1.33	UNT	MC			MC		2	1	1	2	1	1	1
18EV133	MW	0.35	UNT	ALL			ALL		1	1	1	2	4	1	1
18EV134	MW	3.19	UNT	ALL			ALL		2	1	1	2	3	1	1
18EV170	MW	1.13	UNT	MC			MC		2	1	1	2	1	1	1
18EV170	MW	1.69	UNT	MC			MC		2	1	1	2	1	1	1
18EV257	MW	0.18	UNT	ATV			ATV		1	1	1	2	1	1	1
18EV258	MW	0.57	UNT	ATV			ATV		1	4	1	2	1	1	1
18EV259	MW	0.48	UNT				ATV		2	1	1	2	1	1	2
18EV260	MW	0.28	UNT	ATV			ATV		1	1	1	2	1	1	1
18EV270	MW	0.36	UNT	ALL			ALL		1	1	1	2	1	1	1
18EV271	MW	0.67	UNT	ATV			ATV		2	1	1	2	2	1	1
18EV275	MW	0.31	UNT				ALL		1	1	1	2	2	1	1
18EV276	MW	0.10	UNT	ATV			ATV		1	1	1	3	1	1	1
18EV277	MW	0.09	UNT	ALL			ALL	ALL	1	1	1	2	1	1	1
18EV278	MW	0.60	UNT				MC		1	2	1	2	2	1	2
18EV281	MW	0.05	UNT	4WD			4WD		1	4	1	2	1	1	1
18EV282	MW	0.15	UNT	MC			MC	MC	1	1	1	2	3	1	2
18EV283	MW	0.28	UNT	4WD			4WD		1	2	1	2	1	2	2
18EV284	MW	0.07	UNT	4WD			4WD		1	1	1	2	1	1	2

Route	RD	MI	SYS	Alternative					Site Specific Review						
				1	2	3	4	5	BOT	CR	GEO	REC	SOIL	WAT	WLF
18EV304	MW	0.19	UNT	ATV			ATV		2	1	1	2	1	1	1
18EV304	MW	0.13	UNT	ALL			ALL		2	1	1	2	1	1	1
18EV308	MW	0.12	UNT	ALL			ALL		2	4	1	3	1	2	1
18EV309	MW	0.12	UNT	ALL			ALL	ALL	2	1	1	3	1	2	1
18EV310	MW	0.56	UNT	4WD			4WD		1	1	1	3	1	1	1
18EV315	MW	0.36	UNT	4WD			ALL	4WD	1	1	1	2	1	1	1
18EV34	MW	0.65	UNT	ATV			ATV		1	1	1	2	3	1	1
18EV51	MW	0.54	UNT				ATV		1	3	1	2	3	1	1
18EV56	MW	1.38	UNT	ATV			ATV		1	1	1	2	3	1	1
18EV57	MW	0.86	UNT	MC			MC		1	1	1	2	3	1	1
18EV63	MW	0.26	UNT	ATV			ATV		1	1	1	2	1	1	2
18EV67	MW	1.68	UNT	MC			MC		2	3	1	3	2	2	1
18EV70	MW	0.68	UNT	MC			MC		2	1	1	2	2	1	1
18EV77	MW	1.54	UNT	MC			MC		1	1	1	2	3	1	2
18EV88	MW	0.70	UNT	ATV			ATV		2	1	1	2	1	3	1
18EV88	MW	0.03	UNT	ATV			ATV		2	1	1	3	1	2	1
18EV90	MW	0.81	UNT	ATV			ATV		2	1	1	2	1	2	1
18EV91	MW	0.33	UNT	ALL			ALL	ALL	2	1	1	3	3	1	1
18EV94	MW	0.17	UNT				ALL	ALL	2	1	1	2	1	1	1
18EV95	MW	0.33	UNT	4WD			4WD		2	1	1	3	1	3	1
19EV100	MW	1.08	UNT				ALL		1	1	1	2	2	1	2
19EV101	MW	0.57	UNT	4WD			4WD		2	1	1	2	3	1	1
19EV29	MW	0.47	UNT	4WD			4WD		2	1	1	2	2	1	1
21703A	MW	0.08	UNT	ALL			ALL	ALL	2	1	1	2	1	1	1
21703C	MW	0.52	UNT	ALL			ALL	ALL	1	1	1	2	1	1	1
21704A	MW	0.39	UNT	ALL			ALL	ALL	2	1	1	2	1	1	1
21704B	MW	0.21	UNT	ALL			ALL	ALL	1	1	1	2	1	1	1
21711G	MW	0.70	UNR				ATV		1	2	1	3	1	3	1
21711J	MW	0.28	UNR				ATV		1	1	1	2	1	1	1
31614C	MW	0.05	UNT	4WD			4WD		2	1	1	3	1	2	1
31623G	MW	0.41	UNT	4WD			4WD		2	1	1	2	1	1	1
31734B	MW	0.09	UNT	ALL			ALL	ALL	1	1	1	2	1	1	1
31736A	MW	0.17	UNT	4WD			4WD		2	1	1	2	1	1	1
31818G	MW	0.15	UNR	ATV			ATV		2	1	1	2	3	1	1
31821C	MW	0.20	UNR	4WD			4WD		1	1	1	3	3	1	1
31821H	MW	0.10	UNT	4WD			4WD		1	2	1	4	4	1	1
41735B	MW	0.06	UNT	4WD			4WD		1	1	1	2	1	1	1
EV14835	MW	0.19	UNT				MC		2	1	1	2	4	1	1
EV681	MW	0.09	UNT	4WD			4WD		1	2	1	2	2	1	1
FR12319	MW	0.55	UNR				ATV		1	1	1	2	3	2	1
FR12319	MW	0.51	UNR				ATV		1	1	1	2	3	2	1
FR13563	MW	0.05	UNT	ALL			ALL	ALL	2	1	1	2	1	1	1
FR15091	MW	0.47	UNR				ATV		1	3	1	3	1	2	1
FR15091	MW	0.34	UNR				ATV		1	2	1	3	1	2	1
FR98590	MW	0.10	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98596	MW	0.10	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98597	MW	0.09	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98598	MW	0.08	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98599	MW	0.04	UNT	4WD			4WD		2	1	1	2	1	2	1
FR98601	MW	0.05	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98602	MW	0.08	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98603	MW	0.07	UNT	4WD			4WD		1	3	1	2	1	1	1
FR98604	MW	0.03	UNT	4WD			4WD		2	1	1	2	1	2	1
FR98608	MW	0.07	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98609	MW	0.05	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98612	MW	0.04	UNT	4WD			4WD		1	4	1	2	1	1	1

Route	RD	MI	SYS	Alternative					Site Specific Review						
				1	2	3	4	5	BOT	CR	GEO	REC	SOIL	WAT	WLF
FR98616	MW	0.03	UNT	4WD			4WD		1	2	1	2	1	1	1
FR98617	MW	0.04	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98618	MW	0.04	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98619	MW	0.11	UNT	4WD			4WD		2	1	1	2	4	1	1
FR98620	MW	0.08	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98679	MW	0.07	UNT	4WD			4WD		2	2	1	3	1	2	1
FR98680	MW	0.04	UNT	4WD			4WD		2	2	1	3	1	2	1
FR98682	MW	0.05	UNT	4WD			4WD		2	1	1	2	1	2	1
FR98683	MW	0.06	UNT	4WD			4WD		2	1	1	2	1	2	1
FR98685	MW	0.03	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98686	MW	0.03	UNT	4WD			4WD		1	2	1	2	1	1	1
FR98688	MW	0.05	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98689	MW	0.06	UNT	4WD			4WD		2	1	1	3	1	1	1
FR98690	MW	0.04	UNT	4WD			4WD		1	4	1	3	1	1	1
FR98691	MW	0.06	UNT	4WD			4WD		1	4	1	3	1	3	1
FR98692	MW	0.07	UNT	4WD			4WD		1	1	1	3	1	2	1
FR98693	MW	0.01	UNT	4WD			4WD		1	1	1	3	1	2	1
FR98694	MW	0.03	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98695	MW	0.04	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98696	MW	0.03	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98697	MW	0.12	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98699	MW	0.05	UNT	4WD			4WD		2	2	1	2	1	2	2
FR98700	MW	0.02	UNT	4WD			4WD		2	1	1	2	1	1	2
FR98701	MW	0.02	UNT	4WD			4WD		2	1	1	2	1	2	1
FR98702	MW	0.04	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98703	MW	0.06	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98704	MW	0.15	UNT	4WD			4WD		1	4	1	3	4	4	1
FR98705	MW	0.04	UNT	4WD			4WD		2	1	1	2	1	1	1
FR98707	MW	0.02	UNT	4WD			4WD		1	1	1	2	1	1	1
FR98708	MW	0.02	UNT	4WD			4WD		1	1	1	2	1	1	1

Legend

4WD 4 Wheel Drive
ADM Administrative Use Only (closed to public motorized use)
ALL All Vehicles
ATV ATV (open to ATV and Motorcycle)
BOT Botany
CAL Calaveras
GEO Geology
GR Groveland
HR Heritage Resources
MC Motorcycle
MI Miles
MW Mi-Wok
PER Permit Only
RD Ranger District
REC Recreation
SYS System (National Forest System)
UNT Unauthorized Trail
UNR Unauthorized Road
WLF Wildlife and Fish

I. Route Data

The action alternatives consider a number of additions to the NFTS and changes to the existing NFTS. This appendix shows the route data listing of all additions and changes considered in an alternative. The route data identifies:

- the alternative(s) under which the additions or change to the existing NFTS is proposed;
- the type of vehicles allowed;
- season when the route would be open; and,
- mitigation measures and other requirements that would be implemented on the route prior to publication on a MVUM and allowing public use (see Appendix F, Maintenance and Mitigation Definitions).

I.01 ADDITIONS TO THE NFTS

Table I.01-1 lists the vehicle class, season of use (SEA) and mitigations/requirements for the additions to the NFTS proposed in one or more of the action alternatives.

Table I.01-1 Additions to the NFTS: Vehicle Class, Season of Use and Mitigation/Requirement

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
16EV191	CAL	0.13	INV	UNT	ATV	NAT	ATV			ATV	ATV	4912	Calaveras Dome	3	
17EV130	CAL	0.81	INV	UNT	MC	NAT	MC			MC		4911	Tamarack	3	low impact barriers 300' north side; drain dips and tread harden >20% grade 700' and drain dips remainder
17EV275	CAL	0.01	INV	UNT	ALL	NAT	ALL			ALL		4911	Tamarack	3	
17EV275	CAL	0.02	INV	UNT	MC	NAT	MC			MC		4911	Tamarack	3	
17EV278	CAL	1.06	INV	UNT	ATV	NAT	ATV			ATV		4911	Tamarack	3	drain dips and tread harden >20% grade 400' and drain dips remainder
17EV279	CAL	1.08	INV	UNT	ATV	NAT	ATV			ATV		4911	Tamarack	3	drain dips and tread harden >20% grade 500' and drain dips remainder
17EV280	CAL	0.48	INV	UNT	MC	NAT	MC			MC		4911	Tamarack	3	drain dips and tread harden >20% grade 400' and drain dips remainder
17EV307	CAL	0.09	INV	UNT	ALL	NAT	ALL			ALL		4914	Liberty Hill	3	
18EV286	CAL	0.39	INV	UNT	ATV	NAT	ATV			ATV	ATV	4911	Tamarack	3	
18EV287	CAL	1.34	INV	UNT	ALL	NAT	ALL			ALL		4911	Tamarack	3	
18EV288	CAL	1.96	INV	UNT	MC	NAT	MC			MC		4911	Tamarack	3	drain dips and tread harden >20% grade 300' and drain dips remainder; tread harden approaches to 15' each side crossing 2; replace fill over culverts at crossing 6
18EV289	CAL	0.53	INV	UNT	ALL	NAT				4WD		4911	Tamarack	3	
18EV292	CAL	0.08	INV	UNT	ALL	NAT	4WD			ALL	4WD	4911	Tamarack	3	
18EV293	CAL	0.06	INV	UNT	ALL	NAT	4WD			4WD		4911	Tamarack	3	
18EV295	CAL	0.30	INV	UNT	ALL	NAT	4WD			4WD		4911	Tamarack	3	
18EV295A	CAL	0.06	INV	UNT	ALL	NAT	4WD			4WD		4911	Tamarack	3	
18EV297	CAL	0.08	INV	UNT	ALL	NAT	4WD			4WD	4WD	4902	Spicer Mdw Res	3	
18EV298	CAL	0.18	INV	UNT	ALL	NAT	4WD			4WD	4WD	4902	Spicer Mdw Res	3	
18EV299	CAL	0.14	INV	UNT	ALL	NAT	4WD			4WD	4WD	4902	Spicer Mdw Res	3	
18EV300	CAL	0.08	INV	UNT	ALL	NAT	4WD			4WD	4WD	4902	Spicer Mdw Res	3	
18EV301	CAL	0.09	INV	UNT	ALL	NAT	4WD			4WD	4WD	4902	Spicer Mdw Res	3	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
18EV303	CAL	0.10	INV	UNT	ALL	NAT	4WD			4WD	4WD	5063	Pacific Valley	3	
19EV110	CAL	0.09	INV	UNT	ALL	NAT	4WD			4WD	4WD	5063	Pacific Valley	3	
19EV111	CAL	0.32	INV	UNT	ALL	NAT	4WD			4WD		5063	Pacific Valley	3	
19EV111A	CAL	0.14	INV	UNT	ALL	NAT	4WD			4WD	4WD	5063	Pacific Valley	3	
19EV112	CAL	0.04	INV	UNT	ALL	NAT	4WD			4WD	4WD	5064	Ebbetts Pass	3	
19EV113	CAL	0.04	INV	UNT	ALL	NAT	4WD			4WD		5064	Ebbetts Pass	3	
20EV100	CAL	0.09	INV	UNT	ALL	NAT	4WD			4WD		5064	Ebbetts Pass	3	
20EV101A	CAL	0.05	INV	UNT	ALL	NAT	4WD			4WD	4WD	5064	Ebbetts Pass	3	
61602E	CAL	0.23	GIS	UNR	ALL	NAT				4WD		4912	Calaveras Dome	3	
61618A	CAL	0.04	MAP	UNR	ALL	NAT	ALL			ALL		4924	Dorrington	3	
FR10176	CAL	0.09	MAP	UNT	ALL	NAT	4WD			4WD		4912	Calaveras Dome	3	
FR14617	CAL	0.04	GPS	UNT	ALL	NAT	ALL			ALL	ALL	4912	Calaveras Dome	3	
FR8437	CAL	0.13	MAP	UNT	ALL	NAT	4WD			4WD	4WD	4901	Dardanelles Cone	3	
FR8784	CAL	0.07	MAP	UNT	ALL	NAT	4WD			4WD	4WD	5064	Ebbetts Pass	3	
FR9084	CAL	0.17	MAP	UNT	ALL	NAT	4WD			4WD		4913	Boards Crossing	3	
FR9090	CAL	0.17	MAP	UNT	ALL	NAT	4WD			4WD		4911	Tamarack	3	
FR9438	CAL	0.10	MAP	UNT	ALL	NAT	4WD			4WD	4WD	5064	Ebbetts Pass	3	drain dips 75' at pull-out parking
FR9439	CAL	0.16	MAP	UNT	ALL	NAT	4WD			4WD	4WD	5064	Ebbetts Pass	3	
FR9440	CAL	0.04	MAP	UNT	ALL	NAT	4WD			4WD	4WD	5064	Ebbetts Pass	3	
FR9441	CAL	0.18	MAP	UNT	ALL	NAT	4WD			4WD	4WD	4911	Tamarack	3	segment 2: rock barriers 300' between trail and Silver Creek; rock barriers 20' at high water line of North Fork Diversion
FR9501	CAL	0.09	MAP	UNR	ALL	NAT	4WD			4WD		4911	Tamarack	3	low impact barriers 300' north side
FR98607	CAL	0.05	INV	UNT	ALL	NAT	4WD			4WD		4924	Dorrington	3	
FR98622	CAL	0.04	INV	UNT	ALL	NAT	4WD			4WD		4913	Boards Crossing	3	
FR98623	CAL	0.05	INV	UNT	ALL	NAT	4WD			4WD		4913	Boards Crossing	3	
FR98624	CAL	0.20	INV	UNT	ALL	NAT	4WD			4WD		4913	Boards Crossing	3	
FR98625	CAL	0.06	INV	UNT	ALL	NAT	4WD			4WD		4913	Boards Crossing	3	
FR98627	CAL	0.06	INV	UNT	ALL	NAT	4WD			4WD		4913	Boards Crossing	3	
FR98630	CAL	0.04	INV	UNT	ALL	NAT	4WD			4WD		4914	Liberty Hill	3	
FR98631	CAL	0.06	INV	UNT	ALL	NAT	4WD			4WD		4914	Liberty Hill	3	
FR98633	CAL	0.10	INV	UNT	ALL	NAT	4WD			4WD		4921	Garnet Hill	3	
FR98634	CAL	0.05	INV	UNT	ALL	NAT	4WD			4WD		4921	Garnet Hill	3	
FR98636	CAL	0.11	INV	UNT	ALL	NAT	4WD			4WD		4912	Calaveras Dome	3	
FR98637	CAL	0.07	INV	UNT	ALL	NAT	4WD			4WD		4912	Calaveras Dome	3	
FR98638	CAL	0.04	INV	UNT	ALL	NAT	4WD			4WD		4912	Calaveras Dome	3	
FR98639	CAL	0.14	INV	UNT	ALL	NAT	4WD			4WD		4912	Calaveras Dome	3	
FR98643	CAL	0.08	INV	UNT	ALL	NAT	4WD			4WD		4912	Calaveras Dome	3	
FR98644	CAL	0.06	INV	UNT	ALL	NAT	4WD			4WD		4912	Calaveras Dome	3	
FR98646	CAL	0.05	INV	UNT	ALL	NAT	4WD			4WD		4911	Tamarack	3	
FR98647	CAL	0.04	INV	UNT	ALL	NAT	4WD			4WD		4911	Tamarack	3	
FR98660	CAL	0.05	INV	UNT	ALL	NAT	4WD			4WD		4911	Tamarack	3	
FR98661	CAL	0.12	INV	UNT	ALL	NAT	4WD			4WD		4911	Tamarack	3	
FR98662	CAL	0.07	INV	UNT	ALL	NAT	4WD			4WD		5064	Ebbetts Pass	3	
FR98663	CAL	0.05	INV	UNT	ALL	NAT	4WD			4WD		5064	Ebbetts Pass	3	
11808B	GR	0.03	GIS	UNT	ALL	NAT	4WD			4WD		4571	Duckwall Mt	3	SHPO consultation; tread harden wet area 100' MP 0.01-0.03
11908M	GR	0.13	GIS	UNT	ALL	NAT	4WD			4WD		4571	Duckwall Mt	3	
17EV182	GR	1.62	INV	UNT	ALL	NAT	ALL			ALL	ALL	4391	Buckhorn Peak	1	annual maintenance
17EV183	GR	0.64	INV	UNT	ALL	NAT	ALL			ALL	ALL	4391	Buckhorn Peak	1	annual maintenance; hardened drain dips >15% grade 1000' and drain dips remainder
17EV184	GR	0.60	INV	UNT	MC	NAT	MC			MC		4391	Buckhorn Peak	1	annual maintenance; drain dips 3000'
17EV192	GR	0.63	INV	UNT	ALL	NAT	ALL			ALL		4574	Jawbone Ridge	2	low impact barriers 100' each side; RLF: USFWS consultation; surveys; tread harden stream crossings

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
17EV192A	GR	0.06	INV	UNT	ALL	NAT	ALL			ALL		4574	Jawbone Ridge	2	SHPO consultation; RLF: USFWS consultation; surveys
17EV192B	GR	0.15	INV	UNT	ALL	NAT	ALL			ALL		4574	Jawbone Ridge	2	RLF: USFWS consultation; surveys; tread harden stream crossings
17EV194	GR	0.39	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	RLF: USFWS consultation; surveys; tread harden stream crossings
17EV195	GR	0.50	INV	UNT	ALL	NAT	ALL			ALL		4574	Jawbone Ridge	2	RLF surveys
17EV196	GR	0.19	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	RLF surveys
17EV197	GR	0.35	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	tread harden ephemeral drainage 20' MP 0.28; drain dips and tread harden >25% grade 100' and drain dips remainder; RLF surveys
17EV197	GR	0.46	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	tread harden ephemeral drainage 30' MP 0.01; drain dips and tread harden >25% grade 100' and drain dips remainder; drain dips 135' on left (looking upstream) approach to channel; RLF surveys
17EV197A	GR	0.05	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	
17EV317	GR	0.06	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	
17EV318	GR	0.13	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	
17EV319	GR	0.21	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	
17EV320	GR	0.13	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	
17EV321	GR	0.05	INV	UNT	ALL	NAT	ALL			ALL		4574	Jawbone Ridge	2	
17EV322	GR	0.04	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	
17EV323	GR	0.03	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	
17EV324	GR	0.03	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	
17EV325	GR	0.03	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	
17EV326	GR	0.02	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	
17EV327	GR	0.30	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	drain dips and tread harden >25% grade 700' and drain dips remainder
17EV328	GR	0.06	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	
17EV329	GR	0.05	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	tread harden wet seep/spring 150' MP 0.025
17EV330	GR	0.10	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	
17EV331	GR	0.11	INV	UNT	ALL	NAT	ALL			ALL		4574	Jawbone Ridge	2	
17EV332	GR	0.05	INV	UNT	ALL	NAT	ALL			ALL		4574	Jawbone Ridge	2	tread harden 265' MP 0.0-0.05
17EV901	GR	0.37	INV	UNT	ALL	NAT	ALL			ALL		4574	Jawbone Ridge	2	low impact barriers 100' each side; drain dips 480' MP 0.16-0.25; hardened drain dips >15% grade 1000' and drain dips remainder
18EV268	GR	0.51	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	drain dips and tread harden >25% grade 200' and drain dips remainder
18EV269	GR	0.16	INV	UNT	ALL	NAT	ALL			ALL		4574	Jawbone Ridge	2	
18EV34	GR	1.27	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
1N1829	GR	0.08	MAP	UNT	ALL	NAT	ALL			ALL		4571	Duckwall Mt	3	
1S1727	GR	0.87		UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	low impact barriers 100' north side; drain dips and tread harden >25% grade 600' and drain dips remainder
1S1728	GR	0.47	MAP	UNT	ALL	NAT	4WD			4WD		4574	Jawbone Ridge	2	
1S1734A	GR	0.86	MAP	UNT	ALL	NAT				4WD		4574	Jawbone Ridge	2	hardened drain dips >15% grade 1300' and drain dips remainder; RLF surveys
1S1736	GR	0.46	MAP	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	low impact barriers 1300' each side; drain dips and tread harden >25% grade 400' and drain dips remainder

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
1S17E35B	GR	0.34	INV	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	drain dips and tread harden >25% grade 400' and drain dips remainder; RLF surveys
1S17M	GR	1.13	MAP	UNT	ATV	NAT	ATV			ATV		4574	Jawbone Ridge	2	RLF: USFWS consultation; surveys; tread harden stream crossings
1S1811	GR	0.56	MAP	UNT	ALL	NAT				4WD		4563	Ascension Mt	3	
1S1822B	GR	0.05	MAP	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
1S1822C	GR	0.31	MAP	UNT	ALL	NAT				4WD		4563	Ascension Mt	2	hardened drain dips >15% grade 500' and drain dips remainder
1S1824	GR	0.36	MAP	UNT	ALL	NAT				ALL		4563	Ascension Mt	2	
1S1902	GR	0.24	MAP	UNT	ALL	NAT	4WD			4WD		4561	Lake Eleanor	2	
1S1907A	GR	0.39	MAP	UNT	ALL	NAT				4WD		4563	Ascension Mt	2	SHPO consultation
1S1909	GR	0.25	MAP	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
1S1913	GR	0.72	MAP	UNT	ALL	NAT				ALL		4564	Ackerson Mt	2	
1S1920	GR	0.81	MAP	UNT	ALL	NAT				ALL		4563	Ascension Mt	2	
1S1929	GR	0.15	MAP	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
1S1929C	GR	0.19	GIS	UNR	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
1S1930	GR	1.69	MAP	UNT	ALL	NAT	ALL			ALL	ALL	4563	Ascension Mt	2	
1S1933	GR	0.37	MAP	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	low impact barriers and No Vehicles signs 500' each side
2N1820	GR	0.34	MAP	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	tread harden Reed Creek crossing 125' MP 0.25-0.27
2N1905	GR	0.25	MAP	UNT	ALL	NAT	ALL			ALL	ALL	4733	Cherry Lake N	3	hardened drain dips >15% grade 600' and drain dips remainder
2S1804	GR	0.94	MAP	UNT	ATV	NAT	ATV			ATV		4563	Ascension Mt	2	drain dips and tread harden 1 sect 1375' MP 0.68-0.94
2S1906	GR	0.42	MAP	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	hardened drain dips >15% grade 500' and drain dips remainder
FR10178	GR	0.64	MAP	UNR	ALL	NAT	4WD			4WD		4391	Buckhorn Peak	1	RLF surveys
FR10200	GR	0.37	MAP	UNT	ALL	NAT				ALL		4391	Buckhorn Peak	1	waterbars 2000'
FR14721	GR	0.12	MAP	UNR	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR4688	GR	0.73	MAP	UNR	ALL	NAT	ALL			ALL	ALL	4574	Jawbone Ridge	1	
FR5540	GR	0.47	MAP	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR6468	GR	0.04	MAP	UNR	ALL	NAT	ALL			ALL		4564	Ackerson Mt	2	
FR6468	GR	0.18	MAP	UNR	ALL	NAT	ALL			ALL		4564	Ackerson Mt	2	
FR6468	GR	0.02	MAP	UNR	ALL	NAT	ALL			ALL		4564	Ackerson Mt	2	
FR6550	GR	2.27	MAP	UNR	ALL	NAT	ALL			ALL		4573	Groveland	1	hardened drain dips >15% grade 1400' and drain dips remainder
FR8165	GR	0.05	MAP	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	SHPO consultation
FR83630	GR	0.21	INV	UNR	ALL	NAT				ALL		4744	Hull Creek	3	
FR8472	GR	0.18	MAP	UNT	ALL	NAT	4WD			4WD		4562	Cherry Lake S	3	
FR8516	GR	0.05	MAP	UNT	ALL	NAT	4WD			4WD		4382	Kinsley	2	RLF surveys
FR8601	GR	0.47	MAP	UNR	ALL	NAT	4WD			4WD		4564	Ackerson Mt	2	low impact barriers 200' each side
FR8762	GR	0.13	MAP	UNT	ALL	NAT	4WD			4WD		4564	Ackerson Mt	2	
FR8843	GR	0.86	MAP	UNT	ALL	NAT	4WD			4WD		4391	Buckhorn Peak	1	
FR8986	GR	0.51	MAP	UNT	ALL	NAT	4WD			4WD		4562	Cherry Lake S	2	
FR9140	GR	0.04	MAP	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR9359	GR	0.13	MAP	UNR	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98472	GR	0.67	MAP	UNT	ALL	NAT	4WD			4WD		4564	Ackerson Mt	2	
FR98476	GR	0.50	INV	UNT	ALL	NAT	4WD			4WD		4381	El Portal	2	hardened drain dips >15% grade 500' and drain dips remainder
FR98477	GR	0.13	INV	UNT	ALL	NAT	4WD			4WD		4381	El Portal	2	
FR98479	GR	0.06	INV	UNT	ALL	NAT	4WD			4WD		4381	El Portal	2	
FR98481	GR	0.03	INV	UNT	ALL	NAT	4WD			4WD		4382	Kinsley	2	SHPO consultation; RLF surveys

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
FR98482	GR	0.06	INV	UNT	ALL	NAT	4WD			4WD		4382	Kinsley	2	SHPO consultation
FR98483	GR	0.03	INV	UNT	ALL	NAT	4WD			4WD		4382	Kinsley	2	
FR98484	GR	0.04	INV	UNT	ALL	NAT	4WD			4WD		4391	Buckhorn Peak	2	
FR98485	GR	0.08	INV	UNT	ALL	NAT	4WD			4WD		4391	Buckhorn Peak	1	
FR98486	GR	0.21	INV	UNT	ALL	NAT	4WD			4WD		4391	Buckhorn Peak	2	
FR98488	GR	0.05	INV	UNT	ALL	NAT	4WD			4WD		4391	Buckhorn Peak	2	RLF: USFWS consultation; surveys
FR98491	GR	0.19	INV	UNT	ALL	NAT	4WD			4WD		4574	Jawbone Ridge	2	
FR98492	GR	0.09	INV	UNT	ALL	NAT	4WD			4WD		4574	Jawbone Ridge	2	
FR98493	GR	0.02	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	SHPO consultation
FR98494	GR	0.02	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98495	GR	0.05	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98496	GR	0.28	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98501	GR	0.08	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98502	GR	0.02	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98503	GR	0.09	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98504	GR	0.07	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98506	GR	0.14	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98507	GR	0.05	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	SHPO consultation
FR98508	GR	0.06	INV	UNT	ALL	NAT	4WD			4WD		4574	Jawbone Ridge	2	RLF: USFWS consultation; surveys
FR98509	GR	0.03	INV	UNT	ALL	NAT	4WD			4WD		4574	Jawbone Ridge	2	RLF: USFWS consultation; surveys
FR98510	GR	0.04	INV	UNT	ALL	NAT	4WD			4WD		4574	Jawbone Ridge	2	RLF: USFWS consultation; surveys
FR98511	GR	0.15	INV	UNT	ALL	NAT	4WD			4WD		4382	Kinsley	2	RLF: USFWS consultation; surveys
FR98513	GR	0.03	INV	UNT	ALL	NAT	4WD			4WD		4382	Kinsley	2	RLF surveys
FR98514	GR	0.04	INV	UNT	ALL	NAT	4WD			4WD		4382	Kinsley	2	RLF: USFWS consultation; surveys; tread harden stream crossings
FR98515	GR	0.09	INV	UNT	ALL	NAT	4WD			4WD		4382	Kinsley	2	
FR98520	GR	0.03	INV	UNT	ALL	NAT	4WD			4WD		4382	Kinsley	2	
FR98522	GR	0.04	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98523	GR	0.08	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98524	GR	0.03	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98529	GR	0.13	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98530	GR	0.07	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98531	GR	0.03	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98533	GR	0.10	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98535	GR	0.03	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	drain dips 180' MP 0.0-0.03
FR98537	GR	0.09	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98538	GR	0.14	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98539	GR	0.10	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98540	GR	0.03	INV	UNT	ALL	NAT	4WD			4WD		4561	Lake Eleanor	2	
FR98541	GR	0.07	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	SHPO consultation
FR98544	GR	0.08	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	3	
FR98545	GR	0.05	INV	UNT	ALL	NAT	4WD			4WD		4562	Cherry Lake S	3	
FR98546	GR	0.03	INV	UNT	ALL	NAT	4WD			4WD		4562	Cherry Lake S	2	
FR98547	GR	0.08	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98548	GR	0.04	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	
FR98549	GR	0.39	INV	UNT	ALL	NAT	4WD			4WD		4574	Jawbone Ridge	2	
FR98550	GR	0.17	INV	UNT	ALL	NAT	4WD			4WD		4574	Jawbone Ridge	2	
FR98551	GR	0.02	INV	UNT	ALL	NAT	4WD			4WD		4381	El Portal	2	
FR98552	GR	0.03	INV	UNT	ALL	NAT	4WD			4WD		4563	Ascension Mt	2	SHPO consultation
FR98553	GR	0.14	INV	UNT	ALL	NAT	4WD			4WD		4391	Buckhorn Peak	2	
FR98554	GR	0.04	INV	UNT	ALL	NAT	4WD			4WD		4382	Kinsley	2	SHPO consultation
FR98555	GR	0.02	INV	UNT	ALL	NAT	4WD			4WD		4564	Ackerson Mt	2	
FR98560	GR	0.06	INV	UNT	ALL	NAT	4WD			4WD		4564	Ackerson Mt	2	
FR98563	GR	0.86	INV	UNT	ALL	NAT	4WD			4WD		4564	Ackerson Mt	1	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
FR98566	GR	0.05	INV	UNT	ALL	NAT	4WD			4WD		4391	Buckhorn Peak	1	RLF: USFWS consultation; surveys
FR98575	GR	0.13	INV	UNT	ALL	NAT	4WD			4WD		4573	Groveland	1	drain dips 680'; RLF: USFWS consultation; surveys
FR98577	GR	0.03	INV	UNT	ALL	NAT	4WD			4WD		4561	Lake Eleanor	2	
FR98580	GR	0.13	INV	UNT	ALL	NAT	4WD			4WD		4562	Cherry Lake S	2	
FR98581	GR	0.11	INV	UNT	ALL	NAT	4WD			4WD		4562	Cherry Lake S	2	
FR98582	GR	0.06	INV	UNT	ALL	NAT	4WD			4WD		4562	Cherry Lake S	2	
FR98583	GR	0.07	INV	UNT	ALL	NAT	4WD			4WD		4562	Cherry Lake S	2	
FR98584	GR	0.06	INV	UNT	ALL	NAT	4WD			4WD		4562	Cherry Lake S	2	
FR98585	GR	0.06	INV	UNT	ALL	NAT	4WD			4WD		4562	Cherry Lake S	2	
FR98586	GR	0.06	INV	UNT	ALL	NAT	4WD			4WD		4562	Cherry Lake S	2	
FR98587	GR	0.04	INV	UNT	ALL	NAT	4WD			4WD		4562	Cherry Lake S	2	
FR98591	GR	0.05	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	
FR98592	GR	0.08	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	drain dips last 1000'
FR98593	GR	0.09	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	
FR98670	GR	0.20	INV	UNT	ALL	NAT	4WD			4WD		4574	Jawbone Ridge	2	
FR98671	GR	0.09	INV	UNT	ALL	NAT	4WD			4WD		4574	Jawbone Ridge	2	SHPO consultation
FR98672	GR	0.07	INV	UNT	ALL	NAT	4WD			4WD		4562	Cherry Lake S	2	
FR98674	GR	0.06	INV	UNR	ALL	NAT	4WD			4WD		4562	Cherry Lake S	2	
FR98675	GR	0.06	INV	UNR	ALL	NAT	4WD			4WD		4562	Cherry Lake S	2	
FR98676	GR	0.06	INV	UNR	ALL	NAT	4WD			4WD		4562	Cherry Lake S	3	
FS08490	GR	0.09	INV	UNT	ALL	NAT	4WD			4WD		4574	Jawbone Ridge	2	
22	MW	0.08	INV	UNT	ATV	NAT	ATV			ATV	ATV	4743	Twain Harte	2	
16E182	MW	0.27	GIS	UNT	ALL	NAT	ALL			ALL		4571	Duckwall Mt	3	
16E183	MW	1.26	GIS	UNT	ALL	NAT	ALL			ALL	ALL	4743	Twain Harte	3	annual maintenance; rock barriers 50' at base of incline; waterbars 3200'
11715A	MW	0.52	MAP	UNR	ALL	NAT	4WD			4WD		4571	Duckwall Mt	2	annual maintenance
15EV38	MW	0.60	INV	UNT	ALL	NAT	4WD			4WD		4754	Columbia SE	2	annual maintenance; hardened drain dips > 15% grade 1800' and drain dips remainder.
15EV43C	MW	0.69	INV	UNT	ALL	NAT	ATV			ATV		4754	Columbia SE	1	annual maintenance; drain dips and tread harden >25%% grade 500' and drain dips remainder
15EV43G	MW	0.51	INV	UNT	ALL	NAT	ATV			ATV		4753	Columbia	1	annual maintenance
15EV46	MW	0.28	INV	UNT	ATV	NAT	ATV			ATV		4754	Columbia SE	2	annual maintenance; drain dips and tread harden >25% grade 200' and drain dips remainder
15EV47	MW	0.63	INV	UNT	ATV	NAT	MC			MC		4754	Columbia SE	2	annual maintenance; drain dips and tread harden >25% grade 1000' and drain dips remainder
15EV47A	MW	0.12	INV	UNT	ATV	NAT	ALL			ALL		4754	Columbia SE	2	
15EV48	MW	0.64	INV	UNT	MC	NAT	ALL			ALL		4754	Columbia SE	2	drain dips 925' MP 0.0-0.175; drain dips 700' from 16E182A to end
15EV54	MW	0.18	INV	UNT	ALL	NAT	ALL			ALL		4754	Columbia SE	2	drain dips 400' MP 0.025-0.1
16E182A	MW	0.19	INV	UNT	ALL	NAT	ALL			ALL		4571	Duckwall Mt	3	
16EV01	MW	0.05	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	hardened drain dips >15% grade 900' and drain dips remainder
16EV101	MW	1.90	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	tread harden 300' MP 0.4 to 0.45 ; drain dips and tread harden >20% grade 300' and drain dips remainder
16EV106	MW	1.50	INV	UNT	MC	NAT	MC			MC		4742	Crandall Peak	2	tread harden 3 sections 230' MP 0.8-0.85, 1.0-1.05, and 1.4-1.45
16EV108	MW	0.74	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	rock barriers 50' at base of hill climb; tread harden 260' MP 0.525-0.575; drain dips and tread harden >20% grade 700' and drain dips remainder
16EV109	MW	1.14	INV	UNT	MC	NAT	MC			MC	MC	4743	Twain Harte	2	drain dips and tread harden

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
															>20% grade 900' and drain dips remainder
16EV109	MW	0.61	INV	UNT	MC	NAT	MC			MC	MC	4743	Twain Harte	2	drain dips and tread harden >20% grade 400' and drain dips remainder
16EV110	MW	1.15	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	
16EV111	MW	0.44	INV	UNT	MC	NAT	MC			MC	MC	4743	Twain Harte	2	tread harden 150' MP 0.05-0.1; drain dips and tread harden >20% grade 150' and drain dips remainder
16EV112	MW	0.17	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	drain dips 900'
16EV115	MW	2.40	INV	UNT	MC	NAT	MC			MC		4742	Crandall Peak	2	tread harden 260' MP 0.75-0.8
16EV117	MW	0.21	INV	UNT	MC	NAT	MC			MC	MC	4742	Crandall Peak	2	
16EV123	MW	0.33	INV	UNT	ATV	NAT	ATV			ATV		4742	Crandall Peak	2	
16EV124	MW	0.15	INV	UNT	ATV	NAT	ATV			ATV		4742	Crandall Peak	2	
16EV133	MW	0.43	INV	UNT	MC	NAT	MC			MC	MC	4742	Crandall Peak	2	drain dips 2200'
16EV136	MW	1.19	INV	UNT	MC	NAT	MC			MC	MC	4742	Crandall Peak	2	drain dips and tread harden >20% grade 600' and drain dips remainder
16EV137	MW	0.45	INV	UNT	MC	NAT	MC			MC	MC	4742	Crandall Peak	2	annual maintenance; tread harden 2 sections 240' MP 0.19-0.23 and 0.25-0.26 ; drain dips and tread harden >20% grade 400' and drain dips remainder
16EV141	MW	0.87	INV	UNT	MC	NAT	MC			MC	MC	4742	Crandall Peak	2	tread harden ephemeral drainage 20' MP 0.55; drain dips and tread harden >20% grade 200' and drain dips on remainder; tread harden crossing 15' each side of channel
16EV152	MW	0.56	INV	UNT	ATV	NAT	ATV			ATV		4742	Crandall Peak	2	
16EV152	MW	0.33	INV	UNT	ATV	NAT	ATV			ATV		4742	Crandall Peak	2	
16EV154	MW	1.13	INV	UNT	MC	NAT	MC			MC		4742	Crandall Peak	2	
16EV155	MW	0.06	INV	UNT	ALL	NAT	ALL			ALL		4742	Crandall Peak	2	
16EV160	MW	1.31	INV	UNT	MC	NAT	MC			MC		4742	Crandall Peak	2	tread harden 70' MP 0.25; tread harden ephemeral drainage 5 sections 195' total; boardwalk 10'
16EV176	MW	0.04	INV	UNT	MC	NAT	MC			MC	MC	4742	Crandall Peak	2	drain dips 2600'
16EV176	MW	0.50	INV	UNT	MC	NAT	MC			MC	MC	4742	Crandall Peak	2	
16EV177	MW	0.27	INV	UNT	MC	NAT	MC			MC	MC	4742	Crandall Peak	2	drain dips 1400'
16EV178	MW	0.66	INV	UNT	MC	NAT	MC			MC		4742	Crandall Peak	2	drain dips and tread harden >20% grade 400' and drain dips remainder
16EV207	MW	0.03	INV	UNT	MC	NAT				MC		4754	Columbia SE	2	
16EV209	MW	0.14	INV	UNT	ATV	NAT				ATV		4743	Twain Harte	2	rock barriers 740' along creek at occurrence
16EV210	MW	0.09	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	
16EV211	MW	0.08	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	
16EV213	MW	0.06	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	
16EV222	MW	0.31	INV	UNT	MC	NAT				MC		4743	Twain Harte	2	tread harden ephemeral drainage 40' MP 0.06; tread harden 425' MP 0.12-0.23; drain dips 880' MP 0.06-0.23; drain dips and tread harden 425' and dips remainder
16EV223	MW	1.35	INV	UNT	ATV	NAT	ATV			ATV		4743	Twain Harte	2	drain dips and tread harden >20% grade 700' and drain dips remainder
16EV229	MW	0.37	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	tread harden ephemeral drainage 60' MP 0.37; tread harden 2 sections 500' MP 0.075-0.125 and 0.225-0.275; drain dips and tread harden

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
															>20% grade 700' and drain dips remainder
16EV230	MW	0.78	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	tread harden ephemeral drainage 3 sections 165' MP 0.0, 0.4, and 0.525; tread harden 2 sections 300' MP 0.01-0.05 and 0.35-0.4; drain dips and tread harden >20% grade 800' and drain dips remainder
16EV236	MW	0.96	INV	UNT	MC	NAT	MC			MC	MC	4743	Twain Harte	2	
16EV237	MW	0.09	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	
16EV240	MW	0.11	INV	UNT	MC	NAT				MC		4743	Twain Harte	2	
16EV243	MW	0.31	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	padding 60' x 3'
16EV244	MW	0.49	INV	UNT	MC	NAT	MC			MC	MC	4742	Crandall Peak	2	
16EV247	MW	0.68	INV	UNT	MC	NAT	MC			MC	MC	4742	Crandall Peak	2	
16EV248	MW	0.93	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	tread harden 2 sections 1850' MP 0.2-0.25 and 0.4-0.7
16EV249	MW	0.28	INV	UNT	MC	NAT	MC			MC	MC	4743	Twain Harte	2	tread harden 160' MP 0.21-0.24
16EV251	MW	0.32	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	tread harden 240' MP 0.21-0.27
16EV253	MW	0.89	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	tread harden 2 sections 320' MP 0.32-0.34 and 0.5-0.54
16EV254	MW	0.51	INV	UNT	MC	NAT	MC			MC	MC	4743	Twain Harte	2	tread harden ephemeral drainage; 2 sections 120' MP 0.3 and 0.38.; drain dips and tread harden >20% grade 800' and drain dips remainder; drain dips 50' MP 0.375 on left approach looking upstream
16EV255	MW	0.43	INV	UNT	MC	NAT	MC			MC	MC	4743	Twain Harte	2	tread harden ephemeral drainage 40' MP 0.18; tread harden 135' MP 0.35-0.375.; drain dips and tread harden >20% grade 400' and drain dips remainder
16EV256	MW	0.24	INV	UNT	ALL	NAT	ALL			ALL	ALL	4742	Crandall Peak	2	
16EV257	MW	1.37	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	
16EV257A	MW	0.03	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	
16EV258	MW	0.47	INV	UNT	MC	NAT				MC		4743	Twain Harte	2	
16EV258	MW	0.09	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	tread harden ephemeral drainage; 2 sections 110' total. MP 0.01 and 0.2.
16EV259	MW	0.45	INV	UNT	MC	NAT				MC	MC	4743	Twain Harte	2	
16EV259	MW	0.09	INV	UNT	MC	NAT	MC			MC	MC	4743	Twain Harte	2	
16EV259A	MW	0.17	MAP	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	padding 300' x 4'
16EV262	MW	0.09	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	
16EV263	MW	0.02	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	
16EV265	MW	0.12	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	rock barriers 182' along occurrence; tread harden Deer Creek 75' MP 0.025
16EV266	MW	0.21	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	padding 300' x 4'; barriers (rock, log or fence) 30'
16EV266A	MW	0.03	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	OHV cattleguard on existing fence line MP 0.02
16EV267	MW	0.27	INV	UNT	MC	NAT	MC			MC		4742	Crandall Peak	2	drain dips and tread harden >20% grade 300' and drain dips remainder
16EV268	MW	0.38	INV	UNT	MC	NAT	MC			MC		4742	Crandall Peak	2	
16EV269	MW	0.22	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	tread harden ephemeral drainage 50'
16EV272	MW	0.53	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	
16EV273	MW	0.19	INV	UNT	ATV	NAT				ATV		4743	Twain Harte	2	low impact barriers 100' each side
16EV292	MW	0.14	INV	UNT	ALL	NAT	4WD			4WD		4742	Crandall Peak	2	
16EV296	MW	0.36	INV	UNT	MC	NAT	MC			MC		4742	Crandall Peak	2	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
16EV299	MW	0.40	INV	UNT	ATV	NAT				ATV		4743	Twain Harte	3	drain dips and tread harden >25% grade 800' and drain dips remainder
16EV299B	MW	0.26	INV	UNT	ATV	NAT				ATV		4743	Twain Harte	3	drain dips and tread harden >25% grade 200' and drain dips remainder
16EV302	MW	0.31	INV	UNT	MC	NAT	MC			MC	MC	4743	Twain Harte	2	
16EV303	MW	0.20	INV	UNT	MC	NAT	MC			MC	MC	4742	Crandall Peak	2	
16EV304	MW	0.09	INV	UNT	MC	NAT	MC			MC	MC	4742	Crandall Peak	2	
16EV305	MW	0.54	INV	UNT	MC	NAT	PER			PER	PER	4742	Crandall Peak	2	drain dips and tread harden >20% grade 300' and drain dips remainder
16EV306	MW	0.16	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	
16EV318	MW	0.45	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	hardened drain dips >15% grade 600' and drain dips remainder
16EV54	MW	2.36	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	tread harden ephemeral drainage 9 sections 500' MP 0.3, 0.55, 0.78, 1.1, 1.28, 1.5, 1.88, 2.0, 2.1, 2.23, and 2.43. tread harden 260' MP 0.275-0.325; drain dip at MP 2.1; tread harden 10' above drain dip
16EV78	MW	0.19	INV	UNT	ATV	NAT	ATV			ATV		4743	Twain Harte	2	
16EV79	MW	0.61	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	
16EV79	MW	0.85	INV	UNT	MC	NAT	MC			MC		4742	Crandall Peak	2	
16EV81	MW	0.54	INV	UNT	MC	NAT	MC			MC		4743	Twain Harte	2	low impact barriers 2850' each side
17EV101	MW	1.06	INV	UNT	MC	NAT				MC		4742	Crandall Peak	2	barriers (rock, log or fence) 40' MP 0.12; drain dips and tread harden >20% grade 700' and drain dips remainder
17EV104	MW	0.87	INV	UNT	MC	NAT	MC			MC		4742	Crandall Peak	2	
17EV11	MW	0.48	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	drain dips 2500'
17EV11	MW	0.91	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	
17EV117	MW	0.55	INV	UNT	MC	NAT	MC			MC		4742	Crandall Peak	2	
17EV117	MW	0.57	INV	UNT	MC	NAT	MC			MC		4742	Crandall Peak	2	
17EV118	MW	1.37	INV	UNT	MC	NAT	MC			MC		4742	Crandall Peak	2	tread harden ephemeral drainage 15' MP 0.52; tread harden 100' MP 0.52-0.54; drain dips and tread harden >20% grade 1000' and drain dips remainder
17EV12	MW	0.83	INV	UNT	ALL	NAT				ALL		4744	Hull Creek	3	
17EV120	MW	0.11	INV	UNT	MC	NAT	MC			MC		4742	Crandall Peak	2	
17EV121	MW	0.50	INV	UNT	MC	NAT	PER			PER		4742	Crandall Peak	2	drain dips and tread harden >20% grade 800' and drain dips remainder
17EV122B	MW	0.29	INV	UNT	MC	NAT	PER			PER		4742	Crandall Peak	2	
17EV122B	MW	0.05	INV	UNT	MC	NAT	PER			PER		4742	Crandall Peak	2	
17EV14	MW	0.74	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	low impact barriers 250' each side; tread harden ephemeral drainage 3 sections 600' MP 1.19, 1.2, and 1.28; tread harden segment 1 spring crossing with rock ballast; tread harden segment 2 stream crossing and approaches 20' either side
17EV15	MW	0.35	INV	UNT	ATV	NAT				ATV		4744	Hull Creek	3	
17EV153	MW	0.31	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	
17EV153	MW	0.25	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	
17EV157	MW	0.11	INV	UNT	ALL	NAT	ALL			ALL	ALL	4744	Hull Creek	3	
17EV15B	MW	0.79	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	low impact barriers 50' each side

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
17EV160	MW	0.15	INV	UNT	ALL	NAT	ALL			ALL	ALL	4744	Hull Creek	3	
17EV162	MW	0.19	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
17EV202	MW	0.38	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	
17EV205	MW	0.25	INV	UNT	ATV	NAT	ATV			ATV	ATV	4743	Twain Harte	3	
17EV210	MW	1.09	INV	UNT	ATV	NAT	ATV			ATV		4742	Crandall Peak	2	drain dips and tread harden >20% grade 700' and drain dips remainder
17EV210A	MW	0.32	INV	UNT	MC	NAT	MC			MC	MC	4742	Crandall Peak	2	
17EV212	MW	1.19	INV	UNT	ALL	NAT				4WD		4741	Strawberry	2	
17EV220	MW	0.33	INV	UNT	ALL	NAT	4WD			ALL	4WD	4743	Twain Harte	3	
17EV220B	MW	0.05	INV	UNT	ALL	NAT	4WD			ALL	4WD	4743	Twain Harte	3	
17EV23	MW	0.47	INV	UNT	ALL	NAT				4WD		4741	Strawberry	2	
17EV231	MW	0.32	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	
17EV233	MW	0.13	INV	UNT	ATV	NAT				ATV		4742	Crandall Peak	2	not recommeded for inclusion; recommend re-route; tread harden stream approaches 100' each side of drainage
17EV233	MW	0.25	INV	UNT	ATV	NAT				ATV		4742	Crandall Peak	2	not recommeded for inclusion; recommend re-route
17EV235	MW	0.59	INV	UNT	MC	NAT	MC			MC	MC	4742	Crandall Peak	2	tread harden ephemeral drainage 30' MP 0.2
17EV236	MW	0.26	INV	UNT	ATV	NAT	ATV			ATV		4742	Crandall Peak	2	drain dips and tread harden >20% grade 400' and drain dips remainder
17EV237	MW	0.16	INV	UNT	ATV	NAT	ATV			ATV	ATV	4742	Crandall Peak	2	
17EV238	MW	0.68	INV	UNT	ALL	NAT	ALL			ALL	ALL	4741	Strawberry	2	
17EV238A	MW	0.29	INV	UNT	ALL	NAT	ALL			ALL	ALL	4741	Strawberry	2	
17EV239	MW	0.24	INV	UNT	ALL	NAT	ALL			ALL	ALL	4741	Strawberry	2	
17EV240	MW	0.19	INV	UNT	ALL	NAT	ALL			ALL	ALL	4741	Strawberry	2	
17EV241	MW	0.27	INV	UNT	ATV	NAT	ATV			ATV	ATV	4741	Strawberry	2	
17EV245	MW	0.07	INV	UNT	ALL	NAT	4WD			ALL	4WD	4741	Strawberry	2	
17EV249	MW	0.12	INV	UNT	ALL	NAT	4WD			ALL		4741	Strawberry	2	SHPO consultation; hardened drain dips >15% grade 500' and drain dips remainder
17EV249A	MW	0.10	INV	UNT	ALL	NAT	4WD			ALL		4741	Strawberry	2	SHPO consultation
17EV254	MW	0.12	INV	UNT	ALL	NAT				ALL		4741	Strawberry	2	
17EV255	MW	0.48	INV	UNT	ATV	NAT				ATV		4741	Strawberry	2	drain dips and tread harden >20% grade 500' and drain dips remainder
17EV261	MW	0.18	INV	UNT	ALL	NAT	4WD			ALL	4WD	4744	Hull Creek	2	
17EV261A	MW	0.07	INV	UNT	ALL	NAT	4WD			ALL	4WD	4744	Hull Creek	3	
17EV263	MW	0.18	INV	UNT	ALL	NAT				ALL		4744	Hull Creek	3	
17EV264	MW	0.14	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	
17EV266	MW	0.26	INV	UNT	ALL	NAT				ALL		4741	Strawberry	2	
17EV267	MW	0.22	INV	UNT	ALL	NAT	4WD			ALL		4741	Strawberry	2	SHPO consultation
17EV268	MW	0.39	INV	UNT	ALL	NAT	4WD			ALL		4741	Strawberry	2	SHPO consultation; barriers (rock, log or fence) 1200' MP 0.16-0.39; rock barriers 20' at lower route
17EV28	MW	1.38	INV	UNT	ATV	NAT				ATV		4744	Hull Creek	3	tread harden ephemeral drainage 3 sections 200' MP 0.13, 0.64, and 1.3; drain dips and tread harden >20% grade 800' and drain dips remainder; tread harden crossing and approaches for 15' on either side Camp 25 Mile Creek; tread harden approaches for 15' on either side of Two Mile Creek; drain dips 100' on steep slopes leading to Two Mile Creek
17EV281	MW	0.27	INV	UNT	ALL	NAT	ALL			ALL	ALL	4741	Strawberry	2	
17EV282	MW	0.10	INV	UNT	ALL	NAT	ALL			ALL	ALL	4741	Strawberry	2	
17EV283	MW	0.20	INV	UNT	MC	NAT	MC			MC	MC	4741	Strawberry	2	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
17EV289	MW	0.66	INV	UNT	ATV	NAT	ATV			ATV		4743	Twain Harte	3	
17EV28A	MW	0.08	INV	UNT	ALL	NAT	ALL			ALL	ALL	4744	Hull Creek	3	
17EV290	MW	0.40	INV	UNT	ALL	NAT	ALL			ALL	ALL	4744	Hull Creek	3	
17EV293	MW	0.79	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	
17EV297	MW	0.49	INV	UNT	ATV	NAT				ATV		4744	Hull Creek	3	tread harden ephemeral drainage 2 sections 330' MP 0.75 and 0.23
17EV299	MW	0.59	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
17EV300	MW	0.23	INV	UNT	ALL	NAT	ALL			ALL	ALL	4744	Hull Creek	3	
17EV303	MW	0.83	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	
17EV306	MW	0.14	INV	UNT	ALL	NAT				4WD		4743	Twain Harte	3	
17EV34	MW	0.27	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	
17EV37	MW	0.93	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
17EV45	MW	1.68	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
17EV50	MW	2.27	INV	UNT	ATV	NAT				ATV		4744	Hull Creek	3	drain dips and tread harden >20% grade 700' and drain dips remainder
17EV51	MW	3.06	INV	UNT	ATV	NAT				ATV		4744	Hull Creek	3	
17EV51	MW	0.84	INV	UNT	ATV	NAT	ATV			ATV	ATV	4744	Hull Creek	3	tread harden ephemeral drainage 30' MP 0.627
17EV53	MW	2.97	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	
17EV54	MW	0.50	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
17EV58	MW	1.19	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	
17EV60	MW	0.51	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	
17EV60	MW	0.55	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
17EV67	MW	0.28	INV	UNT	ATV	NAT	ATV			ATV	ATV	4744	Hull Creek	3	tread harden ephemeral drainage 40' MP 0.17 (Wrights Creek)
17EV67A	MW	0.36	INV	UNT	ATV	NAT	ATV			ATV	ATV	4744	Hull Creek	3	
17EV71	MW	1.14	INV	UNT	ATV	NAT	ATV			ATV		4743	Twain Harte	3	tread harden 20' (seep/spring area) MP 0.7
17EV75	MW	0.46	INV	UNT	ATV	NAT	ATV			ATV	ATV	4744	Hull Creek	3	drain dips and tread harden >20% grade 400' and drain dips remainder
17EV78	MW	0.30	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
17EV79	MW	1.29	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
17EV80	MW	0.23	INV	UNT	ATV	NAT	ATV			ATV	ATV	4744	Hull Creek	3	tread harden ephemeral drainage 40' MP 0.19 (Wrights Cr)
17EV85	MW	2.01	INV	UNT	MC	NAT	MC			MC		4744	Hull Creek	3	
17EV88	MW	1.53	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	
17EV91	MW	1.03	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
18EV100	MW	0.08	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	barriers (rock, log or fence) 100' prior to Trout Creek; drain dips 200' to west of 31820G
18EV100	MW	0.31	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
18EV101A	MW	0.17	GPS	UNT	ATV	NAT				ATV		4744	Hull Creek	3	
18EV101B	MW	0.53	GPS	UNT	ATV	NAT				ATV		4744	Hull Creek	3	tread harden ephemeral drainage 30' MP 0.13
18EV105	MW	0.69	INV	UNT	MC	NAT	MC			MC		4744	Hull Creek	3	No Vehicles signs 100' each side; tread harden ephemeral drainage 60' MP 0.1; tread harden crossing and approaches 20' each side of intermittent tributary to Trout Creek
18EV106	MW	0.41	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	
18EV110	MW	1.33	INV	UNT	MC	NAT	MC			MC		4744	Hull Creek	3	
18EV133	MW	0.35	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	
18EV134	MW	3.19	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	hardened drain dips >15% grade 500' and drain dips remainder
18EV170	MW	1.13	INV	UNT	MC	NAT	MC			MC		4744	Hull Creek	3	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
18EV170	MW	1.69	INV	UNT	MC	NAT	MC			MC		4744	Hull Creek	3	
18EV257	MW	0.18	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
18EV258	MW	0.57	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	SHPO consultation
18EV259	MW	0.48	INV	UNT	ATV	NAT				ATV		4733	Cherry Lake N	3	
18EV260	MW	0.28	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
18EV270	MW	0.36	INV	UNT	ALL	NAT	ALL			ALL		4732	Pinecrest	3	
18EV271	MW	0.67	INV	UNT	ATV	NAT	ATV			ATV		4732	Pinecrest	3	
18EV275	MW	0.31	INV	UNT	ALL	NAT				ALL		4741	Strawberry	3	
18EV276	MW	0.10	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	barriers (rock, log or fence) 20' MP 0.1
18EV277	MW	0.09	INV	UNT	ALL	NAT	ALL			ALL	ALL	4744	Hull Creek	3	
18EV278	MW	0.60	INV	UNT	MC	NAT				MC		4732	Pinecrest	3	
18EV281	MW	0.05	INV	UNT	ALL	NAT	4WD			4WD		4732	Pinecrest	3	SHPO consultation
18EV282	MW	0.15	INV	UNT	MC	NAT	MC			MC	MC	4732	Pinecrest	3	drain dips 800'
18EV283	MW	0.28	INV	UNT	ALL	NAT	4WD			4WD		4732	Pinecrest	3	
18EV284	MW	0.07	INV	UNT	ALL	NAT	4WD			4WD		4732	Pinecrest	3	
18EV304	MW	0.19	INV	UNT	ALL	NAT	ATV			ATV		4744	Hull Creek	3	
18EV304	MW	0.13	INV	UNT	ATV	NAT	ALL			ALL		4744	Hull Creek	3	
18EV308	MW	0.12	INV	UNT	ALL	NAT	ALL			ALL		4744	Hull Creek	3	SHPO consultation; tread harden ephemeral drainage 2 sections 155' MP 0.003 and 0.125
18EV309	MW	0.12	INV	UNT	ALL	NAT	ALL			ALL	ALL	4744	Hull Creek	3	tread harden drainage (Hull Cr) 60' MP 0.028.
18EV310	MW	0.56	INV	UNT	ALL	NAT	4WD			4WD		4732	Pinecrest	3	tread harden ephemeral drainage 350' MP 0.06 and 0.12
18EV315	MW	0.36	INV	UNT	ALL	NAT	4WD			ALL	4WD	4741	Strawberry	3	
18EV34	MW	0.65	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
18EV51	MW	0.54	INV	UNT	ATV	NAT				ATV		4744	Hull Creek	3	low impact barriers 100' north side; drain dips 3500'
18EV56	MW	1.38	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	drain dips and tread harden >20% grade 500' and drain dips remainder
18EV57	MW	0.86	INV	UNT	MC	NAT	MC			MC		4744	Hull Creek	3	drain dips and tread harden >20% grade 500' and drain dips remainder
18EV63	MW	0.26	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
18EV67	MW	1.68	INV	UNT	MC	NAT	MC			MC		4744	Hull Creek	3	low impact barriers and No Vehicle signs 50' each side; tread harden ephemeral drainage 2 sections 60' MP 0.35 and 0.8; barriers (rock, log or fence) MP 1.26-1.39
18EV70	MW	0.68	INV	UNT	MC	NAT	MC			MC		4744	Hull Creek	3	
18EV77	MW	1.54	INV	UNT	MC	NAT	MC			MC		4733	Cherry Lake N	3	drain dips and tread harden >20% grade 300' and drain dips remainder
18EV88	MW	0.70	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
18EV88	MW	0.03	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	tread harden ephemeral drainage (Rush Cr) 60' MP 0.25.; drain dips 130' on left (looking upstream) approach to channel
18EV90	MW	0.81	INV	UNT	ATV	NAT	ATV			ATV		4744	Hull Creek	3	
18EV91	MW	0.33	INV	UNT	ALL	NAT	ALL			ALL	ALL	4744	Hull Creek	3	tread harden ephemeral drainage 50' MP 0.07; hardened drain dips >15% grade 900' and drain dips remainder
18EV94	MW	0.17	INV	UNT	ALL	NAT				ALL	ALL	4744	Hull Creek	3	
18EV95	MW	0.33	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	tread harden ephemeral drainage 75' MP 0.01; tread harden Trout Creek crossing 80' MP 0.28; drain dips 1750'
19EV100	MW	1.08	INV	UNT	ALL	NAT				ALL		4733	Cherry Lake N	3	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
19EV101	MW	0.57	INV	UNT	ALL	NAT	4WD			4WD		4732	Pinecrest	3	hardened drain dips >15% grade 600' and drain dips remainder
19EV29	MW	0.47	INV	UNT	ATV	NAT	4WD			4WD		4732	Pinecrest	3	
21703A	MW	0.08	GIS	UNT	ALL	NAT	ALL			ALL	ALL	4744	Hull Creek	3	
21703C	MW	0.52	GIS	UNT	ALL	NAT	ALL			ALL	ALL	4744	Hull Creek	3	
21704A	MW	0.39	GIS	UNT	ALL	NAT	ALL			ALL	ALL	4744	Hull Creek	3	
21704B	MW	0.21	GIS	UNT	ALL	NAT	ALL			ALL	ALL	4744	Hull Creek	3	
21711G	MW	0.70	GIS	UNR	ATV	NAT				ATV		4744	Hull Creek	3	tread harden MP 0.45-0.6; tread harden crossing and approaches 20' each side Milk Ranch Spring drainage
21711J	MW	0.28	GIS	UNR	ATV	NAT				ATV		4744	Hull Creek	3	
31614C	MW	0.05	GIS	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	barriers (rock, log or fence) 150' MP 0.05
31623G	MW	0.41	GIS	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	
31734B	MW	0.09	GIS	UNT	ALL	NAT	ALL			ALL	ALL	4744	Hull Creek	3	
31736A	MW	0.17	GIS	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	
31818G	MW	0.15	GIS	UNR	ATV	NAT	ATV			ATV		4741	Strawberry	3	drain dips 800'
31821C	MW	0.20	GIS	UNR	ALL	NAT	4WD			4WD		4744	Hull Creek	3	barriers (rock, log or fence) 20' MP 0.12; hardened drain dips >15% grade 400' and drain dips remainder
31821H	MW	0.10	GIS	UNT	ALL	NAT	4WD			4WD		4733	Cherry Lake N	3	
41735B	MW	0.06	GIS	UNT	ALL	NAT	4WD			4WD		4741	Strawberry	3	
EV14835	MW	0.19	INV	UNT	MC	NAT				MC		4742	Crandall Peak	2	
EV681	MW	0.09	INV	UNT	ALL	NAT	4WD			4WD		4732	Pinecrest	3	
FR12319	MW	0.55	MAP	UNR	MC	NAT				ATV		4743	Twain Harte	2	drain dips and tread harden >20% grade 300' and drain dips remainder
FR12319	MW	0.51	MAP	UNR	MC	NAT				ATV		4743	Twain Harte	2	drain dips and tread harden >20% grade 300' and drain dips remainder
FR13563	MW	0.05	GPS	UNT	ALL	NAT	ALL			ALL	ALL	4744	Hull Creek	3	
FR15091	MW	0.47	GPS	UNR	ATV	NAT				ATV		4744	Hull Creek	3	low impact barriers 50' each side
FR15091	MW	0.34	GPS	UNR	ATV	NAT				ATV		4744	Hull Creek	3	low impact barriers 50' each side ; tread harden drainage 4 sections 190' MP .002, 0.325, 0.35, and 0.8; improve trail tread bench at Brushy and Camp 25 creeks to improve safety 600' for ATV use MP 0.35 and 0.8
FR98590	MW	0.10	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	
FR98596	MW	0.10	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	
FR98597	MW	0.09	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	
FR98598	MW	0.08	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	
FR98599	MW	0.04	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	
FR98601	MW	0.05	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	
FR98602	MW	0.08	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	
FR98603	MW	0.07	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	No Vehicles signs 100' each side
FR98604	MW	0.03	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	
FR98608	MW	0.07	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	
FR98609	MW	0.05	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	3	
FR98612	MW	0.04	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	2	SHPO consultation
FR98616	MW	0.03	INV	UNT	ALL	NAT	4WD			4WD		4742	Crandall Peak	2	evaluate 51-646 against NRHP criteria
FR98617	MW	0.04	INV	UNT	ALL	NAT	4WD			4WD		4754	Columbia SE	2	
FR98618	MW	0.04	INV	UNT	ALL	NAT	4WD			4WD		4754	Columbia SE	2	
FR98619	MW	0.11	INV	UNT	ALL	NAT	4WD			4WD		4754	Columbia SE	2	
FR98620	MW	0.08	INV	UNT	ALL	NAT	4WD			4WD		4754	Columbia SE	2	
FR98679	MW	0.07	INV	UNT	ALL	NAT	4WD			4WD		4754	Columbia SE	1	barriers (rock, log or fence) 200'

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
															MP 0.07
FR98680	MW	0.04	INV	UNT	ALL	NAT	4WD			4WD		4754	Columbia SE	1	barriers (rock, log or fence) 100' MP 0.04
FR98682	MW	0.05	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	
FR98683	MW	0.06	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	
FR98685	MW	0.03	INV	UNT	ALL	NAT	4WD			4WD		4742	Crandall Peak	2	
FR98686	MW	0.03	INV	UNT	ALL	NAT	4WD			4WD		4742	Crandall Peak	2	
FR98688	MW	0.05	INV	UNT	ALL	NAT	4WD			4WD		4741	Strawberry	2	
FR98689	MW	0.06	INV	UNT	ALL	NAT	4WD			4WD		4741	Strawberry	2	
FR98690	MW	0.04	INV	UNT	ALL	NAT	4WD			4WD		4741	Strawberry	2	SHPO consultation
FR98691	MW	0.06	INV	UNT	ALL	NAT	4WD			4WD		4741	Strawberry	2	SHPO consultation; barriers (rock, log or fence) 320' MP 0.0-0.06; rock barrier 20' at end of route before intermittent tributary to South Fork Stanislaus River
FR98692	MW	0.07	INV	UNT	ALL	NAT	4WD			4WD		4741	Strawberry	2	barriers (rock, log or fence) 350' MP 0.0-0.07
FR98693	MW	0.01	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	barriers (rock, log or fence) 200' MP 0.01
FR98694	MW	0.03	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	1	
FR98695	MW	0.04	INV	UNT	ALL	NAT	4WD			4WD		4741	Strawberry	2	
FR98696	MW	0.03	INV	UNT	ALL	NAT	4WD			4WD		4741	Strawberry	2	
FR98697	MW	0.12	INV	UNT	ALL	NAT	4WD			4WD		4742	Crandall Peak	2	barriers (rock, log or fence) 50' MP 0.12
FR98699	MW	0.05	INV	UNT	ALL	NAT	4WD			4WD		4733	Cherry Lake N	3	barriers (rock, log or fence) 75' MP 0.05
FR98700	MW	0.02	INV	UNT	ALL	NAT	4WD			4WD		4733	Cherry Lake N	3	
FR98701	MW	0.02	INV	UNT	ALL	NAT	4WD			4WD		4733	Cherry Lake N	3	
FR98702	MW	0.04	INV	UNT	ALL	NAT	4WD			4WD		4742	Crandall Peak	2	
FR98703	MW	0.06	INV	UNT	ALL	NAT	4WD			4WD		4741	Strawberry	2	
FR98704	MW	0.15	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	SHPO consultation; barriers (rock, log or fence) 160' MP 0.0-0.03
FR98705	MW	0.04	INV	UNT	ALL	NAT	4WD			4WD		4743	Twain Harte	2	
FR98707	MW	0.02	INV	UNT	ALL	NAT	4WD			4WD		4744	Hull Creek	2	
FR98708	MW	0.02	INV	UNT	ALL	NAT	4WD			4WD		4741	Strawberry	2	

Legend

4WD	4 Wheel Drive
ADM	Administrative Use Only (closed to public motorized use)
ALL	All Vehicles
ATV	ATV (open to ATV and Motorcycle)
CAL	Calaveras
GIS	Geographic Information System
GR	Groveland
INV	Inventory
MC	Motorcycle
MI	Miles
MW	Mi-Wok
NAT	Native Material
PER	Permit Only
RD	Ranger District
SEA	Season of Use

	Alternative 1	Alternative 4	Alternative 5
1	year-round	year-round	year-round
2	4/1-11/30	4/1-12/31	4/15-11/15
3	5/15-11/30	4/1-12/31	5/15-11/15

SRC	Source
SUR	Surface
SYS	System (National Forest System)
UNR	Unauthorized Road
UNT	Unauthorized Trail

I.02 Changes to the Existing NFTS: Vehicle Class

Table I.01-2 lists the vehicle class, season of use (SEA) and mitigations/requirements for the existing NFTS with vehicle class changes proposed in one or more of the action alternatives.

Table I.02-1 Changes to the Existing NFTS: Vehicle Class, Season of Use and Mitigations

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
04N04Y	CAL	0.05	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4911	Tamarack	3	
04N06	CAL	0.24	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4911	Tamarack	3	
04N38	CAL	2.64	GIS	ALL	ALL	AC	HLO			HLO	HLO	4922	Devils Nose	3	
04N80Y	CAL	1.17	GIS	ALL	ALL	AGG	HLO			HLO	ML1	4912	Calaveras Dome	3	
04N80Y	CAL	1.14	GIS	ALL	ALL	AGG	HLO			HLO	ML1	4924	Dorrington	3	
04N80Y	CAL	0.16	GIS	ALL	ALL	AGG	HLO			HLO	ML1	4921	Garnet Hill	3	
04N80Y	CAL	0.59	GIS	ALL	ALL	AGG	HLO			HLO	ML1	4921	Garnet Hill	3	
05N02B	CAL	0.89	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4924	Dorrington	3	
05N02R	CAL	0.40	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4924	Dorrington	3	
05N02R	CAL	1.48	GIS	ALL	ALL	NAT	HLO			HLO	ML1	4912	Calaveras Dome	3	
05N14	CAL	0.60	GIS	HLO	HLO	NAT	ALL			ALL		4913	Boards Crossing	3	mixed use sign plan
05N14	CAL	4.62	GIS	HLO	HLO	NAT	ALL			ALL		4913	Boards Crossing	3	mixed use sign plan
05N14	CAL	0.55	GIS	HLO	HLO	AGG	ALL			ALL		4751	Stanislaus	3	
05N14	CAL	0.53	GIS	HLO	HLO	AGG	ALL			ALL		4751	Stanislaus	3	
05N14	CAL	3.25	GIS	HLO	HLO	NAT	ALL			ALL		4924	Dorrington	3	
05N14	CAL	1.12	GIS	HLO	HLO	NAT	ALL			ALL		4751	Stanislaus	3	
05N14	CAL	0.02	GIS	HLO	HLO	NAT	ALL			ALL		4751	Stanislaus	3	
05N14	CAL	0.71	GIS	HLO	HLO	NAT	ALL			ALL		4913	Boards Crossing	3	
05N14	CAL	0.34	GIS	HLO	HLO	NAT	ALL			ALL		4924	Dorrington	3	
05N14L	CAL	1.13	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
05N14M	CAL	0.10	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
05N35	CAL	1.65	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
05N35B	CAL	0.46	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
05N40	CAL	0.15	GIS	HLO	HLO	NAT	ADM			ADM	ADM	4912	Calaveras Dome	3	
05N51Y	CAL	1.58	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
05N51YA	CAL	0.44	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
05N53Y	CAL	0.08	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
05N56	CAL	0.01	GIS	ALL	ALL	AGG	HLO			HLO	HLO	4912	Calaveras Dome	2	
06N11Y	CAL	0.81	GIS	ALL		NAT	ADM			ADM	ADM	4912	Calaveras Dome	3	
06N13X	CAL	0.30	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
06N17A	CAL	0.46	GIS	ML1		NAT	t-ALL			t-ALL		4912	Calaveras Dome	3	
06N17A	CAL	0.09	MAP	ML1		NAT	t-ALL			t-ALL		4912	Calaveras Dome	3	
06N17B	CAL	0.65	GIS	ML1		NAT	t-ALL			t-ALL		4912	Calaveras Dome	3	
06N17D	CAL	0.35	GIS	ML1		NAT	t-ALL			t-ALL		4912	Calaveras Dome	3	
06N17J	CAL	0.52	GIS	ML1		NAT	t-ALL			t-ALL		4912	Calaveras Dome	3	
06N17P	CAL	0.41	GIS	ML1	ALL	NAT	t-ALL			t-ALL		4912	Calaveras Dome	3	
06N27	CAL	1.53	GIS	ML1	ALL	NAT	t-ALL			t-ALL	t-ALL	4912	Calaveras Dome	3	
06N27	CAL	3.23	GIS	ML1	ALL	NAT	t-ALL			t-ALL	t-ALL	4912	Calaveras Dome	3	
06N29Y	CAL	0.98	GIS	ALL	ALL	NAT	HLO				HLO	4912	Calaveras Dome	3	
06N40	CAL	0.09	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4911	Tamarack	2	
06N44	CAL	0.06	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4911	Tamarack	2	
06N58	CAL	0.03	GIS	HLO	HLO	NAT	ALL			ALL		4913	Boards Crossing	3	mixed use sign plan
06N58	CAL	0.79	GIS	HLO	HLO	NAT	ALL			ALL		4913	Boards Crossing	3	mixed use sign plan
06N58	CAL	0.46	GIS	HLO	HLO	NAT	ALL			ALL		4913	Boards Crossing	3	mixed use sign plan
06N58	CAL	0.08	GIS	HLO	HLO	NAT	ALL			ALL		4913	Boards Crossing	3	mixed use sign plan
06N58	CAL	0.36	GIS	HLO	HLO	NAT	ALL			ALL		4911	Tamarack	3	mixed use sign plan
06N58	CAL	0.70	GIS	HLO	HLO	NAT	ALL			ALL		4911	Tamarack	3	mixed use sign plan

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
06N58	CAL	0.18	GIS	HLO	HLO	NAT	ALL			ALL		4914	Liberty Hill	3	mixed use sign plan
06N58	CAL	1.74	GIS	HLO	HLO	NAT	ALL			ALL		4914	Liberty Hill	3	mixed use sign plan
06N58	CAL	0.90	GIS	HLO	HLO	NAT	ALL			ALL		4911	Tamarack	3	mixed use sign plan
06N58	CAL	0.25	GIS	HLO	HLO	NAT	ALL			ALL		4923	Fort Mt	3	mixed use sign plan
06N58	CAL	0.12	GIS	HLO	HLO	NAT	ALL			ALL		4923	Fort Mt	3	mixed use sign plan
06N60Y	CAL	0.02	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4911	Tamarack	2	
06N62	CAL	1.35	GIS	HLO	HLO	AGG	ALL			ALL		4913	Boards Crossing	3	mixed use sign plan
06N64	CAL	0.93	GIS	ALL	ALL	NAT	ML1			ML1	ML1	4911	Tamarack	3	
06N66YB	CAL	0.82	GIS	ML1		NAT	t-ALL			t-ALL		4911	Tamarack	3	
06N71Y	CAL	1.35	GIS	ALL	ALL	NAT	ADM			ADM	ADM	4912	Calaveras Dome	3	
06N76YA	CAL	0.25	GIS	ML1		NAT	t-ALL			t-ALL		4912	Calaveras Dome	3	
06N80	CAL	0.05	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4911	Tamarack	3	
06N80Y	CAL	0.78	GIS	ML1		NAT	t-ALL			t-ALL		4912	Calaveras Dome	3	
06N80YA	CAL	0.11	GIS	ML1		NAT	t-ALL			t-ALL		4912	Calaveras Dome	3	
06N81Y	CAL	0.46	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
06N81Y	CAL	0.14	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
06N81Y	CAL	0.42	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
06N81Y	CAL	0.26	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
06N81YA	CAL	0.51	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
06N82	CAL	0.12	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4911	Tamarack	3	
06N85	CAL	0.72	GIS	ML1	ALL	NAT	t-ALL			t-ALL		4911	Tamarack	3	
06N85A	CAL	0.39	GIS	ML1		NAT	t-ALL			t-ALL		4911	Tamarack	3	
06N94	CAL	1.68	GIS	ALL	ALL	NAT	ML1			ML1	ML1	4912	Calaveras Dome	3	
07N01	CAL	0.09	GIS	HLO	HLO	AC				ALL		4751	Stanislaus	3	combined use sign plan
07N01C	CAL	0.18	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4911	Tamarack	3	
07N01E	CAL	0.36	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
07N01G	CAL	0.13	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
07N02	CAL	2.39	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4902	Spicer Mdw Res	3	
07N02Y	CAL	0.02	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	2	
07N05	CAL	0.53	GIS	HLO	HLO	NAT	ALL			ALL		4751	Stanislaus	3	combined use sign plan
07N08	CAL	0.37	GIS	ALL	ALL	NAT	ADM			ADM	ADM	4912	Calaveras Dome	2	
07N08	CAL	2.52	GIS	HLO	HLO	NAT	ADM			ADM	ADM	4912	Calaveras Dome	2	
07N08	CAL	2.57	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4921	Garnet Hill	3	
07N08	CAL	1.94	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4921	Garnet Hill	3	
07N08	CAL	0.45	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
07N09	CAL	0.84	GIS	HLO	HLO	AGG	ALL			ALL		4751	Stanislaus	3	combined use sign plan
07N09	CAL	1.13	GIS	HLO	HLO	NAT	ALL			ALL		4751	Stanislaus	3	combined use sign plan
07N09	CAL	2.23	GIS	HLO	HLO	NAT	ALL			ALL		4751	Stanislaus	3	combined use sign plan
07N09	CAL	0.48	GIS	HLO	HLO	NAT	ALL			ALL		4751	Stanislaus	3	combined use sign plan
07N09	CAL	1.09	GIS	HLO	HLO	AGG	ALL			ALL		4751	Stanislaus	3	combined use sign plan
07N09	CAL	0.44	GIS	HLO	HLO	AGG	ALL			ALL		4913	Boards Crossing	3	mixed use sign plan
07N09	CAL	0.01	GIS	HLO	HLO	AGG	ALL			ALL		4913	Boards Crossing	3	mixed use sign plan
07N09	CAL	0.59	GIS	HLO	HLO	NAT	ALL			ALL		4913	Boards Crossing	3	mixed use sign plan
07N09	CAL	2.94	GIS	HLO	HLO	AGG	ALL			ALL		4913	Boards Crossing	3	mixed use sign plan
07N09A	CAL	0.86	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4911	Tamarack	3	
07N09B	CAL	0.45	GIS	ML1		NAT	t-4WD			t-4WD		4911	Tamarack	3	
07N09C	CAL	0.62	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4911	Tamarack	3	
07N09D	CAL	0.16	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4912	Calaveras Dome	3	
07N09E	CAL	0.29	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4912	Calaveras Dome	3	
07N09F	CAL	0.13	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4912	Calaveras Dome	3	
07N09G	CAL	0.12	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4912	Calaveras Dome	3	
07N09H	CAL	0.54	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4912	Calaveras Dome	3	
07N09J	CAL	0.26	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4912	Calaveras Dome	3	
07N09W	CAL	0.24	GIS	ML1		NAT	t-ALL			t-ALL		4911	Tamarack	3	
07N14C	CAL	0.47	GIS	ML1		NAT	t-ALL			t-ALL		4912	Calaveras Dome	3	
07N16A	CAL	0.20	GIS	ML1		NAT	t-ALL			t-ALL		4912	Calaveras Dome	3	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
07N16X	CAL	1.37	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
07N17	CAL	2.79	GIS	ALL	ALL	NAT	HLO				HLO	4912	Calaveras Dome	3	
07N17	CAL	2.24	GIS	ALL	ALL	NAT	HLO				HLO	5064	Ebbetts Pass	3	
07N17A	CAL	0.08	GIS	ML1		NAT	t-4WD			t-ALL		5064	Ebbetts Pass	3	
07N17B	CAL	0.57	GIS	ALL	ALL	AGG	ADM				ADM	5064	Ebbetts Pass	3	
07N18Y	CAL	0.90	GIS	ALL	ALL	NAT	HLO			HLO	HLO	5063	Pacific Valley	3	
07N18YC	CAL	0.32	GIS	ML1		NAT	t-4WD			t-4WD		5063	Pacific Valley	3	
07N19X	CAL	0.11	GIS	ML1		NAT	t-ALL			t-ALL		4902	Spicer Mdw Res	3	
07N22	CAL	0.05	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4902	Spicer Mdw Res	3	
07N22	CAL	0.43	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4911	Tamarack	3	
07N22	CAL	0.01	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4911	Tamarack	3	
07N22	CAL	1.03	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4911	Tamarack	3	
07N28	CAL	0.91	GIS	HLO	HLO	AGG	ALL			ALL		4924	Dorrington	3	mixed use sign plan
07N28	CAL	1.35	GIS	HLO	HLO	AGG	ALL			ALL		4924	Dorrington	3	mixed use sign plan
07N28	CAL	0.96	GIS	HLO	HLO	AGG	ALL			ALL		4924	Dorrington	3	mixed use sign plan
07N29Y	CAL	3.96	GIS	ALL	ALL	AGG	HLO				HLO	5063	Pacific Valley	3	
07N38	CAL	0.75	GIS	ALL	ALL	NAT	HLO				HLO	4911	Tamarack	3	
07N40Y	CAL	0.20	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4921	Garnet Hill	3	
07N48A	CAL	0.22	GIS	ML1		NAT	t-ALL			t-ALL		4912	Calaveras Dome	3	
07N49Y	CAL	0.36	GIS	ML1	HLO	NAT	HLO			ALL	HLO	4912	Calaveras Dome	3	
07N55	CAL	1.06	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4912	Calaveras Dome	3	
07N55A	CAL	0.59	GIS	ALL	ALL	NAT	HLO			HLO	HLO	5063	Pacific Valley	3	
07N55Y	CAL	0.40	GIS	ALL	ALL	NAT	HLO				HLO	5063	Pacific Valley	3	
07N56YA	CAL	0.71	GIS	ML1		NAT	t-ALL			t-ALL		4911	Tamarack	3	
07N57	CAL	0.29	GIS	ALL	ALL	NAT	ADM			ADM	ADM	4902	Spicer Mdw Res	3	
07N58	CAL	1.77	GIS	ALL		NAT	ADM			ADM	ADM	4901	Dardanelles Cone	3	
07N58	CAL	0.12	GIS	ALL	ALL	NAT	HLO			HLO	HLO	5064	Ebbetts Pass	3	
07N60	CAL	0.40	GIS	ALL	ALL	NAT	ADM			ADM	ADM	4571	Duckwall Mt	3	
07N70	CAL	0.77	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
07N75	CAL	1.84	GIS	HLO	HLO	AGG				ALL		4913	Boards Crossing	3	combined use sign plan
07N75C	CAL	0.49	GIS	ALL	ALL	NAT	HLO				HLO	4562	Cherry Lake S	3	
07N77	CAL	0.96	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
07N82	CAL	0.95	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
07N82A	CAL	0.24	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4571	Duckwall Mt	3	
07N87	CAL	1.70	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4562	Cherry Lake S	3	
07N87A	CAL	0.14	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4562	Cherry Lake S	3	
07N87A	CAL	0.20	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4733	Cherry Lake N	3	
07N87B	CAL	0.11	GIS	ALL	ALL	NAT	t-4WD			t-4WD	t-4WD	4563	Ascension Mt	3	
07N93	CAL	2.68	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
07N94	CAL	0.44	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
07N94A	CAL	0.73	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4571	Duckwall Mt	3	
07N95	CAL	0.08	GIS	ALL		NAT	ADM			ADM	ADM	4571	Duckwall Mt	3	
07N95A	CAL	0.11	GIS	ALL	ALL	NAT	ADM			ADM	ADM	4574	Jawbone Ridge	3	
08N01A	CAL	0.12	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4571	Duckwall Mt	3	
08N04	CAL	0.01	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4571	Duckwall Mt	3	
08N04	CAL	0.23	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
08N13	CAL	0.54	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
08N14	CAL	0.11	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
FR10831	CAL	0.03	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
FR11116	CAL	0.04	MAP	ALL	ALL	AC	HLO			HLO	HLO	4562	Cherry Lake S	3	
FR12088	CAL	0.11	MAP	ALL	ALL	AC	HLO			HLO	HLO	4562	Cherry Lake S	3	
FR12476	CAL	0.05	MAP	ALL	ALL	AC	HLO			HLO	HLO	4571	Duckwall Mt	3	
FR12477	CAL	0.37	MAP	ALL	ALL	AC	HLO			HLO	HLO	4562	Cherry Lake S	3	
FR5219	CAL	0.03	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
FR7181	CAL	0.16	MAP	ALL	ALL	AC	HLO			HLO	HLO	4571	Duckwall Mt	3	
FR8080	CAL	0.04	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4571	Duckwall Mt	3	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
FR8319	CAL	0.33	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
FR8319	CAL	0.48	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
FR8319	CAL	0.05	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4571	Duckwall Mt	3	
FR8322	CAL	0.08	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
FR8323	CAL	0.06	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
FR8925	CAL	0.04	MAP	ALL	ALL	AC	HLO			HLO	HLO	4562	Cherry Lake S	3	
FR9330	CAL	0.11	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	3	
FR9331	CAL	0.33	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4571	Duckwall Mt	3	
FS83231	CAL	0.06	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4571	Duckwall Mt	3	
01N01	GR	7.77	GIS	HLO	HLO	AGG	ALL			ALL		4913	Boards Crossing	2	mixed use sign plan
01N01	GR	0.36	GIS	HLO	HLO	AC	ALL			ALL		4913	Boards Crossing	2	mixed use sign plan
01N01	GR	0.03	GIS	HLO	HLO	AC	ALL			ALL		4913	Boards Crossing	2	mixed use sign plan
01N01	GR	0.43	GIS	HLO	HLO	AC	ALL			ALL		4922	Devils Nose	2	mixed use sign plan
01N01C	GR	0.19	GIS	ML1		NAT	t-ALL			t-ALL		4571	Duckwall Mt	2	
01N01D	GR	0.50	GIS	ML1		NAT	t-ALL			t-ALL		4571	Duckwall Mt	2	
01N04	GR	5.14	GIS	ALL	ALL	NAT	HLO				HLO	4571	Duckwall Mt	3	
01N04A	GR	0.44	GIS	ML1		AGG	t-4WD			t-ALL		4571	Duckwall Mt	3	
01N04C	GR	0.91	GIS	ML1		NAT	t-4WD			t-ALL		4562	Cherry Lake S	3	
01N07A	GR	0.80	GIS	ML1		NAT	t-4WD			t-ALL		4562	Cherry Lake S	2	
01N07Y	GR	0.50	GIS	ALL	ALL	NAT	HLO				HLO	4571	Duckwall Mt	2	
01N07Y	GR	1.07	GIS	ALL	ALL	NAT	HLO				HLO	4571	Duckwall Mt	2	
01N09	GR	6.62	GIS	ALL	ALL	NAT	ADM				ADM	4562	Cherry Lake S	2	
01N10	GR	5.14	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	2	
01N10	GR	6.62	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	2	
01N10A	GR	0.53	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	
01N10B	GR	0.16	GIS	ML1		NAT	t-4WD			t-ALL		4563	Ascension Mt	2	
01N14	GR	1.04	GIS	ALL	ALL	AGG	HLO			HLO	HLO	4563	Ascension Mt	3	
01N14	GR	2.72	GIS	ALL	ALL	AGG	HLO				HLO	4563	Ascension Mt	3	
01N14A	GR	0.82	GIS	ALL	ALL	AGG	HLO				HLO	4563	Ascension Mt	3	
01N14B	GR	0.96	GIS	ML1	ALL	NAT				t-ALL		4564	Ackerson Mt	3	
01N14E	GR	0.54	GIS	ML1	ALL	NAT				t-ALL		4564	Ackerson Mt	3	
01N14F	GR	0.44	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4564	Ackerson Mt	3	
01N15	GR	1.09	GIS	ALL	ALL	NAT	ML1				ML1	4563	Ascension Mt	2	
01N15Y	GR	0.53	GIS	ML1		AGG	ADM			ADM	ADM	4563	Ascension Mt	2	
01N23	GR	1.98	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	
01N32Y	GR	1.03	GIS	ML1		NAT	t-4WD			t-ALL		4563	Ascension Mt	2	
01N33Y	GR	0.29	GIS	ML1		NAT	t-4WD			t-ALL		4563	Ascension Mt	2	
01N34	GR	1.24	GIS	ML1	ALL	NAT				t-ALL		4574	Jawbone Ridge	3	
01N34A	GR	0.93	GIS	ML1	ALL	NAT				t-ALL		4573	Groveland	3	
01N37	GR	1.43	GIS	ML1	ALL	NAT	ALL			ALL		4573	Groveland	2	
01N40Y	GR	1.91	GIS	ALL	ALL	AGG	HLO				HLO	4573	Groveland	3	
01N40Y	GR	0.62	GIS	ML1	ALL	NAT				t-ALL		4573	Groveland	3	
01N45	GR	1.73	GIS	ML1		NAT	t-4WD			t-ALL		4564	Ackerson Mt	2	
01N45Y	GR	0.48	GIS	ALL	ALL	AGG	HLO			HLO	HLO	4564	Ackerson Mt	3	
01N60	GR	0.76	GIS	ALL	ALL	NAT	HLO				HLO	4564	Ackerson Mt	2	
01N60A	GR	0.35	GIS	ALL	ALL	NAT	HLO				HLO	4564	Ackerson Mt	2	
01N69	GR	1.14	GIS	ML1		NAT	t-ALL			t-ALL		4564	Ackerson Mt	2	
01N76	GR	0.74	GIS	ALL	ALL	NAT	HLO				HLO	4563	Ascension Mt	2	
01N76	GR	0.97	GIS	ALL	ALL	NAT	HLO				HLO	4563	Ascension Mt	2	
01N76	GR	0.67	GIS	ALL	ALL	NAT	HLO				HLO	4381	El Portal	2	
01N81	GR	0.72	GIS	ML1		NAT	t-4WD			t-ALL		4574	Jawbone Ridge	2	
01N86	GR	1.19	GIS	ML1		NAT	ADM			ADM	ADM	4563	Ascension Mt	2	
01N88	GR	0.63	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	2	
01N91	GR	0.58	GIS	ML1		NAT	t-4WD			t-ALL		4574	Jawbone Ridge	2	
01N97	GR	5.01	GIS	ALL	ALL	AGG	HLO				ML1	4574	Jawbone Ridge	3	
01N97E	GR	0.64	GIS	ML1	ALL	NAT				t-ALL		4574	Jawbone Ridge	3	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
01S01	GR	2.95	GIS	ML1		NAT	ADM			t-4WD	ADM	4574	Jawbone Ridge	2	
01S01Y	GR	0.59	GIS	ALL		NAT	ML1				ML1	4563	Ascension Mt	2	
01S01Y	GR	0.07	GIS	ALL		NAT	HLO			HLO	ML1	4563	Ascension Mt	2	
01S01YA	GR	0.17	GIS	ALL	ALL	NAT	ML1				ML1	4574	Jawbone Ridge	2	
01S01YB	GR	0.66	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	2	
01S01YC	GR	0.13	GIS	ML1		NAT	t-4WD			t-ALL		4563	Ascension Mt	2	
01S03	GR	0.01	GIS	HLO	HLO	AGG	ALL			ALL		4913	Boards Crossing	2	combined use sign plan
01S03	GR	0.68	GIS	HLO	HLO	AGG	ALL			ALL		4913	Boards Crossing	2	combined use sign plan
01S03	GR	2.33	GIS	HLO	HLO	AGG	ALL			ALL		4913	Boards Crossing	2	combined use sign plan
01S03	GR	0.91	GIS	HLO	HLO	AGG	ALL			ALL		4913	Boards Crossing	2	combined use sign plan
01S03A	GR	0.63	GIS	ML1		NAT	t-4WD			t-ALL		4573	Groveland	2	
01S04	GR	1.28	GIS	ML1	ALL	AGG	ALL			t-ALL		4573	Groveland	2	
01S04	GR	0.51	GIS	ML1	ALL	AGG	ALL			t-ALL		4573	Groveland	2	
01S05A	GR	0.65	GIS	ML1		NAT				t-ALL		4573	Groveland	2	
01S05Y	GR	1.96	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4573	Groveland	2	
01S06	GR	0.03	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	1	
01S06	GR	0.37	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	1	
01S06	GR	0.30	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4561	Lake Eleanor	1	
01S06B	GR	0.11	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	1	
01S11C	GR	0.68	GIS	ML1		NAT	t-ALL			t-ALL		4574	Jawbone Ridge	1	
01S11C	GR	0.07	GIS	ML1		NAT	t-ALL			t-ALL		4562	Cherry Lake S	1	
01S11C	GR	0.08	GIS	ML1		NAT	t-ALL			t-ALL		4563	Ascension Mt	2	
01S11C	GR	0.07	GIS	ML1		NAT	t-ALL			t-ALL		4563	Ascension Mt	2	
01S11C	GR	0.22	GIS	ML1		NAT	t-ALL			t-ALL		4563	Ascension Mt	2	
01S11D	GR	0.98	GIS	ML1		NAT	t-ALL			t-ALL		4563	Ascension Mt	2	
01S11Y	GR	1.44	GIS	ALL	ALL	NAT	ML1				ML1	4563	Ascension Mt	2	
01S12	GR	2.25	GIS	ALL	ALL	AGG	HLO			HLO	HLO	4563	Ascension Mt	2	
01S13	GR	0.70	GIS	ALL	ALL	AGG	HLO			HLO	HLO	4563	Ascension Mt	2	
01S13Y	GR	1.22	GIS	ALL	ALL	AGG	HLO			HLO	HLO	4574	Jawbone Ridge	2	
01S14K	GR	0.17	GIS	ML1	ALL	NAT	t-ALL			t-ALL		4574	Jawbone Ridge	2	
01S14L	GR	0.58	GIS	ML1	ALL	NAT	t-ALL			t-ALL		4574	Jawbone Ridge	2	
01S15C	GR	0.57	GIS	ML1		NAT	t-4WD			t-ALL		4574	Jawbone Ridge	2	
01S15Y	GR	3.14	GIS	ALL	ALL	NAT	ADM				ADM	4563	Ascension Mt	2	
01S15Y	GR	0.14	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	
01S15YA	GR	1.36	GIS	ALL	ALL	NAT	ML1				ML1	4574	Jawbone Ridge	2	
01S15YB	GR	0.18	GIS	ALL	ALL	NAT	ADM				ADM	4563	Ascension Mt	2	
01S16A	GR	0.27	GIS	ALL	ALL	NAT	ADM				ADM	4561	Lake Eleanor	2	
01S16B	GR	0.25	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4573	Groveland	2	
01S16Y	GR	1.87	GIS	ALL	ALL	AGG	HLO			HLO	HLO	4573	Groveland	2	
01S17	GR	2.68	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4573	Groveland	1	
01S17	GR	0.30	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4573	Groveland	1	
01S17	GR	0.04	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4573	Groveland	1	
01S17A	GR	0.56	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4573	Groveland	1	
01S17D	GR	0.20	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	1	
01S19Y	GR	0.47	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	
01S20	GR	0.30	GIS	ML1		NAT	t-4WD			t-4WD		4563	Ascension Mt	2	
01S20Y	GR	0.65	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4573	Groveland	2	
01S23C	GR	0.27	GIS	ML1		NAT	t-ALL			t-ALL		4573	Groveland	2	
01S23E	GR	0.16	GIS	ML1		NAT	ADM			ADM	ADM	4573	Groveland	2	
01S23Y	GR	0.67	GIS	ALL	ALL	AC	HLO			HLO	HLO	4574	Jawbone Ridge	2	
01S26	GR	2.21	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	2	
01S26	GR	2.69	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	2	
01S26A	GR	0.20	GIS	ML1		NAT	t-4WD			t-ALL		4574	Jawbone Ridge	2	
01S26B	GR	0.41	GIS	ML1	ALL	NAT				t-ALL		4563	Ascension Mt	2	
01S26C	GR	0.69	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	
01S26E	GR	0.21	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
01S27	GR	0.80	GIS	ML1		NAT	t-4WD			t-ALL		4574	Jawbone Ridge	2	
01S27Y	GR	0.84	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	2	
01S28B	GR	0.59	GIS	ML1		NAT	ADM			ADM	ADM	4563	Ascension Mt	2	
01S29A	GR	0.24	GIS	ML1		NAT				t-ALL		4574	Jawbone Ridge	2	
01S30	GR	0.63	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4573	Groveland	2	
01S30	GR	0.15	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4573	Groveland	2	
01S30	GR	1.25	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	
01S30A	GR	0.24	GIS	ML1		NAT	t-4WD			t-ALL		4563	Ascension Mt	2	
01S30B	GR	0.55	GIS	ALL	ALL	NAT	ML1				ML1	4563	Ascension Mt	2	
01S32A	GR	0.50	GIS	ML1		NAT	t-ALL			t-ALL		4564	Ackerson Mt	2	
01S33	GR	1.72	GIS	ALL	ALL	NAT	ML1			HLO	ML1	4563	Ascension Mt	1	
01S35Y	GR	1.32	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	1	
01S35Y	GR	1.00	GIS	ML1		NAT				t-4WD		4563	Ascension Mt	1	
01S35YA	GR	0.39	GIS	ALL	ALL	NAT	HLO				HLO	4563	Ascension Mt	1	
01S36Y	GR	0.50	GIS	ALL	ALL	NAT	HLO				HLO	4563	Ascension Mt	1	
01S39	GR	0.80	GIS	ML1		NAT				t-ALL		4563	Ascension Mt	1	
01S39Y	GR	0.89	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	2	
01S39YA	GR	0.10	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4571	Duckwall Mt	2	
01S39YB	GR	0.38	GIS	ML1		NAT	t-4WD			t-ALL		4571	Duckwall Mt	2	
01S40Y	GR	0.51	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	1	
01S42	GR	1.03	GIS	ML1		NAT				t-ALL		4563	Ascension Mt	1	
01S43	GR	0.25	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	1	
01S45Y	GR	0.04	GIS	ML1		NAT	ALL			ALL		4563	Ascension Mt	2	
01S45Y	GR	0.35	GIS	ML1		NAT	t-ALL			t-ALL		4563	Ascension Mt	2	
01S46	GR	0.25	GIS	ML1		NAT	t-4WD			t-4WD		4574	Jawbone Ridge	2	
01S50	GR	0.43	GIS	ALL	ALL	NAT	ADM				ADM	4563	Ascension Mt	2	
01S51	GR	2.24	GIS	ALL	ALL	AGG	HLO			HLO	HLO	4574	Jawbone Ridge	2	
01S51A	GR	0.77	GIS	ML1		NAT	t-4WD			t-ALL		4563	Ascension Mt	2	
01S51B	GR	0.71	GIS	ML1		NAT				t-ALL		4563	Ascension Mt	2	
01S52	GR	0.15	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	
01S52Y	GR	0.49	GIS	ML1		NAT	t-4WD			t-4WD		4574	Jawbone Ridge	1	
01S53	GR	1.08	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	
01S54Y	GR	0.50	GIS	ML1		NAT	t-ALL			t-ALL		4563	Ascension Mt	2	
01S55Y	GR	0.17	GIS	ALL	ALL	AC	HLO			HLO	HLO	4563	Ascension Mt	1	
01S55Y	GR	1.34	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4564	Ackerson Mt	1	
01S56Y	GR	0.60	GIS	ML1		NAT	t-4WD			t-ALL		4563	Ascension Mt	2	
01S57	GR	1.96	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4564	Ackerson Mt	2	
01S57B	GR	1.45	GIS	ML1		NAT	t-4WD			t-ALL		4744	Hull Creek	2	
01S57Y	GR	0.66	GIS	ML1		NAT	t-4WD			t-4WD		4571	Duckwall Mt	2	
01S58	GR	3.00	GIS	ALL	ALL	NAT	ADM				ADM	4733	Cherry Lake N	2	
01S59	GR	0.87	GIS	ML1		NAT	t-4WD			t-ALL		4744	Hull Creek	2	
01S60Y	GR	0.51	GIS	ML1		NAT	t-ALL			t-ALL		4744	Hull Creek	2	
01S61Y	GR	0.26	GIS	ML1		NAT	t-4WD			t-4WD		4744	Hull Creek	2	
01S61YA	GR	0.55	GIS	ML1		NAT	t-4WD			t-4WD		4733	Cherry Lake N	2	
01S62	GR	1.42	GIS	ALL	ALL	NAT	ML1				ML1	4562	Cherry Lake S	2	
01S63	GR	0.09	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4564	Ackerson Mt	2	
01S63Y	GR	2.26	GIS	ALL	ALL	NAT	ADM				ADM	4564	Ackerson Mt	2	
01S63YA	GR	0.10	GIS	ALL	ALL	NAT	ADM				ADM	4564	Ackerson Mt	2	
01S65Y	GR	0.45	GIS	ML1		NAT	t-4WD			t-4WD		4564	Ackerson Mt	2	
01S66Y	GR	0.49	GIS	ML1		NAT	t-ALL			t-ALL		4564	Ackerson Mt	2	
01S70	GR	1.10	GIS	ALL	ALL	NAT					ML1	4563	Ascension Mt	2	
01S70	GR	1.64	GIS	ALL		AGG					ML1	4563	Ascension Mt	2	
01S70A	GR	0.34	GIS	ALL	ALL	NAT	ML1				ML1	4563	Ascension Mt	2	
01S73Y	GR	2.12	GIS	ML1	ALL	NAT	ALL			ALL		4564	Ackerson Mt	2	
01S79	GR	0.12	GIS	ML1	ATV	NAT	t-ATV			t-ATV		4564	Ackerson Mt	2	
01S79	GR	2.51	GIS	ML1		NAT				t-ALL		4564	Ackerson Mt	2	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
01S79	GR	0.19	GIS	ML1		NAT				t-ALL		4563	Ascension Mt	2	
01S81	GR	1.90	GIS	ALL	ALL	AGG	HLO			HLO	HLO	4382	Kinsley	2	
01S81A	GR	0.59	GIS	ML1		NAT				t-ALL		4382	Kinsley	2	
01S81Y	GR	1.00	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	1	
01S82	GR	1.39	GIS	ALL	ALL	AGG	HLO			HLO	HLO	4391	Buckhorn Peak	2	
01S86	GR	2.77	GIS	ML1	HLO	NAT	t-4WD			t-ALL		4574	Jawbone Ridge	2	
01S86B	GR	0.57	GIS	ML1		NAT	t-4WD			t-ALL		4382	Kinsley	2	
01S96	GR	1.52	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	2	
01S96A	GR	0.22	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	
01S97	GR	0.90	GIS	ML1		NAT	t-4WD			t-4WD		4574	Jawbone Ridge	2	
02N04	GR	1.11	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4573	Groveland	3	
02N04	GR	0.22	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	3	
02N05	GR	0.83	GIS	HLO	HLO	NAT	ALL			ALL		4912	Calaveras Dome	3	mixed use sign plan
02N14	GR	1.81	GIS	HLO	HLO	AGG	ALL			ALL		4924	Dorrington	3	mixed use sign plan
02N14	GR	2.57	GIS	HLO	HLO	AGG	ALL			ALL		4914	Liberty Hill	3	mixed use sign plan
02N64	GR	0.71	GIS	ML1		NAT	t-ALL			t-ALL		4573	Groveland	3	
02N82	GR	1.33	GIS	ALL	ALL	NAT				t-ALL		4574	Jawbone Ridge	3	
02N87	GR	0.13	GIS	ALL	ALL	NAT	ADM				ADM	4391	Buckhorn Peak	3	
02S01	GR	0.79	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	2	
02S01	GR	0.32	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	2	
02S01	GR	0.07	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	2	
02S01	GR	0.67	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	
02S01	GR	1.26	GIS	ALL	ALL	AGG	HLO			HLO	HLO	4382	Kinsley	2	
02S01	GR	7.71	GIS	ALL		NAT	HLO				HLO	4574	Jawbone Ridge	2	
02S01A	GR	0.92	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4391	Buckhorn Peak	2	
02S01C	GR	0.39	GIS	ALL	ALL	NAT	HLO				HLO	4391	Buckhorn Peak	2	
02S01G	GR	0.08	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4381	El Portal	2	
02S01G	GR	0.01	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4381	El Portal	2	
02S01G	GR	0.30	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	2	
02S02	GR	5.35	GIS	HLO	HLO	AGG	ALL			ALL		4924	Dorrington	2	mixed use sign plan
02S02	GR	0.10	GIS	HLO	HLO	AGG	ALL			ALL		4914	Liberty Hill	2	mixed use sign plan
02S02	GR	2.37	GIS	HLO	HLO	AGG	ALL			ALL		4913	Boards Crossing	2	mixed use sign plan
02S04	GR	1.47	GIS	ALL	ALL	NAT	ADM				ADM	4391	Buckhorn Peak	2	
02S04Y	GR	0.38	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4391	Buckhorn Peak	1	
02S04YA	GR	0.44	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4391	Buckhorn Peak	1	
02S05C	GR	0.98	GIS	ML1		NAT				t-ALL		4391	Buckhorn Peak	1	
02S07	GR	2.88	GIS	ML1		NAT	ALL			ALL	ALL	4563	Ascension Mt	1	
02S07A	GR	0.66	GIS	ML1		NAT				t-ALL		4563	Ascension Mt	2	
02S07Y	GR	1.45	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4382	Kinsley	2	
02S08	GR	3.47	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	1	
02S09A	GR	1.64	GIS	ML1		NAT				t-ALL		4392	Coulterville	2	
02S09Y	GR	1.12	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4392	Coulterville	1	
02S10Y	GR	0.88	GIS	ML1		NAT				t-ALL		4392	Coulterville	2	
02S11C	GR	1.04	GIS	ML1		NAT				t-ALL		4564	Ackerson Mt	1	
02S11Y	GR	0.76	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	
02S12Y	GR	0.45	GIS	ML1		NAT	HLO			HLO		4391	Buckhorn Peak	2	
02S12YA	GR	0.28	GIS	ML1		NAT	HLO			HLO		4382	Kinsley	2	
02S13	GR	0.91	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	
02S13	GR	2.75	GIS	ALL	ALL	AGG	HLO			HLO	HLO	4563	Ascension Mt	2	
02S17Y	GR	1.27	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	
02S18A	GR	0.55	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4573	Groveland	1	
02S18Y	GR	1.51	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4573	Groveland	2	
02S20	GR	1.73	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4573	Groveland	2	
02S20C	GR	0.37	GIS	ML1		NAT	t-ALL			t-ALL		4381	El Portal	2	
02S20Y	GR	2.33	GIS	ML1		NAT				t-ALL		4574	Jawbone Ridge	2	
02S21	GR	0.02	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	1	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
02S21	GR	1.54	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4391	Buckhorn Peak	1	
02S21	GR	3.51	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4391	Buckhorn Peak	1	
02S21	GR	0.03	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	1	
02S21Y	GR	0.30	GIS	ALL	ALL	NAT	t-ALL			t-ALL	ML1	4391	Buckhorn Peak	2	
02S21Y	GR	1.53	GIS	ML1		NAT	t-ALL			t-ALL		4563	Ascension Mt	2	
02S22	GR	0.73	GIS	ML1		NAT				t-ALL		4391	Buckhorn Peak	2	
02S22Y	GR	1.15	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4391	Buckhorn Peak	1	
02S23	GR	1.64	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4391	Buckhorn Peak	1	
02S23	GR	0.02	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4391	Buckhorn Peak	1	
02S23	GR	1.43	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4391	Buckhorn Peak	1	
02S23YA	GR	0.73	GIS	ML1		NAT	t-ALL			t-ALL		4391	Buckhorn Peak	2	
02S24	GR	0.47	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4391	Buckhorn Peak	2	
02S24Y	GR	0.32	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4391	Buckhorn Peak	2	
02S26	GR	1.48	GIS	ML1		NAT				t-ALL		4391	Buckhorn Peak	2	
02S30	GR	1.11	GIS	HLO	HLO	BIT	ALL			ALL		4913	Boards Crossing	2	combined use sign plan
02S30A	GR	0.18	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4391	Buckhorn Peak	2	
02S30B	GR	0.34	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4391	Buckhorn Peak	2	
02S34	GR	0.24	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	1	
02S35	GR	0.29	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	1	
02S37	GR	1.60	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	1	
02S37YB	GR	0.74	GIS	ML1		NAT	t-ALL			t-ALL		4381	El Portal	2	
02S39B	GR	0.85	GIS	ML1		NAT	t-ALL			t-ALL		4381	El Portal	2	
02S41	GR	1.60	GIS	ML1		NAT	ALL			ALL		4381	El Portal	2	
02S43	GR	1.40	GIS	ML1		NAT	t-4WD			t-4WD		4574	Jawbone Ridge	1	
02S44	GR	1.49	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	1	
02S45	GR	1.19	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4381	El Portal	1	
02S47	GR	0.27	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	1	
02S50Y	GR	0.73	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4563	Ascension Mt	2	
02S52	GR	0.35	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4382	Kinsley	1	
02S53	GR	0.97	GIS	ML1	HLO	NAT	HLO			ALL	HLO	4563	Ascension Mt	1	
02S53	GR	0.11	GIS	ML1	HLO	NAT	HLO			ALL	HLO	4733	Cherry Lake N	1	
02S53A	GR	0.09	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4733	Cherry Lake N	1	
02S56	GR	1.13	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4571	Duckwall Mt	1	
02S56A	GR	0.21	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4571	Duckwall Mt	1	
02S57	GR	0.29	GIS	ALL	ALL	NAT	ADM				ADM	4562	Cherry Lake S	1	
02S57	GR	0.67	GIS	ALL	ALL	NAT	ADM				ADM	4733	Cherry Lake N	1	
02S58	GR	0.20	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	1	
02S59A	GR	0.50	GIS	ML1		NAT				t-ALL		4562	Cherry Lake S	1	
02S59B	GR	1.35	GIS	ML1		NAT				t-ALL		4562	Cherry Lake S	1	
02S64C	GR	0.73	GIS	ML1		NAT	t-ALL			t-ALL		4562	Cherry Lake S	2	
02S65D	GR	0.22	GIS	ALL	ALL	NAT	ML1				ML1	4391	Buckhorn Peak	2	
02S68	GR	1.81	GIS	ML1		NAT	ALL			ALL		4563	Ascension Mt	2	
02S74	GR	1.37	GIS	ML1		NAT				t-ALL		4574	Jawbone Ridge	2	
02S74A	GR	1.73	GIS	ML1		NAT				t-ALL		4574	Jawbone Ridge	2	
02S82	GR	0.34	GIS	ML1		NAT	t-4WD			t-ALL		4574	Jawbone Ridge	2	
02S83	GR	1.83	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4562	Cherry Lake S	2	
02S83B	GR	0.38	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4574	Jawbone Ridge	2	
02S84	GR	0.50	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4571	Duckwall Mt	2	
02S86	GR	0.08	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4572	Tuolumne	1	
02S93C	GR	0.36	GIS	ML1		NAT	t-ALL			t-ALL		4572	Tuolumne	2	
02S97	GR	0.63	GIS	ALL	ALL	AGG	HLO			HLO	HLO	4572	Tuolumne	2	
02S97	GR	0.40	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4572	Tuolumne	2	
03N01	GR	0.57	GIS	HLO	HLO	AGG	ALL			ALL		4914	Liberty Hill	2	combined use sign plan
03N01	GR	0.86	GIS	HLO	HLO	AGG	ALL			ALL		4914	Liberty Hill	3	combined use sign plan
03N01	GR	0.30	GIS	HLO	HLO	AC	ALL			ALL		4914	Liberty Hill	3	combined use sign plan
03N01	GR	0.31	GIS	HLO	HLO	AC	ALL			ALL		4914	Liberty Hill	3	combined use sign plan

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
03N01	GR	0.60	GIS	HLO	HLO	AC	ALL			ALL		4914	Liberty Hill	3	combined use sign plan
03N01	GR	2.24	GIS	HLO	HLO	AGG				ALL		4914	Liberty Hill	3	mixed use sign plan
03N01C	GR	0.11	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4571	Duckwall Mt	2	
03N01P	GR	0.44	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
03N01P	GR	0.61	GIS	ALL	ALL	NAT	t-4WD				HLO	4571	Duckwall Mt	2	
03N01Q	GR	0.20	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
03S06	GR	0.66	GIS	ML1		NAT				t-ALL		4743	Twain Harte	1	
21904B	GR	0.06	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4743	Twain Harte	2	
FR4898	GR	0.09	GIS	ALL	ALL	NAT	ADM				ADM	4743	Twain Harte	2	
FR4898	GR	0.22	GIS	ALL	ALL	NAT	ADM				ADM	4743	Twain Harte	2	
FR7856	GR	0.14	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4743	Twain Harte	2	
FR8445	GR	0.05	MAP	ALL	ALL	AC	HLO			HLO	HLO	4743	Twain Harte	3	
FR8602	GR	0.23	MAP	ALL	ALL	NAT	ADM				ADM	4743	Twain Harte	2	
01N01	MW	0.02	GIS	HLO	HLO	NAT	ALL			ALL		4914	Liberty Hill	1	mixed use sign plan
01N01	MW	8.47	GIS	HLO	HLO	AC	ALL			ALL		4912	Calaveras Dome	1	mixed use sign plan
01N01	MW	5.77	GIS	ALL	ALL	NAT					t-ALL	4743	Twain Harte	1	
01N01J	MW	0.28	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	1	
01N03	MW	0.01	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	1	
01N16	MW	0.03	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
01N33	MW	0.73	GIS	ALL	ALL	AGG	HLO				HLO	4743	Twain Harte	2	
01N58A	MW	0.40	GIS	ALL	ALL	NAT	ML1				ML1	4743	Twain Harte	2	
02N03Y	MW	0.79	GIS	ALL	ALL	AGG	HLO				HLO	4572	Tuolumne	2	
02N03Y	MW	0.04	GIS	ALL	ALL	AGG	HLO				HLO	4572	Tuolumne	2	
02N03Y	MW	0.29	GIS	ALL	ALL	AGG	HLO				HLO	4572	Tuolumne	2	
02N03Y	MW	0.02	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N03Y	MW	0.16	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N03Y	MW	0.02	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N03Y	MW	0.08	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
02N03Y	MW	0.03	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
02N03Y	MW	0.58	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
02N03YA	MW	0.31	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N03YB	MW	0.18	GIS	ML1		NAT				t-ALL		4572	Tuolumne	2	
02N03YB	MW	0.43	GIS	ML1		NAT				t-ALL		4572	Tuolumne	2	
02N07	MW	0.92	GIS	ALL	ALL	AGG	HLO				HLO	4572	Tuolumne	2	
02N07D	MW	0.05	GIS	ML1		NAT	t-ALL			t-ALL		4572	Tuolumne	2	
02N08	MW	0.42	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N08	MW	0.43	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N08	MW	0.30	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N08A	MW	0.29	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N09	MW	0.14	GIS	ALL	ALL	NAT	ADM				ADM	4743	Twain Harte	1	
02N09	MW	1.13	GIS	ALL	ALL	NAT	ADM				ADM	4743	Twain Harte	1	
02N09A	MW	0.36	GIS	ALL	ALL	AGG	HLO				HLO	4744	Hull Creek	2	
02N09D	MW	0.19	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
02N09D	MW	0.11	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
02N10	MW	1.17	GIS	ALL	ALL	AGG	HLO				HLO	4743	Twain Harte	1	
02N10	MW	0.06	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
02N10	MW	0.10	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N10	MW	0.05	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N10	MW	1.77	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N10	MW	0.07	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N10	MW	0.07	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N10	MW	0.05	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N10	MW	0.86	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N13Y	MW	0.26	GIS	ALL	ALL	AGG	HLO				HLO	4572	Tuolumne	3	
02N13Y	MW	0.85	GIS	ALL	ALL	AGG	HLO				HLO	4572	Tuolumne	3	
02N14	MW	3.50	GIS	HLO	HLO	AGG	ALL			ALL		4912	Calaveras Dome	3	mixed use sign plan

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
02N26	MW	0.47	GIS	ALL	ALL	AC	HLO				HLO	4572	Tuolumne	2	
02N26	MW	0.21	GIS	ALL	ALL	NAT	HLO				HLO	4572	Tuolumne	2	
02N26	MW	0.59	GIS	ALL	ALL	NAT	HLO				HLO	4571	Duckwall Mt	2	
02N32Y	MW	0.03	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	2	
02N34	MW	2.63	GIS	ALL	ALL	AGG	HLO				HLO	4743	Twain Harte	2	
02N34A	MW	0.84	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
02N34B	MW	0.56	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
02N34C	MW	0.47	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
02N39	MW	0.86	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	2	
02N39A	MW	0.71	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	2	
02N44	MW	0.65	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
02N44	MW	0.17	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
02N44	MW	0.50	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
02N44	MW	0.32	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	2	
02N44	MW	1.60	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	2	
02N44A	MW	0.08	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	2	
02N58	MW	0.80	GIS	ALL	ALL	NAT	ML1				ML1	4733	Cherry Lake N	3	
02N63A	MW	0.08	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	2	
02N63B	MW	0.15	MAO	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	2	
02N75	MW	0.82	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	1	
02N75A	MW	0.30	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	1	
02N81	MW	2.08	GIS	ALL	ALL	NAT					HLO	4733	Cherry Lake N	3	
02N81A	MW	0.18	GIS	ALL	ALL	NAT					HLO	4744	Hull Creek	3	
02N88	MW	1.35	GIS	ALL	ALL	AGG	HLO				HLO	4744	Hull Creek	1	
02N88A	MW	0.28	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	1	
02N93	MW	1.02	GIS	ALL	ALL	NAT	ML1				ML1	4754	Columbia SE	2	
03N01	MW	1.80	GIS	HLO	HLO	AGG	ALL			ALL		4914	Liberty Hill	3	combined use sign plan
03N01	MW	5.77	GIS	HLO	HLO	AGG	ALL			ALL		4912	Calaveras Dome	3	mixed use sign plan
03N01	MW	1.69	GIS	HLO	HLO	AGG	ALL			ALL		4912	Calaveras Dome	3	mixed use sign plan
03N01	MW	1.58	GIS	HLO	HLO	AGG				ALL		4912	Calaveras Dome	3	mixed use sign plan
03N01D	MW	0.15	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	3	
03N01H	MW	0.95	GIS	ALL	ALL	AGG					HLO	4754	Columbia SE	3	
03N01J	MW	0.81	GIS	ALL	ALL	AGG					HLO	4754	Columbia SE	3	
03N01L	MW	0.38	GIS	ALL	ALL	NAT					HLO	4754	Columbia SE	3	
03N01M	MW	0.63	GIS	ALL	ALL	NAT					HLO	4751	Stanislaus	3	
03N01U	MW	0.07	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	3	
03N01W	MW	0.22	GIS	ML1	ALL	NAT				t-ALL		4743	Twain Harte	3	
03N01Y	MW	1.69	GIS	ALL	MC	NAT	t-MC			t-MC	t-MC	4744	Hull Creek	2	
03N02	MW	0.11	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	2	
03N03	MW	0.08	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	1	
03N03	MW	3.43	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	1	
03N03B	MW	0.77	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	1	
03N03C	MW	0.21	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	1	
03N04	MW	0.09	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	1	
03N06Y	MW	0.02	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	2	
03N06Y	MW	0.89	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	2	
03N07	MW	1.80	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	2	
03N08Y	MW	0.49	GIS	ML1	ALL	NAT	t-ATV			t-ATV	t-ATV	4754	Columbia SE	3	
03N10Y	MW	0.57	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	2	
03N10YA	MW	0.19	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	2	
03N11	MW	5.13	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	1	
03N11	MW	0.61	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	1	
03N11	MW	0.53	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	1	
03N11	MW	0.03	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	1	
03N11	MW	0.32	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	1	
03N11A	MW	1.10	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
03N11B	MW	0.32	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
03N11C	MW	0.22	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	2	
03N11D	MW	0.01	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	1	
03N12	MW	3.28	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	1	
03N12A	MW	1.11	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	1	
03N12B	MW	1.04	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	1	
03N14	MW	0.89	GIS	ALL	ALL	AGG	HLO				HLO	4733	Cherry Lake N	2	
03N14	MW	0.16	GIS	ALL	ALL	AGG	HLO				HLO	4733	Cherry Lake N	2	
03N14	MW	0.34	GIS	ALL	ALL	AGG	HLO				HLO	4733	Cherry Lake N	2	
03N14	MW	0.13	GIS	ALL	ALL	AGG	HLO				HLO	4733	Cherry Lake N	2	
03N15	MW	3.56	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	1	
03N16	MW	3.32	GIS	ALL	ALL	AGG					HLO	4733	Cherry Lake N	3	
03N16	MW	1.32	GIS	ALL	ALL	AGG					HLO	4733	Cherry Lake N	3	
03N17Y	MW	1.30	GIS	ALL	ALL	NAT					HLO	4733	Cherry Lake N	3	
03N18	MW	2.57	GIS	ALL	ALL	NAT					HLO	4743	Twain Harte	3	
03N20Y	MW	2.85	GIS	ALL	ALL	AGG					HLO	4743	Twain Harte	3	
03N20YB	MW	0.11	GIS	ALL	ALL	NAT					HLO	4743	Twain Harte	3	
03N20YC	MW	0.81	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	3	
03N20YD	MW	0.84	GIS	ALL	ALL	NAT					HLO	4744	Hull Creek	3	
03N20YD	MW	0.50	GIS	ALL	ALL	NAT					HLO	4744	Hull Creek	3	
03N22	MW	1.85	GIS	ALL	ALL	AGG					HLO	4744	Hull Creek	3	
03N22A	MW	1.32	GIS	ALL	ALL	NAT					HLO	4733	Cherry Lake N	3	
03N22Y	MW	0.60	GIS	ALL	ALL	NAT					HLO	4733	Cherry Lake N	3	
03N24	MW	4.87	GIS	ALL	ALL	AGG	HLO				HLO	4733	Cherry Lake N	2	
03N24A	MW	0.09	GIS	ML1		NAT				t-ALL		4733	Cherry Lake N	2	
03N24D	MW	0.30	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	2	
03N25	MW	1.43	GIS	ALL	ALL	NAT					HLO	4733	Cherry Lake N	3	
03N26YA	MW	0.11	GIS	ALL	ALL	NAT					ML1	4733	Cherry Lake N	3	
03N26YB	MW	0.14	GIS	ML1	ALL	NAT	ALL			ALL		4733	Cherry Lake N	3	
03N26YB	MW	0.15	GIS	ML1	ALL	NAT	ALL			t-ATV		4733	Cherry Lake N	3	
03N27	MW	2.85	GIS	ALL	ALL	NAT					HLO	4732	Pinecrest	3	
03N27	MW	1.60	GIS	ALL	ALL	NAT					HLO	4732	Pinecrest	3	
03N27A	MW	1.03	GIS	ALL	ALL	NAT					HLO	4743	Twain Harte	3	
03N27B	MW	0.34	GIS	ALL	ALL	NAT					HLO	4741	Strawberry	3	
03N27C	MW	2.06	GIS	ALL	ALL	NAT					HLO	4741	Strawberry	3	
03N27C	MW	0.65	GIS	ALL	ALL	NAT					HLO	4741	Strawberry	3	
03N27Y	MW	1.20	GIS	ALL	ALL	NAT					HLO	4741	Strawberry	3	
03N27YA	MW	0.40	GIS	ALL	ALL	NAT					HLO	4741	Strawberry	3	
03N28	MW	2.26	GIS	ALL	ALL	NAT					HLO	4741	Strawberry	3	
03N29A	MW	0.70	GIS	ALL	ALL	NAT					HLO	4741	Strawberry	3	
03N29C	MW	1.05	GIS	ALL	ALL	NAT					HLO	4741	Strawberry	3	
03N30	MW	1.75	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	2	
03N30	MW	0.20	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	2	
03N30	MW	0.08	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	2	
03N30	MW	0.62	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
03N30	MW	1.02	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	2	
03N30	MW	0.14	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	2	
03N30	MW	0.38	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	2	
03N30	MW	0.04	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	2	
03N30	MW	0.20	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	2	
03N32Y	MW	2.18	GIS	ALL	ALL	NAT					HLO	4744	Hull Creek	3	
03N32YA	MW	0.28	GIS	ALL	ALL	NAT					HLO	4744	Hull Creek	3	
03N34	MW	1.63	GIS	ALL	ALL	NAT	HLO				HLO	4753	Columbia	2	
03N34A	MW	0.27	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	2	
03N34Y	MW	3.21	GIS	HLO	HLO	AGG	ALL			ALL		4913	Boards Crossing	3	mixed use sign plan
03N34Y	MW	0.75	GIS	ALL	ALL	NAT					HLO	4733	Cherry Lake N	3	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
03N38	MW	0.04	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	1	
03N39	MW	3.16	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	2	
03N40	MW	0.23	GIS	ALL	ALL	NAT					HLO	4733	Cherry Lake N	3	
03N41	MW	1.68	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4741	Strawberry	2	
03N43A	MW	0.55	GIS	ML1		NAT				t-ALL		4741	Strawberry	3	
03N44	MW	1.62	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	1	
03N45	MW	0.19	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	1	
03N45YA	MW	0.54	GIS	ALL	ALL	NAT					HLO	4741	Strawberry	3	
03N46	MW	0.42	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	1	
03N46	MW	0.28	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	1	
03N46Y	MW	0.80	GIS	ALL	ALL	NAT					HLO	4754	Columbia SE	3	
03N48	MW	2.30	GIS	ALL	ALL	AGG	HLO				HLO	4754	Columbia SE	3	
03N48	MW	0.59	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	3	
03N48	MW	0.12	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	3	
03N48	MW	0.07	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
03N48A	MW	0.53	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
03N48B	MW	0.80	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	3	
03N48Y	MW	0.75	GIS	ML1	ALL	NAT	t-ALL			t-ALL	t-ALL	4743	Twain Harte	3	
03N50	MW	0.91	GIS	ALL	ALL	NAT	HLO				HLO	4754	Columbia SE	2	
03N50	MW	2.05	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
03N53	MW	0.50	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
03N58	MW	0.29	GIS	ALL	ALL	NAT	t-MC			t-MC	ML1	4743	Twain Harte	2	
03N59	MW	0.52	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	3	
03N59A	MW	0.10	GIS	ALL	ALL	NAT	HLO				HLO	4751	Stanislaus	3	
03N60	MW	1.33	GIS	ML1	ATV	NAT	t-ATV			t-ATV	t-ATV	4751	Stanislaus	3	
03N68	MW	1.71	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
03N68Y	MW	0.88	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	1	
03N69	MW	0.56	GIS	ALL	ALL	AGG	HLO				HLO	4743	Twain Harte	2	
03N69	MW	0.82	GIS	ALL	ALL	AGG	HLO				HLO	4743	Twain Harte	2	
03N69	MW	3.83	GIS	ALL	ALL	NAT	HLO				HLO	4742	Crandall Peak	2	
03N69A	MW	0.61	GIS	ALL	ALL	NAT	HLO			HLO	HLO	4742	Crandall Peak	2	
03N69Y	MW	0.06	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	1	
03N69Y	MW	0.42	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	1	
03N70A	MW	0.13	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	3	
03N71	MW	0.08	GIS	ALL	ALL	NAT	HLO				HLO	4733	Cherry Lake N	2	
03N71	MW	0.64	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
03N71	MW	0.01	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	3	
03N71Y	MW	1.30	GIS	ML1	MC	NAT	t-MC			t-MC		4741	Strawberry	2	
03N71Y	MW	0.28	GIS	ML1	MC	NAT	t-MC			t-MC		4741	Strawberry	2	
03N72	MW	1.43	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	3	
03N73	MW	2.05	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	2	
03N73B	MW	0.31	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
03N75Y	MW	0.32	GIS	ALL	ALL	NAT					HLO	4743	Twain Harte	3	
03N77	MW	0.56	GIS	ALL	ALL	AGG	HLO				HLO	4743	Twain Harte	3	
03N84	MW	0.47	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	3	
03N87	MW	0.19	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	3	
03N87	MW	2.04	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	3	
03N89	MW	0.72	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	3	
03N90	MW	3.77	GIS	ALL	ALL	AGG	HLO				HLO	4744	Hull Creek	3	
03N91	MW	0.17	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
03N91	MW	0.12	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	3	
03N91	MW	0.05	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
03N91	MW	0.06	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	2	
03N92	MW	0.88	GIS	ALL	ALL	AGG	HLO				HLO	4742	Crandall Peak	3	
03N92	MW	0.30	GIS	ALL	ALL	AGG	HLO				HLO	4742	Crandall Peak	3	
03N95	MW	1.12	GIS	ALL	ALL	NAT	HLO				HLO	4751	Stanislaus	3	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
03N95A	MW	0.56	GIS	ALL	ALL	NAT	HLO				HLO	4751	Stanislaus	3	
03N99	MW	1.50	GIS	ALL	ALL	AGG	HLO				HLO	4741	Strawberry	3	
03N99	MW	0.15	GIS	ALL	ALL	AGG	HLO				HLO	4751	Stanislaus	3	
03N99	MW	0.87	GIS	ALL	ALL	AGG	HLO				HLO	4741	Strawberry	2	
04N01	MW	2.26	GIS	ALL	ALL	AGG	HLO				HLO	4742	Crandall Peak	2	
04N01	MW	0.38	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	2	
04N01	MW	2.32	GIS	ALL	ALL	NAT	HLO				HLO	4743	Twain Harte	1	
04N01	MW	0.41	GIS	ALL	ALL	AGG	HLO				HLO	4743	Twain Harte	2	
04N01	MW	0.52	GIS	ALL	ALL	AGG	HLO				HLO	4743	Twain Harte	2	
04N01A	MW	0.31	GIS	ALL	ALL	NAT	HLO				HLO	4751	Stanislaus	2	
04N01B	MW	0.58	GIS	ALL	ALL	NAT	HLO				HLO	4751	Stanislaus	2	
04N01C	MW	0.07	GIS	ALL	ALL	NAT	HLO				HLO	4751	Stanislaus	2	
04N01Y	MW	0.59	GIS	ALL	ALL	NAT	HLO				HLO	4751	Stanislaus	2	
04N02	MW	0.54	GIS	ALL	ALL	NAT	HLO				HLO	4751	Stanislaus	2	
04N02	MW	1.07	GIS	ALL	ALL	AGG	HLO				HLO	4751	Stanislaus	2	
04N02	MW	0.16	GIS	ALL	ALL	AGG	HLO				HLO	4751	Stanislaus	2	
04N02	MW	0.17	GIS	ALL	ALL	AGG	HLO				HLO	4751	Stanislaus	2	
04N04	MW	2.29	GIS	ALL	ALL	AGG	HLO				HLO	4732	Pinecrest	1	
04N04	MW	0.25	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	1	
04N04	MW	0.38	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	1	
04N04A	MW	0.77	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	1	
04N04C	MW	1.10	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	1	
04N05	MW	0.48	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	1	
04N05	MW	1.25	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	1	
04N05B	MW	0.01	GIS	ALL	ALL	NAT	HLO				HLO	4751	Stanislaus	1	
04N09	MW	0.30	GIS	HLO	HLO	BIT	ALL			ALL		4913	Boards Crossing	1	combined use sign plan
04N09	MW	0.62	GIS	ML1	ALL	NAT	ALL			ALL		4751	Stanislaus	3	
04N09	MW	0.04	GIS	ML1	ALL	NAT	t-ALL			t-ALL		4751	Stanislaus	3	
04N09	MW	0.27	GIS	ML1		NAT				t-ALL		4742	Crandall Peak	3	
04N09	MW	0.76	GIS	ML1		NAT				t-MC		4742	Crandall Peak	3	
04N11	MW	4.94	GIS	ALL	ALL	NAT	HLO				HLO	4742	Crandall Peak	3	
04N13	MW	1.02	GIS	ALL	ALL	NAT	HLO				HLO	4742	Crandall Peak	2	
04N15Y	MW	0.48	GIS	ALL	ALL	NAT	HLO				HLO	4742	Crandall Peak	1	
04N16Y	MW	0.62	GIS	ALL	ALL	NAT	HLO				HLO	4742	Crandall Peak	1	
04N16YA	MW	0.28	GIS	ALL	ALL	NAT	HLO				HLO	4742	Crandall Peak	1	
04N17	MW	0.03	GIS	ALL	ALL	NAT	HLO				HLO	4751	Stanislaus	2	
04N17	MW	0.28	GIS	ALL	ALL	NAT	HLO				HLO	4751	Stanislaus	2	
04N17D	MW	0.59	GIS	ALL	ALL	NAT	ML1			t-ALL	ML1	4732	Pinecrest	2	
04N17E	MW	0.32	GIS	ALL	ALL	NAT	ML1				ML1	4741	Strawberry	2	
04N17F	MW	0.63	GIS	ALL	ALL	NAT	ML1				ML1	4741	Strawberry	2	
04N18	MW	0.69	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	2	
04N18	MW	0.92	GIS	ALL	ALL	NAT	HLO				HLO	4744	Hull Creek	2	
04N20Y	MW	1.17	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	1	
04N20YA	MW	0.20	GIS	ALL	ALL	NAT	ML1			ML1	ML1	4732	Pinecrest	1	
04N25	MW	0.44	GIS	HLO	HLO	AGG	ALL			ALL		4913	Boards Crossing	3	combined use sign plan
04N32	MW	2.00	GIS	ALL	ALL	AC	HLO				HLO	4732	Pinecrest	3	
04N32A	MW	0.88	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
04N32C	MW	0.42	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
04N33	MW	0.42	GIS	HLO	ALL	NAT				ALL		4914	Liberty Hill	3	mixed use sign plan
04N35Y	MW	0.50	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	2	
04N49Y	MW	0.16	GIS	ALL	ALL	NAT	ML1				ML1	4732	Pinecrest	3	
04N49Y	MW	1.23	GIS	ALL	ALL	NAT					HLO	4741	Strawberry	3	
04N49YA	MW	0.13	GIS	ML1		NAT	t-4WD			t-ALL		4741	Strawberry	3	
04N50Y	MW	2.01	GIS	ALL	ALL	NAT					HLO	4741	Strawberry	3	
04N50Y	MW	1.57	GIS	ALL	ALL	NAT					HLO	4741	Strawberry	3	
04N50YC	MW	1.10	GIS	ALL	ALL	NAT					HLO	4751	Stanislaus	3	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
04N61A	MW	0.69	GIS	ALL	ALL	NAT	HLO				HLO	4751	Stanislaus	2	
04N69	MW	1.63	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	2	
04N72Y	MW	0.93	GIS	ALL	ALL	NAT					HLO	4741	Strawberry	3	
04N72YA	MW	0.25	GIS	ALL	ALL	NAT					HLO	4741	Strawberry	3	
04N74	MW	0.26	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	1	
04N75	MW	1.80	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	2	
04N78	MW	2.86	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	2	
04N90	MW	4.05	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	2	
04N95	MW	0.36	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
04N95	MW	0.22	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
04N95	MW	0.48	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N98	MW	1.22	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N02Y	SU	1.86	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
04N06YA	SU	0.07	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N10	SU	2.43	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N10A	SU	0.82	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N10B	SU	0.66	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
04N11	SU	2.38	GIS	ALL	ALL	AGG	HLO				HLO	4732	Pinecrest	3	
04N12Q	SU	0.17	MAP	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
04N13	SU	0.34	GIS	ALL	ALL	AC	HLO				HLO	4732	Pinecrest	2	
04N13	SU	2.08	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	2	
04N24	SU	0.30	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N25A	SU	0.27	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N26B	SU	0.78	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N26C	SU	0.35	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N27Y	SU	0.84	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
04N31	SU	0.05	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	2	
04N31	SU	0.79	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
04N31A	SU	0.36	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
04N32	SU	0.60	GIS	ALL	ALL	AGG	HLO				HLO	4741	Strawberry	3	
04N33	SU	1.75	GIS	ALL	ALL	BIT	HLO				HLO	4732	Pinecrest	3	
04N34	SU	2.44	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
04N34	SU	1.22	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N34	SU	2.27	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N35Y	SU	2.04	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	2	
04N47	SU	4.03	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N47D	SU	0.19	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N47Y	SU	1.76	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N51Y	SU	0.51	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	2	
04N54	SU	1.17	GIS	ALL	ALL	NAT	HLO				HLO	4742	Crandall Peak	3	
04N55	SU	0.48	GIS	ALL	ALL	NAT	HLO				HLO	4742	Crandall Peak	3	
04N55	SU	0.71	GIS	ALL	ALL	NAT	HLO				HLO	4742	Crandall Peak	3	
04N57	SU	0.15	GIS	ALL	ALL	NAT	HLO				HLO	4742	Crandall Peak	3	
04N57A	SU	0.37	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N65	SU	0.08	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N65	SU	0.76	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
04N65	SU	0.08	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
04N65	SU	0.23	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
04N67	SU	0.32	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	2	
04N67A	SU	0.31	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	2	
04N68Y	SU	1.52	GIS	ALL	ALL	NAT	HLO				HLO	4742	Crandall Peak	3	
04N70	SU	1.51	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N71	SU	1.13	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N71A	SU	0.58	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N73	SU	0.78	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	2	
04N76Y	SU	0.23	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
04N76Y	SU	0.37	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N77Y	SU	0.38	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N78Y	SU	0.50	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
04N78YA	SU	0.34	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	3	
04N78YB	SU	0.21	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	3	
04N91	SU	0.43	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	3	
04N91	SU	0.14	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	3	
04N91	SU	0.50	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	3	
05N01	SU	2.54	GIS	HLO	HLO	AGG	ALL			ALL		4914	Liberty Hill	3	mixed use sign plan
05N01	SU	0.55	GIS	HLO	HLO	NAT	ALL			ALL		4914	Liberty Hill	3	mixed use sign plan
05N01	SU	0.47	GIS	HLO	HLO	NAT	ALL			ALL		4911	Tamarack	3	mixed use sign plan
05N01	SU	0.71	GIS	HLO	HLO	NAT	ALL			ALL		4911	Tamarack	3	mixed use sign plan
05N01	SU	2.61	GIS	HLO	HLO	NAT	ALL			ALL		4911	Tamarack	3	mixed use sign plan
05N02C	SU	0.16	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
05N02C	SU	0.22	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
05N02D	SU	0.21	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	2	
05N02F	SU	0.24	GIS	ALL	ALL	AGG	HLO				HLO	4741	Strawberry	3	
05N02H	SU	0.22	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
05N02L	SU	0.19	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
05N02L	SU	0.13	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
05N04	SU	0.30	GIS	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	3	
05N14D	SU	0.66	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
05N17Y	SU	0.15	GIS	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	3	
05N26Y	SU	1.15	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
05N29Y	SU	0.76	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
05N29Y	SU	0.18	GIS	ALL	ALL	NAT	HLO				HLO	4741	Strawberry	3	
05N44	SU	0.15	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
05N44	SU	0.27	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
05N44	SU	0.20	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
05N44	SU	0.06	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
05N44	SU	0.03	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
05N59	SU	1.03	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
05N73Y	SU	0.29	GIS	ALL	ALL	NAT	HLO				HLO	4732	Pinecrest	3	
05N85Y	SU	0.92	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
05N85YA	SU	0.90	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
05N93	SU	1.44	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
06N06A	SU	0.31	GIS	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	3	
06N06B	SU	0.09	GIS	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	3	
06N06B	SU	0.05	GIS	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	3	
06N06B1	SU	0.27	MAP	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	3	
06N06C	SU	0.26	GIS	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	3	
06N06F	SU	0.08	GIS	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	3	
06N07Y	SU	0.08	GIS	ALL	ALL	NAT	HLO				HLO	4893	Sonora Pass	3	
06N08Y	SU	0.06	GIS	ALL	ALL	NAT	HLO				HLO	4893	Sonora Pass	3	
06N09Y	SU	0.04	GIS	ALL	ALL	NAT	HLO				HLO	4893	Sonora Pass	3	
06N12	SU	0.34	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	3	
06N14	SU	0.37	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	3	
06N16A	SU	0.21	GIS	ALL	ALL	NAT	HLO				HLO	4901	Dardanelles Cone	3	
06N19	SU	0.48	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
06N19A	SU	0.15	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
06N24	SU	0.13	GIS	ALL	ALL	AGG	ADM				ADM	4903	Donnell Lake	3	
06N24	SU	0.32	GIS	ALL	ALL	AGG	ML1				ML1	4903	Donnell Lake	3	
06N24	SU	0.49	GIS	ALL	ALL	AGG	HLO				HLO	4903	Donnell Lake	3	
06N24A	SU	0.19	GIS	ALL	ALL	AGG	HLO			HLO	HLO	4903	Donnell Lake	3	
06N30	SU	0.72	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	
06N30A	SU	0.10	GIS	ALL	ALL	NAT	HLO				HLO	4914	Liberty Hill	3	

Route	RD	MI	SRC	Existing			Alternative					Quad		SEA	Mitigation/Requirement
				SYS	USE	SUR	1	2	3	4	5	#	Name		
06N33Y	SU	0.92	GIS	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	3	
06N34Y	SU	2.91	GIS	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	3	
06N34YD	SU	0.25	GIS	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	3	
06N36Y	SU	1.12	GIS	ALL	ALL	NAT	ADM				ADM	4904	Dardanelle	3	
06N36Y	SU	0.21	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	3	
06N36Y	SU	0.04	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	3	
06N37Y	SU	0.09	GIS	ALL	ALL	NAT	HLO				HLO	4893	Sonora Pass	3	
06N39Y	SU	0.10	GIS	ALL	ALL	NAT	HLO				HLO	4893	Sonora Pass	3	
06N44Y	SU	0.12	GIS	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	3	
06N45Y	SU	0.26	GIS	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	3	
06N47Y	SU	0.25	GIS	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	3	
06N82Y	SU	0.24	GIS	ALL	ALL	NAT	t-4WD				HLO	4904	Dardanelle	3	
07N13	SU	0.60	GIS	ALL	ALL	NAT	HLO				HLO	4901	Dardanelles Cone	3	
07N13A	SU	0.15	GIS	ALL		NAT	HLO				HLO	4901	Dardanelles Cone	3	
07N30Y	SU	0.23	GIS	ALL	ALL	NAT	HLO				HLO	4901	Dardanelles Cone	3	
07N30YA	SU	0.09	GIS	ALL	ALL	NAT	HLO				HLO	4901	Dardanelles Cone	3	
07N30YB	SU	0.09	GIS	ALL	ALL	NAT	HLO				HLO	4901	Dardanelles Cone	3	
41899Z21	SU	0.08	MAP	ALL	ALL	AC	HLO			HLO	HLO	4732	Pinecrest	3	
51913A1	SU	0.06	MAP	ALL	ALL	NAT	HLO				HLO	4904	Dardanelle	3	
61919A	SU	0.16	GIS	ALL	ALL	NAT	HLO				HLO	4903	Donnell Lake	3	
61931B04	SU	0.06	MAP	ALL	ALL	NAT	t-4WD				t-4WD	4903	Donnell Lake	3	
61932B	SU	0.05	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4903	Donnell Lake	3	
62127C	SU	0.14	GIS	ALL	ALL	NAT	HLO				HLO	4893	Sonora Pass	3	
72032C	SU	0.05	GIS	ALL	ALL	NAT	HLO				HLO	4901	Dardanelles Cone	3	
FR12607	SU	0.19	MAP	ALL	ALL	AC	HLO			HLO	HLO	4741	Strawberry	3	
FR14823	SU	0.25	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4901	Dardanelles Cone	3	
FR14833	SU	0.09	MAP	ALL	ALL	NAT	HLO			HLO	HLO	4901	Dardanelles Cone	3	

Legend

AC Asphalt
ADM Administrative Use Only (closed to public motorized use)
AGG Aggregate or Gravel
ALL All Vehicles
ATV ATV (open to ATV and Motorcycle)
CAL Calaveras
GIS Geographic Information System
GR Groveland
HLO Highway Legal Only
INV Inventory
MC Motorcycle
MI Miles
MW Mi-Wok
NAT Native Material
RD Ranger District
SEA Season of Use

	Alternative 1	Alternative 4	Alternative 5
1	year-round	year-round	year-round
2	4/1-11/30	4/1-12/31	4/15-11/15
3	5/15-11/30	4/1-12/31	5/15-11/15

SRC Source
SUR Surface
SYS System (National Forest System)
t-ALL convert road to All Vehicle trail
t-ATV convert road to ATV trail
t-MC convert road to MC trail
t-4WD convert road to 4WD trail

I.03 Changes to the Existing NFTS: Season of Use

Table I.03-1 lists the existing NFTS routes with season of use changes proposed in one or more of the action alternatives. By the nature of the alternatives, this table lists **all** existing NFTS routes open to public motorized use in at least one alternative.

Table I.03-1 Changes to the Existing NFTS: Season of Use

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
01N01	MW	8.47	AC	1	year-round	year-round	year-round
01N01	MW	5.79	NAT	1	year-round	year-round	year-round
01N01	GR	4.22	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N01	GR	1.58	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
01N01	GR	7.77	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01N01A	GR	0.61	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N01C	GR	0.19	NAT	2	4/1-11/30	4/1-12/31	no public
01N01D	GR	0.49	NAT	2	4/1-11/30	4/1-12/31	no public
01N01H	MW	0.66	NAT	1	year-round	year-round	year-round
01N01J	MW	0.28	NAT	1	year-round	year-round	year-round
01N01K	MW	0.57	NAT	1	year-round	year-round	year-round
01N01L	GR	0.12	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N02	MW	1.38	IMP	1	year-round	year-round	year-round
01N02Y	MW	1.53	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N02YA	MW	0.23	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N03	MW	0.01	NAT	1	year-round	year-round	year-round
01N04	MW	0.49	AC	1	year-round	year-round	year-round
01N04	GR	12.93	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
01N04	GR	0.72	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01N04	MW	12.89	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
01N04	GR	5.14	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
01N04	GR	0.18	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
01N04	GR	0.29	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
01N04A	GR	0.44	AGG	3	5/15-11/30	4/1-12/31	no public
01N04B	MW	0.66	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
01N04C	GR	0.90	NAT	3	5/15-11/30	4/1-12/31	no public
01N04Y	MW	0.50	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N05	GR	2.65	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N07	GR	17.68	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
01N07A	GR	0.80	NAT	2	4/1-11/30	4/1-12/31	no public
01N07C	GR	0.60	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N07Y	GR	1.57	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N08	GR	1.51	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01N09	GR	6.62	NAT	2	no public	4/1-12/31	no public
01N09Y	MW	0.36	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N10	GR	11.76	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N10A	GR	0.53	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N10B	GR	0.16	NAT	2	4/1-11/30	4/1-12/31	no public
01N11	MW	2.27	NAT	1	year-round	year-round	year-round
01N11B	MW	0.45	NAT	1	year-round	year-round	year-round
01N11Y	GR	2.43	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N12	MW	1.03	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N13	MW	2.03	NAT	1	year-round	year-round	year-round
01N13A	MW	0.48	NAT	1	year-round	year-round	year-round
01N13B	MW	0.96	NAT	1	year-round	year-round	year-round
01N14	GR	3.76	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
01N14A	GR	0.82	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
01N14B	GR	0.96	NAT	3	no public	4/1-12/31	no public
01N14E	GR	0.54	NAT	3	no public	4/1-12/31	no public
01N14F	GR	0.44	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
01N14Y	GR	0.95	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
01N15	GR	1.09	NAT	2	no public	4/1-12/31	no public
04N01A	MW	0.31	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N01B	MW	0.58	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N01C	MW	0.07	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N01E	MW	0.29	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N01Y	MW	0.59	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N02	MW	4.05	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N02	MW	1.40	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
04N02A	MW	0.49	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N02Y	SU	1.85	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N03	CAL	0.01	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N03Y	MW	1.95	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
04N03YA	MW	0.97	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N04	MW	2.29	AGG	1	year-round	year-round	year-round
04N04	MW	0.64	NAT	1	year-round	year-round	year-round
04N04A	MW	0.77	NAT	1	year-round	year-round	year-round
04N04C	MW	1.10	NAT	1	year-round	year-round	year-round
04N04Y	CAL	0.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N05	MW	1.73	NAT	1	year-round	year-round	year-round
04N05B	MW	0.01	NAT	1	year-round	year-round	year-round
04N05Y	MW	1.14	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N06	CAL	0.24	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N06Y	SU	0.48	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
04N06YA	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N07	CAL	0.64	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N07Y	MW	1.35	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N08Y	MW	1.54	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N09	MW	4.17	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N09	MW	0.66	NAT	3	5/15-11/30	4/1-12/31	no public
04N09	MW	1.54	BST	3	5/15-11/30	4/1-12/31	5/15-11/15
04N09	MW	0.27	NAT	3	no public	4/1-12/31	no public
04N09B	MW	0.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N09Y	MW	0.42	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N10	SU	2.42	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N10A	SU	0.82	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N10B	SU	0.65	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N10Y	MW	0.44	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
04N11	MW	4.94	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N11	SU	2.38	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
04N11X	CAL	0.14	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N11X	CAL	0.12	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
04N12	SU	5.42	AC	3	year-round	4/1-12/31	5/15-11/15
04N12	SU	13.95	NAT	3	year-round	4/1-12/31	5/15-11/30
04N12C	SU	0.47	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N12F	SU	0.22	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N12H	SU	1.30	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N12Q	SU	0.17	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N13	MW	1.02	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N13	MW	0.26	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
04N13	SU	2.08	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N13	SU	0.34	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
04N14	MW	2.46	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N14	SU	2.07	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
01N16	MW	0.42	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N17	MW	2.38	NAT	1	year-round	year-round	year-round
01N17A	MW	0.16	NAT	1	year-round	year-round	year-round
01N17Y	MW	0.59	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N17YA	MW	0.34	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N18	MW	1.37	NAT	1	year-round	year-round	year-round
01N18A	MW	0.17	NAT	1	year-round	year-round	year-round
01N18Y	GR	0.35	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
01N19	MW	1.32	NAT	1	year-round	year-round	year-round
01N20	MW	1.69	AGG	1	year-round	year-round	year-round
01N20A	MW	0.66	NAT	1	year-round	year-round	year-round
01N20B	MW	0.46	NAT	1	year-round	year-round	year-round
01N22	MW	2.72	IMP	1	year-round	year-round	year-round
01N22A	MW	0.54	NAT	1	year-round	year-round	year-round
01N23	GR	1.98	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N24	MW	3.90	NAT	1	year-round	year-round	year-round
01N24A	MW	0.09	NAT	1	year-round	year-round	year-round
01N24B	MW	0.34	NAT	1	year-round	year-round	year-round
01N24C	MW	1.16	NAT	1	year-round	year-round	year-round
01N24D	MW	0.30	NAT	1	year-round	year-round	year-round
01N25	MW	0.34	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01N25A	MW	0.09	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N25B	MW	0.29	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01N25Y	GR	0.73	IMP	2	4/1-11/30	4/1-12/31	4/15-11/15
01N26	GR	3.78	IMP	2	4/1-11/30	4/1-12/31	4/15-11/15
01N26A	GR	0.26	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N26B	GR	0.44	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N26C	GR	0.31	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N26D	GR	0.28	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N27	MW	0.97	AGG	1	year-round	year-round	year-round
01N27A	MW	0.64	NAT	1	year-round	year-round	year-round
01N27B	MW	0.42	AGG	1	year-round	year-round	year-round
01N28	GR	0.38	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N28A	GR	0.11	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N30	GR	2.88	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N31Y	GR	0.93	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N31YA	GR	0.26	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N32	GR	0.92	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N32A	GR	0.13	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N32Y	GR	1.03	NAT	2	4/1-11/30	4/1-12/31	no public
01N33	MW	0.73	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01N33Y	GR	0.29	NAT	2	4/1-11/30	4/1-12/31	no public
01N34	GR	1.24	NAT	3	no public	4/1-12/31	no public
01N34A	GR	0.93	NAT	3	no public	4/1-12/31	no public
01N34Y	MW	1.07	NAT	1	year-round	year-round	year-round
01N35	MW	0.92	NAT	1	year-round	year-round	year-round
01N36	MW	0.76	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N36A	MW	0.50	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N37	GR	1.42	NAT	2	4/1-11/30	4/1-12/31	no public
01N38	MW	0.26	NAT	1	year-round	year-round	year-round
01N39	MW	0.87	NAT	1	year-round	year-round	year-round
01N40	MW	0.22	NAT	1	year-round	year-round	year-round
01N40Y	GR	1.91	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
01N40Y	GR	0.62	NAT	3	no public	4/1-12/31	no public
01N41	MW	0.52	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N42Y	GR	1.12	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N42YC	GR	0.39	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N43	MW	6.00	AGG	1	year-round	year-round	year-round
01N43A	MW	0.86	NAT	1	year-round	year-round	year-round
01N43B	MW	0.61	NAT	1	year-round	year-round	year-round
01N43C	MW	0.52	NAT	1	year-round	year-round	year-round
01N43D	MW	0.21	NAT	1	year-round	year-round	year-round

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
04N15	MW	2.15	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N15	MW	0.21	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
04N15Y	MW	0.48	NAT	1	year-round	year-round	year-round
04N16	MW	9.66	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
04N16Y	MW	0.62	NAT	1	year-round	year-round	year-round
04N16YA	MW	0.28	NAT	1	year-round	year-round	year-round
04N17	MW	6.52	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N17	MW	0.37	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
04N17A	MW	0.18	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N17D	MW	0.58	NAT	2	no public	4/1-12/31	no public
04N17E	MW	0.32	NAT	2	no public	4/1-12/31	no public
04N17F	MW	0.62	NAT	2	no public	4/1-12/31	no public
04N17G	MW	0.62	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
04N17Y	MW	0.95	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N18	MW	3.42	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N18C	MW	0.40	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N18Y	SU	2.98	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N18YD	SU	0.63	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N20	SU	0.10	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
04N203B	SU	0.04	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
04N20A	SU	0.15	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
04N20Y	MW	1.17	NAT	1	year-round	year-round	year-round
04N22	SU	2.39	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
04N23	SU	1.25	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
04N24	SU	0.30	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N25	MW	3.74	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
04N25	SU	1.51	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
04N25A	SU	0.27	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N26	SU	6.57	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
04N26	SU	0.78	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N26	SU	2.77	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N26B	SU	0.78	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N26C	SU	0.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N27	SU	1.33	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N27Y	SU	0.33	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N27Y	SU	0.51	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N28Y	SU	1.20	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N28YB	SU	0.39	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N29	SU	1.84	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
04N31	SU	0.84	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N31A	SU	0.36	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N32	MW	1.99	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
04N32	SU	0.60	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
04N32A	MW	0.88	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N32C	MW	0.42	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N33	MW	7.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N33	SU	1.75	BST	3	5/15-11/30	4/1-12/31	5/15-11/15
04N33A	MW	1.14	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N33B	MW	1.74	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N33C	MW	1.42	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N33Y	SU	1.42	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N34	SU	5.91	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N34B	SU	0.19	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N34Y	SU	0.40	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N34Y	SU	0.02	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N35A	SU	0.38	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
04N35Y	MW	0.49	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N35Y	SU	2.04	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N38	CAL	2.64	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
04N38	CAL	3.10	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
04N38Y	SU	1.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N39	SU	0.93	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
01N44	MW	0.52	NAT	1	year-round	year-round	year-round
01N45	GR	1.73	NAT	2	4/1-11/30	4/1-12/31	no public
01N45Y	GR	0.48	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
01N46	MW	0.92	NAT	1	year-round	year-round	year-round
01N48	MW	0.84	NAT	1	year-round	year-round	year-round
01N48A	MW	0.60	NAT	1	year-round	year-round	year-round
01N48B	MW	0.18	NAT	1	year-round	year-round	year-round
01N49	MW	1.42	NAT	1	year-round	year-round	year-round
01N49	MW	2.78	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N49A	MW	0.22	NAT	1	year-round	year-round	year-round
01N49B	MW	0.37	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N50	MW	2.70	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N50A	MW	0.44	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N50C	MW	1.13	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N51	MW	0.65	NAT	1	year-round	year-round	year-round
01N53	MW	0.38	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N54A	MW	0.10	NAT	1	year-round	year-round	year-round
01N56	MW	3.21	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N56A	MW	1.16	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N57	MW	2.20	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N58	MW	1.95	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N58A	MW	0.40	NAT	2	no public	4/1-12/31	no public
01N58B	MW	0.20	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N59	GR	0.19	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N60	GR	0.76	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N60A	GR	0.35	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N61	MW	1.69	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N67	MW	1.22	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N69	GR	1.14	NAT	2	4/1-11/30	4/1-12/31	no public
01N70Y	MW	0.74	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N70YB	MW	0.19	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N74	GR	4.31	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N74C	GR	0.33	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N76	GR	2.38	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N77	MW	1.10	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N77A	MW	0.18	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N78	MW	0.28	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N78	MW	0.23	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01N78A	MW	0.17	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01N79	GR	3.34	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N79A	GR	0.51	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N79B	GR	0.74	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N80	GR	1.44	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N81	GR	0.72	NAT	2	4/1-11/30	4/1-12/31	no public
01N82	GR	0.30	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01N83	GR	1.95	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N88	GR	0.63	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N89	GR	0.52	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N91	GR	0.58	NAT	2	4/1-11/30	4/1-12/31	no public
01N94	GR	0.55	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N94A	GR	0.40	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01N96	GR	4.94	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01N96E	GR	0.52	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01N97	GR	5.01	AGG	3	5/15-11/30	4/1-12/31	no public
01N97E	GR	0.64	NAT	3	no public	4/1-12/31	no public
01N98	GR	0.64	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S01	GR	2.95	NAT	2	no public	4/1-12/31	no public
01S01Y	GR	0.07	NAT	2	4/1-11/30	4/1-12/31	no public
01S01Y	GR	0.59	NAT	2	no public	4/1-12/31	no public
01S01YA	GR	0.17	NAT	2	no public	4/1-12/31	no public
01S01YB	GR	0.65	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S01YC	GR	0.13	NAT	2	4/1-11/30	4/1-12/31	no public

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
04N40	CAL	0.82	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N41Y	CAL	0.12	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
04N42	MW	1.07	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N44	CAL	0.22	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N47	SU	4.02	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N47D	SU	0.19	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N47Y	SU	1.76	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N48Y	SU	0.22	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N49Y	MW	1.23	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N49Y	MW	0.16	NAT	3	no public	4/1-12/31	no public
04N49YA	MW	0.13	NAT	3	5/15-11/30	4/1-12/31	no public
04N50	CAL	0.14	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N50Y	MW	3.58	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N50YC	MW	1.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N51Y	SU	0.51	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N53Y	SU	0.24	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N54	SU	1.17	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N55	SU	1.19	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N57	SU	0.15	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N57A	SU	0.37	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N59	SU	1.22	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
04N61	MW	2.02	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N61A	MW	0.69	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N62	CAL	0.38	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N62Y	MW	0.64	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N63	CAL	3.47	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N63Y	SU	1.55	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N65	SU	1.16	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N67	SU	0.32	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N67A	SU	0.31	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N68Y	SU	1.52	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N69	MW	1.63	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N70	SU	0.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N70	SU	1.16	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N71	SU	1.13	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N71A	SU	0.58	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N72Y	MW	1.67	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N72YA	MW	0.25	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N73	SU	0.77	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N74	MW	0.26	NAT	1	year-round	year-round	year-round
04N74Y	MW	1.63	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N75	MW	1.80	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N76	SU	1.72	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N76Y	SU	0.59	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N77	MW	0.79	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N77Y	SU	0.38	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N78	MW	2.85	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N78Y	SU	0.50	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N78YA	SU	0.34	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N78YB	SU	0.21	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N79	MW	0.88	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N79	MW	1.10	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
04N80	MW	0.52	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N80Y	CAL	3.06	AGG	3	5/15-11/30	4/1-12/31	no public
04N81	MW	0.73	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N81	MW	2.20	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
04N82	MW	0.63	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N82Y	MW	0.84	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N83	MW	1.62	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N83B	MW	0.52	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N85	MW	2.94	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
04N85	MW	0.00	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
01S02	GR	7.27	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
01S03	GR	1.53	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
01S03	GR	9.75	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S03A	GR	0.63	NAT	2	4/1-11/30	4/1-12/31	no public
01S04	GR	1.17	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S04	GR	1.79	AGG	2	4/1-11/30	4/1-12/31	no public
01S04A	GR	0.85	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S05	GR	4.00	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S05A	GR	0.65	NAT	2	no public	4/1-12/31	no public
01S05Y	GR	1.96	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S06	GR	0.70	NAT	1	year-round	year-round	year-round
01S06B	GR	0.10	NAT	1	year-round	year-round	year-round
01S06B	GR	0.01	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S07	GR	0.28	AGG	1	year-round	year-round	year-round
01S07	GR	0.47	IMP	1	year-round	year-round	year-round
01S07	GR	2.01	NAT	1	year-round	year-round	year-round
01S07D	GR	0.53	NAT	1	year-round	year-round	year-round
01S08	GR	1.46	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S08Y	GR	1.08	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S09	GR	2.03	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S10	MW	0.66	NAT	1	year-round	year-round	year-round
01S10A	MW	0.31	NAT	1	year-round	year-round	year-round
01S11	GR	3.11	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S11A	GR	0.86	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S11C	GR	1.11	NAT	2	4/1-11/30	4/1-12/31	no public
01S11D	GR	0.98	NAT	2	4/1-11/30	4/1-12/31	no public
01S11F	GR	0.57	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S11Y	GR	1.44	NAT	2	no public	4/1-12/31	no public
01S12	GR	18.47	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S12D	GR	0.73	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S12E	GR	1.20	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S12G	GR	0.77	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S12H	GR	0.77	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S13	GR	15.93	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S13	GR	0.70	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S13C	GR	2.00	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S13Y	GR	1.22	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S14	GR	12.45	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S14K	GR	0.17	NAT	2	4/1-11/30	4/1-12/31	no public
01S14L	GR	0.58	NAT	2	4/1-11/30	4/1-12/31	no public
01S14M	GR	0.29	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S15	GR	1.66	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S15	GR	2.51	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S15C	GR	0.57	NAT	2	4/1-11/30	4/1-12/31	no public
01S15Y	GR	0.13	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S15Y	GR	3.14	NAT	2	no public	4/1-12/31	no public
01S15YA	GR	1.36	NAT	2	no public	4/1-12/31	no public
01S15YB	GR	0.18	NAT	2	no public	4/1-12/31	no public
01S16	GR	0.73	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S16	GR	1.85	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S16A	GR	0.27	NAT	2	no public	4/1-12/31	no public
01S16B	GR	0.25	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S16Y	GR	1.87	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S17	GR	3.02	NAT	1	year-round	year-round	year-round
01S17A	GR	0.56	NAT	1	year-round	year-round	year-round
01S17D	GR	0.20	NAT	1	year-round	year-round	year-round
01S19	GR	2.65	IMP	2	4/1-11/30	4/1-12/31	4/15-11/15
01S19A	GR	0.99	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S19C	GR	0.24	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S19Y	GR	0.47	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S20	GR	0.30	NAT	2	4/1-11/30	4/1-12/31	no public
01S20Y	GR	0.65	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
04N86	MW	1.04	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N86Y	MW	0.49	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
04N88	MW	5.79	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N88A	MW	0.38	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N89	MW	1.35	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N89A	MW	0.67	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N90	MW	4.05	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N91	SU	1.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N95	MW	1.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N95	MW	1.16	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
04N97	MW	0.82	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N98	MW	1.22	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
04N99	MW	1.83	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N01	SU	3.46	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
05N01	SU	1.13	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
05N01	SU	2.30	BST	3	5/15-11/30	4/1-12/31	5/15-11/15
05N01	SU	4.34	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N01	SU	0.82	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
05N01A	SU	0.56	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N01J	SU	1.01	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N01M	SU	0.86	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N02	SU	8.16	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
05N02	CAL	17.64	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N02	CAL	5.79	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
05N02	SU	5.64	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N02	SU	5.32	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
05N02	SU	7.11	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
05N02B	CAL	0.89	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N02C	SU	0.38	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N02D	SU	0.21	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
05N02F	SU	0.24	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
05N02H	SU	0.22	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N02L	SU	0.32	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N02R	CAL	1.87	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N04	SU	3.52	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N05Y	SU	0.71	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N05YA	SU	0.65	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N06	SU	1.73	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N06Y	SU	0.38	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N07X	CAL	2.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N08Y	SU	1.48	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N08YA	SU	0.34	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N08YC	SU	0.15	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N09	SU	4.90	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N09A	SU	0.66	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N09C	SU	0.18	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N09D	SU	0.13	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N09X	SU	8.77	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N09XA	SU	0.71	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N10	CAL	7.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N10C	CAL	1.50	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N11	SU	3.48	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N11Y	SU	0.88	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N12	SU	0.25	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N12	SU	2.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N12Y	SU	0.80	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N12YA	SU	0.45	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N13X	SU	0.52	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
05N13Y	SU	0.63	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N14	CAL	10.68	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N14	CAL	1.08	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
05N14	CAL	4.25	BST	3	5/15-11/30	4/1-12/31	5/15-11/15

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
01S21	GR	0.37	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S21Y	GR	1.61	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S22	GR	2.42	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S23	GR	3.03	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S23C	GR	0.27	NAT	2	4/1-11/30	4/1-12/31	no public
01S23D	GR	0.34	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S23Y	GR	0.67	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
01S24	GR	3.36	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S24A	GR	1.07	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S25	GR	2.88	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S25A	GR	2.37	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S25C	GR	0.62	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S25D	GR	0.52	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S25E	GR	0.24	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S25F	GR	0.52	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S25Y	GR	0.74	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S26	GR	4.94	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S26A	GR	0.20	NAT	2	4/1-11/30	4/1-12/31	no public
01S26B	GR	0.41	NAT	2	no public	4/1-12/31	no public
01S26C	GR	0.68	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S26E	GR	0.20	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S27	GR	0.80	NAT	2	4/1-11/30	4/1-12/31	no public
01S27Y	GR	0.84	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S28	GR	0.81	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S28Y	GR	0.32	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S29	GR	5.22	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S29A	GR	0.24	NAT	2	no public	4/1-12/31	no public
01S29C	GR	0.74	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S30	GR	2.03	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S30A	GR	0.24	NAT	2	4/1-11/30	4/1-12/31	no public
01S30B	GR	0.55	NAT	2	no public	4/1-12/31	no public
01S30Y	GR	0.12	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
01S31Y	GR	0.16	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S32	GR	2.08	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S32A	GR	0.50	NAT	2	4/1-11/30	4/1-12/31	no public
01S33	GR	1.72	NAT	1	no public	year-round	no public
01S35Y	GR	1.00	NAT	1	no public	year-round	no public
01S35Y	GR	1.32	NAT	1	year-round	year-round	year-round
01S35YA	GR	0.39	NAT	1	year-round	year-round	year-round
01S36	GR	1.37	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S36B	GR	0.20	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S36Y	GR	0.50	NAT	1	year-round	year-round	year-round
01S37	GR	0.91	NAT	1	year-round	year-round	year-round
01S38	GR	0.36	NAT	1	year-round	year-round	year-round
01S38Y	GR	1.15	NAT	1	year-round	year-round	year-round
01S39	GR	0.62	NAT	1	no public	year-round	no public
01S39	GR	0.18	NAT	1	year-round	year-round	year-round
01S39Y	GR	0.89	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S39YA	GR	0.10	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S39YB	GR	0.38	NAT	2	4/1-11/30	4/1-12/31	no public
01S40Y	GR	0.51	NAT	1	year-round	year-round	year-round
01S41	GR	1.43	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S41A	GR	0.52	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S42	GR	1.03	NAT	1	no public	year-round	no public
01S42Y	GR	0.36	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S43	GR	0.25	NAT	1	year-round	year-round	year-round
01S45Y	GR	0.39	NAT	2	4/1-11/30	4/1-12/31	no public
01S46	GR	0.25	NAT	2	4/1-11/30	4/1-12/31	no public
01S46Y	GR	1.78	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S46YB	GR	0.30	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S46YC	GR	0.20	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S47	GR	0.97	AC	2	4/1-11/30	4/1-12/31	4/15-11/15

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
05N14	SU	12.10	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
05N14D	SU	0.66	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N14G	CAL	0.65	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N14L	CAL	1.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N14M	CAL	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N14Y	SU	2.19	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N15X	SU	0.54	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N15XA	SU	0.11	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N15Y	SU	2.04	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
05N16	CAL	0.95	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N16A	CAL	0.25	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N17	SU	1.01	NAT	3	year-round	4/1-12/31	5/15-11/30
05N17Y	SU	0.15	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N18	SU	0.26	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N18Y	SU	2.85	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N18YB	SU	0.18	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N18YC	SU	0.30	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N18YD	SU	0.52	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N21	SU	4.93	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N22	SU	3.13	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N22Y	SU	1.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N24	CAL	0.16	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
05N25	SU	2.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N25A	SU	0.28	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N25B	SU	0.11	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N26	SU	0.47	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
05N26Y	SU	1.15	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N28	SU	4.21	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
05N28C	SU	0.15	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N28D	SU	0.51	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N29	SU	3.00	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N29Y	SU	0.94	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N30	SU	3.16	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N30A	SU	2.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N31	SU	2.67	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N32	SU	2.76	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N32A	SU	2.17	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N34Y	CAL	0.60	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
05N35	CAL	1.65	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N35B	CAL	0.46	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N39	SU	5.46	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N39A	SU	1.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N39Y	SU	1.62	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N40Y	SU	3.87	AGG	3	year-round	4/1-12/31	5/15-11/15
05N41Y	CAL	1.47	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
05N42	CAL	5.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N43Y	CAL	1.82	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
05N44	SU	0.71	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N47	CAL	0.63	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N47A	CAL	0.32	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N47B	CAL	0.26	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N47Y	CAL	2.09	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
05N48Y	SU	1.57	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
05N50	CAL	0.34	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
05N50Y	SU	0.41	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N51Y	CAL	1.58	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N51YA	CAL	0.44	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N52	CAL	2.51	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
05N53Y	CAL	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N55	CAL	1.60	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
05N55Y	SU	1.11	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N55YA	SU	0.40	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
01S47A	GR	0.65	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
01S47B	GR	0.06	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
01S48	MW	0.76	NAT	1	year-round	year-round	year-round
01S48Y	GR	0.71	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S49	MW	2.35	NAT	1	year-round	year-round	year-round
01S50	GR	0.42	NAT	2	no public	4/1-12/31	no public
01S50Y	GR	0.41	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S51	GR	2.23	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S51A	GR	0.77	NAT	2	4/1-11/30	4/1-12/31	no public
01S51B	GR	0.71	NAT	2	no public	4/1-12/31	no public
01S52	GR	0.15	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S52Y	GR	0.49	NAT	1	year-round	year-round	no public
01S53	GR	1.08	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S54Y	GR	0.50	NAT	2	4/1-11/30	4/1-12/31	no public
01S55Y	GR	0.17	AC	1	year-round	year-round	year-round
01S55Y	GR	1.34	NAT	1	year-round	year-round	year-round
01S56Y	GR	0.60	NAT	2	4/1-11/30	4/1-12/31	no public
01S57	GR	1.96	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S57B	GR	1.45	NAT	2	4/1-11/30	4/1-12/31	no public
01S57Y	GR	0.66	NAT	2	4/1-11/30	4/1-12/31	no public
01S58	GR	2.99	NAT	2	no public	4/1-12/31	no public
01S59	GR	0.87	NAT	2	4/1-11/30	4/1-12/31	no public
01S60	GR	1.92	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S60Y	GR	0.51	NAT	2	4/1-11/30	4/1-12/31	no public
01S61Y	GR	0.26	NAT	2	4/1-11/30	4/1-12/31	no public
01S61YA	GR	0.55	NAT	2	4/1-11/30	4/1-12/31	no public
01S62	GR	1.42	NAT	2	no public	4/1-12/31	no public
01S62A	GR	0.39	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S63	GR	0.08	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S63Y	GR	2.26	NAT	2	no public	4/1-12/31	no public
01S63YA	GR	0.10	NAT	2	no public	4/1-12/31	no public
01S64	GR	1.59	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S65Y	GR	0.45	NAT	2	4/1-11/30	4/1-12/31	no public
01S66	GR	0.00	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S66	GR	1.79	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S66A	GR	0.33	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S66Y	GR	0.49	NAT	2	4/1-11/30	4/1-12/31	no public
01S67	GR	3.15	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S67Y	GR	0.51	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
01S69	GR	1.26	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S70	GR	1.10	NAT	2	4/1-11/30	4/1-12/31	no public
01S70	GR	1.63	AGG	2	4/1-11/30	4/1-12/31	no public
01S70A	GR	0.34	NAT	2	no public	4/1-12/31	no public
01S70B	GR	0.42	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S71	GR	1.65	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S72Y	GR	1.16	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S73Y	GR	2.12	NAT	2	4/1-11/30	4/1-12/31	no public
01S75	GR	1.10	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S75A	GR	0.30	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S75Y	GR	1.56	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S75YA	GR	0.69	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S75YB	GR	0.32	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S76	GR	1.65	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S78	GR	4.04	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S78A	GR	0.80	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S79	GR	0.12	NAT	2	4/1-11/30	4/1-12/31	no public
01S79	GR	2.70	NAT	2	no public	4/1-12/31	no public
01S80	GR	2.48	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S80A	GR	0.55	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S80B	GR	0.82	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S81	GR	1.90	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S81A	GR	0.59	NAT	2	no public	4/1-12/31	no public

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
05N55YB	SU	0.25	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N56	CAL	0.94	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
05N56	CAL	1.32	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
05N59	SU	1.03	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N59Y	SU	0.40	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N63	CAL	0.90	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N65Y	SU	1.64	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N66	CAL	0.02	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N67	SU	1.39	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
05N67Y	CAL	0.18	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
05N71	CAL	2.21	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N71A	CAL	0.61	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N71Y	SU	0.20	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N72	CAL	0.41	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N73Y	SU	0.29	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N76Y	CAL	1.43	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N77Y	CAL	4.53	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N79Y	CAL	1.03	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N80Y	SU	0.18	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N82Y	SU	0.62	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N83Y	SU	0.46	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N83YB	SU	0.21	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N85Y	SU	0.92	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N85YA	SU	0.90	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N87	SU	2.17	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N87D	SU	0.24	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N88	CAL	2.18	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N88	CAL	2.14	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
05N88B	CAL	4.47	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N88Y	CAL	1.28	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N88YA	CAL	0.44	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N89	CAL	3.23	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N89Y	CAL	0.13	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
05N90	SU	1.58	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N92	SU	2.50	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N92B	SU	0.75	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N92Y	CAL	0.05	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
05N93	SU	1.44	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N93Y	SU	0.84	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N95	SU	3.60	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N95	SU	6.51	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
05N95B	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N95J	SU	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
05N95Y	CAL	0.18	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
05N95YA	CAL	0.11	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
05N97	SU	0.83	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
05N99Y	CAL	0.64	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
06N01	SU	0.83	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
06N01A	SU	0.19	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N01B	SU	0.11	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
06N03	CAL	2.84	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N03C	CAL	0.43	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N03E	CAL	0.26	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N03F	CAL	0.46	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N05	SU	8.71	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N05B	SU	0.47	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N05Y	SU	0.80	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N06	SU	6.23	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N06A	SU	0.31	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N06B	SU	0.14	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N06B1	SU	0.27	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N06C	SU	0.26	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
01S81Y	GR	1.00	NAT	1	year-round	year-round	year-round
01S82	GR	1.39	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S83	GR	0.67	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S85	GR	1.68	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S86	GR	2.76	NAT	2	4/1-11/30	4/1-12/31	no public
01S86B	GR	0.57	NAT	2	4/1-11/30	4/1-12/31	no public
01S87	GR	0.66	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S87A	GR	0.19	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S89	GR	2.13	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S90	GR	0.06	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
01S94	GR	0.76	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
01S96	GR	1.51	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S96A	GR	0.22	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
01S97	GR	0.90	NAT	2	4/1-11/30	4/1-12/31	no public
02N01	MW	0.68	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
02N01B	MW	0.43	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N03	MW	1.77	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N03Y	MW	0.89	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N03Y	MW	1.12	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02N03YA	MW	0.31	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N03YB	MW	0.60	NAT	2	no public	4/1-12/31	no public
02N04	GR	1.33	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N04Y	MW	0.54	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N05	GR	4.63	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N05A	GR	2.79	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N05Y	MW	0.65	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N05YA	MW	0.48	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N06	MW	5.16	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N06A	MW	0.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N06B	MW	0.14	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N06Y	MW	0.86	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N07	MW	6.64	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N07	MW	1.54	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02N07C	MW	0.29	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N07D	MW	0.05	NAT	2	4/1-11/30	4/1-12/31	no public
02N08	MW	1.15	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N08A	MW	0.29	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N08Y	GR	1.75	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N08Y	GR	6.78	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
02N08YA	GR	0.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N08YB	GR	0.42	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N08YD	GR	1.22	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N09	MW	1.27	NAT	1	no public	year-round	no public
02N09	MW	4.05	AGG	1	year-round	year-round	year-round
02N09	MW	0.16	NAT	1	year-round	year-round	year-round
02N09A	MW	0.36	AGG	1	year-round	year-round	year-round
02N09D	MW	0.29	NAT	1	year-round	year-round	year-round
02N10	MW	4.61	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N10	MW	1.17	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02N10Y	GR	5.11	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N11	MW	4.72	AGG	1	year-round	year-round	year-round
02N11	MW	3.35	NAT	1	year-round	year-round	year-round
02N11	MW	4.69	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N11	MW	2.64	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02N11A	MW	0.28	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N11C	MW	0.41	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N11D	MW	0.33	NAT	1	year-round	year-round	year-round
02N11F	MW	1.00	NAT	1	year-round	year-round	year-round
02N12	GR	0.84	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
02N13	MW	2.27	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02N13A	MW	0.54	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N13Y	MW	1.11	AGG	1	year-round	year-round	year-round

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
06N06F	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N07	CAL	2.29	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N07Y	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N08	CAL	4.27	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N08Y	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N09	CAL	5.37	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N09Y	SU	0.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N10	CAL	3.03	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N10X	SU	0.29	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
06N11	CAL	5.52	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N11A	CAL	0.42	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N11X	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N11Y	CAL	0.67	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N11YA	CAL	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N12	SU	0.33	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N12X	SU	0.36	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
06N13	SU	0.08	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
06N13X	CAL	0.30	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N13Y	SU	1.91	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N14	SU	0.37	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N15	SU	1.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N15A	SU	0.30	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N16	SU	0.95	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N16A	SU	0.21	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N17	CAL	9.55	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N17A	CAL	0.56	NAT	3	5/15-11/30	4/1-12/31	no public
06N17B	CAL	0.65	NAT	3	5/15-11/30	4/1-12/31	no public
06N17D	CAL	0.35	NAT	3	5/15-11/30	4/1-12/31	no public
06N17J	CAL	0.52	NAT	3	5/15-11/30	4/1-12/31	no public
06N17P	CAL	0.41	NAT	3	5/15-11/30	4/1-12/31	no public
06N17Q	CAL	0.14	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N17Y	CAL	0.98	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N17YA	CAL	0.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N18	CAL	5.75	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N18A	CAL	0.46	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N18C	CAL	0.28	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N18F	CAL	0.62	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N19	SU	0.48	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N19A	SU	0.15	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N19Y	SU	1.43	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N20Y	CAL	1.01	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N21Y	CAL	2.49	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N21YA	CAL	0.28	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N22Y	CAL	0.36	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N23	SU	0.27	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N23Y	CAL	1.18	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N24	SU	0.49	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
06N24	SU	0.32	NAT	3	no public	4/1-12/31	no public
06N24	SU	0.12	AGG	3	no public	4/1-12/31	no public
06N24A	SU	0.19	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
06N24Y	CAL	0.40	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N26	CAL	0.02	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
06N27	CAL	4.77	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N28Y	CAL	1.29	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N28YA	CAL	0.38	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N29	CAL	0.26	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N29Y	CAL	0.98	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N30	SU	0.72	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N30A	SU	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N31Y	SU	0.74	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N32	CAL	1.01	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N33	SU	0.10	AC	3	5/15-11/30	4/1-12/31	5/15-11/15

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
02N14	GR	5.54	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
02N14	MW	3.49	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
02N14Y	MW	1.92	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N14YA	MW	0.53	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N15	GR	1.75	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N16	GR	1.75	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N16A	GR	0.42	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N17	MW	1.81	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N18	GR	1.47	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N20	MW	1.44	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N20A	MW	0.26	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N22	GR	2.27	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
02N22A	GR	0.76	IMP	3	5/15-11/30	4/1-12/31	5/15-11/30
02N23	GR	0.96	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N24	GR	3.28	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
02N26	MW	0.80	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N26	MW	0.47	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
02N28	MW	2.26	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N28	MW	0.01	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N29	MW	6.68	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N29A	MW	0.57	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N29Y	MW	0.95	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N31	MW	0.95	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N31Y	MW	0.72	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N31YA	MW	0.52	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N32	MW	2.80	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
02N32Y	MW	0.03	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N33	MW	1.14	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N34	MW	2.63	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02N34A	MW	0.84	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N34B	MW	0.56	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N34C	MW	0.47	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N39	MW	0.86	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N39A	MW	0.71	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N40	GR	3.01	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N41	GR	0.40	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N42	MW	0.98	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N43	MW	2.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N44	MW	3.25	IMP	2	4/1-11/30	4/1-12/31	4/15-11/15
02N44A	MW	0.08	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N45	MW	0.40	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N47	MW	1.72	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N47A	MW	0.32	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N48	MW	1.50	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N48A	MW	0.53	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N49	MW	0.22	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N49	MW	1.47	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N49A	MW	0.79	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N49A	MW	0.50	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N50	MW	0.99	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N52	MW	1.69	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N53	MW	1.70	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N53A	MW	0.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N54	MW	6.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N55	MW	2.02	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N56	GR	3.39	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N57	GR	0.29	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N57A	GR	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N58	GR	1.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N58	MW	0.90	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N58	MW	0.80	NAT	3	no public	4/1-12/31	no public
02N58B	MW	0.11	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
06N33Y	SU	0.92	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N34Y	SU	2.91	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N34YD	SU	0.25	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N36Y	SU	0.25	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N36Y	SU	0.27	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
06N36Y	SU	1.12	NAT	3	no public	4/1-12/31	no public
06N37Y	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N38Y	SU	1.01	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N39Y	SU	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N40	CAL	0.09	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
06N41Y	SU	0.34	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N42Y	CAL	1.90	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N43Y	SU	0.26	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N44	CAL	0.05	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
06N44Y	SU	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N45	CAL	10.32	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N45Y	SU	0.26	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N47Y	SU	0.25	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N53Y	CAL	0.85	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N54Y	CAL	0.17	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N58	CAL	5.97	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N58Y	CAL	0.80	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N59Y	CAL	0.47	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N60	CAL	0.22	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N60Y	CAL	0.02	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
06N62	CAL	1.34	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
06N63	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N64	CAL	0.99	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N64Y	SU	0.24	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N65Y	CAL	0.39	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
06N65YA	CAL	0.62	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
06N66Y	CAL	4.21	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N66YA	CAL	0.34	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N66YB	CAL	0.82	NAT	3	5/15-11/30	4/1-12/31	no public
06N70Y	CAL	1.22	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N71Y	CAL	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N73Y	CAL	0.41	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N74Y	CAL	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N75	CAL	0.37	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N76Y	CAL	0.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N76YA	CAL	0.25	NAT	3	5/15-11/30	4/1-12/31	no public
06N76YB	CAL	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N77	CAL	1.20	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N77A	CAL	0.82	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N77B	CAL	0.29	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N77Y	CAL	1.56	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N78	CAL	1.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N78A	CAL	0.17	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N78Y	CAL	1.57	IMP	3	5/15-11/30	4/1-12/31	5/15-11/30
06N79	CAL	1.41	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N79Y	CAL	0.31	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N80	CAL	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N80Y	CAL	0.78	NAT	3	5/15-11/30	4/1-12/31	no public
06N80YA	CAL	0.11	NAT	3	5/15-11/30	4/1-12/31	no public
06N81	CAL	0.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N81Y	CAL	1.29	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N81YA	CAL	0.51	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N82	CAL	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N82Y	SU	0.24	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N84Y	CAL	0.01	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N85	CAL	0.72	NAT	3	5/15-11/30	4/1-12/31	no public
06N85A	CAL	0.39	NAT	3	5/15-11/30	4/1-12/31	no public

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
02N58C	MW	0.20	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N59	GR	1.79	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N60	GR	1.32	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N62	MW	2.69	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N63A	MW	0.08	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N63B	MW	0.15	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N64	GR	0.71	NAT	3	5/15-11/30	4/1-12/31	no public
02N65	GR	0.45	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N66	GR	2.94	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N69	GR	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N71	MW	0.53	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
02N75	MW	0.82	NAT	1	year-round	year-round	year-round
02N75A	MW	0.30	NAT	1	year-round	year-round	year-round
02N76	GR	1.49	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N77Y	GR	0.54	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N78	GR	1.42	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N78	GR	0.60	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
02N80	GR	2.16	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
02N81	MW	2.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N81A	MW	0.18	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N82	GR	1.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N84	GR	0.62	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
02N85	MW	1.33	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02N87	GR	0.00	NAT	2	no public	4/1-12/31	no public
02N87	GR	0.13	NAT	3	no public	4/1-12/31	no public
02N88	MW	1.35	AGG	1	year-round	year-round	year-round
02N88A	MW	0.28	NAT	1	year-round	year-round	year-round
02N89	GR	2.01	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
02N91	MW	0.31	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N93	MW	0.65	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N93	MW	1.02	NAT	2	no public	4/1-12/31	no public
02N93A	MW	0.53	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02N94	GR	2.03	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
02N95	GR	1.28	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
02N98Y	MW	1.45	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
02S01	GR	13.61	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S01	GR	1.26	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02S01A	GR	0.92	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S01C	GR	0.39	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S01G	GR	0.38	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S02	GR	0.00	AGG	1	year-round	year-round	year-round
02S02	GR	13.65	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02S02C	GR	0.30	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S03	GR	0.00	NAT	1	year-round	year-round	year-round
02S03	GR	10.60	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S03Y	GR	1.37	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S04	GR	1.47	NAT	2	no public	4/1-12/31	no public
02S04Y	GR	0.37	NAT	1	year-round	year-round	year-round
02S04YA	GR	0.44	NAT	1	year-round	year-round	year-round
02S05	GR	1.26	NAT	1	year-round	year-round	year-round
02S05C	GR	0.98	NAT	1	no public	year-round	no public
02S06	GR	1.73	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S07	GR	2.88	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S07A	GR	0.66	NAT	2	no public	4/1-12/31	no public
02S07Y	GR	1.45	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S08	GR	3.58	NAT	1	year-round	year-round	year-round
02S09	GR	3.75	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S09A	GR	1.64	NAT	2	no public	4/1-12/31	no public
02S09Y	GR	1.12	NAT	1	year-round	year-round	year-round
02S10Y	GR	0.88	NAT	2	no public	4/1-12/31	no public
02S11	GR	3.78	NAT	1	year-round	year-round	year-round
02S11C	GR	1.03	NAT	1	no public	year-round	no public

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
06N85Y	CAL	0.46	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N88Y	CAL	0.84	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N89	CAL	1.97	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N89Y	CAL	1.57	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N90	CAL	3.11	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N90A	CAL	0.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N90Y	CAL	1.47	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N90YA	CAL	0.83	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N91	CAL	6.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N91A	CAL	0.36	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N91B	CAL	0.34	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N91C	CAL	0.15	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N91D	CAL	0.79	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N91E	CAL	0.47	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N92	CAL	1.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N94	CAL	1.69	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N95	CAL	5.15	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N95A	CAL	0.43	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N95G	CAL	0.68	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N96	CAL	2.99	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N97Y	CAL	2.65	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N98	CAL	0.30	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
06N98Y	CAL	0.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N01	CAL	10.25	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
07N01C	CAL	0.17	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N01E	CAL	0.34	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N01G	CAL	0.13	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N01H	CAL	0.12	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
07N02	CAL	2.38	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N02Y	CAL	0.00	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
07N03Y	CAL	0.13	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
07N05	CAL	1.83	AGG	3	year-round	4/1-12/31	5/15-11/15
07N05	CAL	2.80	NAT	3	year-round	4/1-12/31	5/15-11/30
07N05Y	CAL	0.36	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
07N07Y	CAL	1.68	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N08	CAL	3.39	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
07N08	CAL	0.24	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
07N08	CAL	2.89	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N09	CAL	4.97	AC	3	year-round	4/1-12/31	5/15-11/15
07N09	CAL	14.53	AGG	3	year-round	4/1-12/31	5/15-11/15
07N09	CAL	4.42	NAT	3	year-round	4/1-12/31	5/15-11/30
07N09A	CAL	0.86	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N09B	CAL	0.45	NAT	3	5/15-11/30	4/1-12/31	no public
07N09C	CAL	0.62	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N09D	CAL	0.16	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N09E	CAL	0.29	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N09F	CAL	0.13	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N09G	CAL	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N09H	CAL	0.54	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N09J	CAL	0.26	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N09W	CAL	0.02	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N09W	CAL	0.23	NAT	3	5/15-11/30	4/1-12/31	no public
07N11	CAL	6.28	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N11D	CAL	0.68	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N12A	CAL	1.29	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N13	SU	0.60	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N13A	SU	0.15	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N14	CAL	2.48	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
07N14A	CAL	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N14C	CAL	0.47	NAT	3	5/15-11/30	4/1-12/31	no public
07N14D	CAL	0.64	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N14F	CAL	0.15	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
02S11Y	GR	0.76	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S12	GR	1.33	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S12Y	GR	0.45	NAT	2	4/1-11/30	4/1-12/31	no public
02S12YA	GR	0.28	NAT	2	4/1-11/30	4/1-12/31	no public
02S13	GR	0.91	IMP	2	4/1-11/30	4/1-12/31	4/15-11/15
02S13	GR	2.75	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02S13C	GR	0.25	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S13F	GR	0.72	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S14	GR	1.22	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S15Y	GR	1.01	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S16	GR	2.54	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S16Y	GR	0.18	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02S17	GR	0.02	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02S17Y	GR	1.26	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S18	GR	0.21	AC	1	year-round	year-round	year-round
02S18	GR	2.68	NAT	1	year-round	year-round	year-round
02S18A	GR	0.55	NAT	1	year-round	year-round	year-round
02S18Y	GR	1.51	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S19	GR	0.01	NAT	1	year-round	year-round	year-round
02S19Y	GR	1.70	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S19YA	GR	0.51	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S19YB	GR	0.31	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S20	GR	9.87	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S20C	GR	0.37	NAT	2	4/1-11/30	4/1-12/31	no public
02S20D	GR	0.79	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S20Y	GR	2.33	NAT	2	no public	4/1-12/31	no public
02S21	GR	5.14	NAT	1	year-round	year-round	year-round
02S21Y	GR	1.83	NAT	2	4/1-11/30	4/1-12/31	no public
02S22	GR	0.72	NAT	2	no public	4/1-12/31	no public
02S22Y	GR	1.15	NAT	1	year-round	year-round	year-round
02S23	GR	3.09	NAT	1	year-round	year-round	year-round
02S23Y	GR	2.18	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S23YA	GR	0.73	NAT	2	4/1-11/30	4/1-12/31	no public
02S24	GR	0.47	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S24Y	GR	0.32	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S25	GR	3.43	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S26	GR	1.48	NAT	2	no public	4/1-12/31	no public
02S27	GR	0.40	IMP	2	4/1-11/30	4/1-12/31	4/15-11/15
02S27	GR	7.56	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S27A	GR	0.64	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S27B	GR	0.90	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S27C	GR	0.31	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S28	GR	2.75	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S28A	GR	0.44	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S28B	GR	0.36	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S30	GR	8.61	BST	2	4/1-11/30	4/1-12/31	4/15-11/15
02S30A	GR	0.18	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S30B	GR	0.33	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S30C	GR	0.57	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S30E	GR	0.46	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S31Y	GR	1.22	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S31YA	GR	0.39	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S31YB	GR	0.25	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S32	GR	2.10	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02S33	GR	3.30	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S33B	GR	0.24	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S34	GR	0.21	NAT	1	year-round	year-round	year-round
02S35	GR	0.29	NAT	1	year-round	year-round	year-round
02S37	GR	1.60	NAT	1	year-round	year-round	year-round
02S37Y	GR	2.12	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S37YB	GR	0.74	NAT	2	4/1-11/30	4/1-12/31	no public
02S38Y	GR	0.38	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
07N15	CAL	0.49	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N16	CAL	4.83	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N16A	CAL	0.20	NAT	3	5/15-11/30	4/1-12/31	no public
07N16X	CAL	1.36	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N17	CAL	2.24	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N17	CAL	2.79	NAT	3	year-round	4/1-12/31	5/15-11/30
07N17A	CAL	0.08	NAT	3	5/15-11/30	4/1-12/31	no public
07N17B	CAL	0.57	AGG	3	no public	4/1-12/31	no public
07N18A	CAL	0.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N18Y	CAL	0.90	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N18YC	CAL	0.32	NAT	3	5/15-11/30	4/1-12/31	no public
07N19	CAL	3.53	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
07N19X	CAL	0.11	NAT	3	5/15-11/30	4/1-12/31	no public
07N19Y	CAL	0.75	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N20	CAL	0.40	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
07N20Y	CAL	0.44	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N20YA	CAL	0.17	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N21	CAL	1.03	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
07N21Y	CAL	1.19	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N21YA	CAL	0.30	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N22	CAL	1.51	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N23	CAL	4.45	AGG	3	year-round	4/1-12/31	5/15-11/15
07N23	CAL	1.53	BST	3	year-round	4/1-12/31	5/15-11/15
07N24	CAL	3.85	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N25Y	CAL	0.38	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N26	CAL	1.64	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N28	CAL	3.43	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N28	CAL	3.22	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
07N28E	CAL	0.71	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N28J	CAL	0.17	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N29Y	CAL	3.96	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
07N30Y	SU	0.23	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N30YA	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N30YB	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N31	CAL	1.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N31A	CAL	0.64	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N31B	CAL	0.14	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N31C	CAL	0.24	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N35	CAL	5.83	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N37Y	CAL	1.40	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N38	CAL	0.75	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N40Y	CAL	0.20	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N41Y	SU	0.11	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
07N46	CAL	1.03	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N46A	CAL	0.13	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N47	CAL	2.50	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N47	CAL	4.62	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
07N47C	CAL	0.57	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N48	CAL	0.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N48A	CAL	0.22	NAT	3	5/15-11/30	4/1-12/31	no public
07N48B	CAL	0.31	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N49Y	CAL	0.36	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N50	CAL	2.40	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N50Y	CAL	0.04	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
07N51	CAL	0.52	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N51A	CAL	0.19	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N51Y	CAL	0.43	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N52	CAL	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N52Y	CAL	0.27	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N53	CAL	3.52	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N53Y	CAL	1.42	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N54Y	CAL	1.22	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
02S39	GR	1.51	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S39A	GR	0.43	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S39B	GR	0.85	NAT	2	4/1-11/30	4/1-12/31	no public
02S40	GR	1.36	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S41	GR	1.60	NAT	2	4/1-11/30	4/1-12/31	no public
02S43	GR	1.40	NAT	1	year-round	year-round	no public
02S44	GR	1.49	NAT	1	year-round	year-round	year-round
02S45	GR	1.19	NAT	1	year-round	year-round	year-round
02S47	GR	0.27	NAT	1	year-round	year-round	year-round
02S50	GR	0.21	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S50Y	GR	0.73	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S51Y	GR	1.90	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S51YA	GR	0.55	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S52	GR	0.34	NAT	1	year-round	year-round	year-round
02S53	GR	1.08	NAT	1	year-round	year-round	year-round
02S53A	GR	0.09	NAT	1	year-round	year-round	year-round
02S56	GR	1.13	NAT	1	year-round	year-round	year-round
02S56A	GR	0.21	NAT	1	year-round	year-round	year-round
02S57	GR	0.96	NAT	1	no public	year-round	no public
02S58	GR	0.20	NAT	1	year-round	year-round	year-round
02S59	GR	0.80	NAT	1	year-round	year-round	year-round
02S59A	GR	0.50	NAT	1	no public	year-round	no public
02S59B	GR	1.35	NAT	1	no public	year-round	no public
02S60	GR	1.93	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S60B	GR	0.51	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S60C	GR	0.21	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S62	GR	5.51	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S62B	GR	0.66	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S64	GR	1.61	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02S64C	GR	0.73	NAT	2	4/1-11/30	4/1-12/31	no public
02S65	GR	3.37	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S65D	GR	0.22	NAT	2	no public	4/1-12/31	no public
02S66	GR	3.26	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S66Y	GR	1.82	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S66YA	GR	0.09	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S67	GR	0.38	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S68	GR	1.81	NAT	2	4/1-11/30	4/1-12/31	no public
02S70	GR	1.31	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S70A	GR	0.58	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S71	GR	2.27	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S72	GR	0.46	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S74	GR	1.37	NAT	2	no public	4/1-12/31	no public
02S74A	GR	1.73	NAT	2	no public	4/1-12/31	no public
02S79	GR	2.68	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02S82	GR	0.34	NAT	2	4/1-11/30	4/1-12/31	no public
02S83	GR	1.82	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S83B	GR	0.38	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S84	GR	0.50	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S86	GR	0.08	NAT	1	year-round	year-round	year-round
02S88	GR	2.38	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S89	GR	4.95	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S90	GR	0.05	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S91	GR	2.09	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S91A	GR	0.73	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02S92	GR	1.30	IMP	2	4/1-11/30	4/1-12/31	4/15-11/15
02S93	GR	2.52	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S93C	GR	0.36	NAT	2	4/1-11/30	4/1-12/31	no public
02S96	GR	0.30	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
02S97	GR	0.40	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
02S97	GR	0.62	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
03N01	GR	10.44	AC	2	year-round	4/1-12/31	4/15-11/15
03N01	GR	7.92	AC	3	year-round	4/1-12/31	5/15-11/15

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
07N55	CAL	1.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N55A	CAL	0.59	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N55Y	CAL	0.40	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N56Y	CAL	1.73	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N56YA	CAL	0.71	NAT	3	5/15-11/30	4/1-12/31	no public
07N57	CAL	2.84	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N57	CAL	0.29	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
07N57Y	CAL	1.11	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N58	CAL	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N59	CAL	1.65	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N59A	CAL	0.20	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N59Y	CAL	0.39	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N61Y	CAL	0.24	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
07N62	CAL	0.29	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N62Y	CAL	0.69	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N64Y	CAL	1.76	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N65	CAL	1.60	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N65B	CAL	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N65C	CAL	0.18	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N66	CAL	0.66	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N66B	CAL	0.20	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N67	CAL	0.63	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N68	CAL	1.32	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N68A	CAL	0.67	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N69	CAL	2.69	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N69A	CAL	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N69B	CAL	0.24	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N70	CAL	0.77	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N71Y	CAL	0.47	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N71YA	CAL	0.03	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N72	CAL	2.74	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N72A	CAL	0.30	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N72B	CAL	0.46	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N73	CAL	1.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N75	CAL	1.84	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
07N75C	CAL	0.49	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N76	SU	1.55	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
07N76Y	CAL	3.26	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N77	CAL	0.95	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N80A	CAL	0.01	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
07N82	CAL	0.95	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N82A	CAL	0.24	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N83B	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N84Y	CAL	0.97	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N84YB	CAL	0.19	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N87	CAL	1.70	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N87A	CAL	0.33	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N87B	CAL	0.11	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N88Y	CAL	1.88	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N91	CAL	0.14	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N92	CAL	1.18	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N92A	CAL	0.39	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N92B	CAL	0.55	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N93	CAL	2.68	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N94	CAL	0.44	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
07N94A	CAL	0.73	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
08N01A	CAL	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
08N02	CAL	1.82	NAT	3	year-round	4/1-12/31	5/15-11/30
08N04	CAL	0.23	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
08N06	CAL	0.44	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
08N12	CAL	0.56	IMP	3	year-round	4/1-12/31	5/15-11/30
08N13	CAL	0.54	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
03N01	GR	2.24	AGG	3	year-round	4/1-12/31	5/15-11/15
03N01	MW	8.45	AC	3	year-round	4/1-12/31	5/15-11/15
03N01	MW	16.51	AGG	3	year-round	4/1-12/31	5/15-11/15
03N01B	MW	1.51	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N01C	GR	0.11	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N01D	MW	0.15	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N01G	GR	1.02	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N01H	MW	0.95	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N01J	MW	0.81	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N01L	MW	0.38	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N01M	MW	0.63	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N01N	GR	0.37	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N01P	GR	1.05	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N01Q	GR	0.20	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N01S	GR	0.31	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N01T	GR	0.45	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N01U	MW	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N01W	MW	0.22	NAT	3	no public	4/1-12/31	no public
03N01Y	MW	1.69	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N02	MW	1.93	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N03	MW	3.51	NAT	1	year-round	year-round	year-round
03N03B	MW	0.77	NAT	1	year-round	year-round	year-round
03N03C	MW	0.21	NAT	1	year-round	year-round	year-round
03N03Y	MW	1.37	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N04	MW	0.09	NAT	1	year-round	year-round	year-round
03N05	MW	2.86	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N06Y	MW	0.91	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N07	MW	3.96	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N07	MW	0.56	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
03N07	MW	4.89	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N07C	MW	0.73	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N07E	MW	0.69	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N08	MW	6.79	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N08Y	MW	0.48	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N09	MW	4.11	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N09A	MW	1.21	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N09Y	MW	0.89	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N09YA	MW	0.33	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N10	MW	6.76	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N10A	MW	1.34	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N10B	MW	0.39	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N10Y	MW	0.57	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N10YA	MW	0.19	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N11	MW	6.61	NAT	1	year-round	year-round	year-round
03N11A	MW	1.10	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N11B	MW	0.31	NAT	1	year-round	year-round	year-round
03N11B	MW	0.00	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N11C	MW	0.21	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N11D	MW	0.01	NAT	1	year-round	year-round	year-round
03N11Y	MW	0.41	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N12	MW	3.28	NAT	1	year-round	year-round	year-round
03N12A	MW	1.11	NAT	1	year-round	year-round	year-round
03N12B	MW	1.04	NAT	1	year-round	year-round	year-round
03N12Y	MW	1.69	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N12YA	MW	0.38	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N12YB	MW	0.88	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N12YC	MW	0.34	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N14	MW	1.52	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
03N14Y	MW	0.81	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N15	MW	3.56	NAT	1	year-round	year-round	year-round
03N15Y	MW	1.13	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N16	MW	6.19	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
08N14	CAL	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
15EV26	CAL	0.29	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV55	CAL	1.43	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV55A	CAL	0.09	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV56	CAL	0.51	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV57	CAL	1.18	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV58	CAL	0.66	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV59	CAL	0.45	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV60	CAL	1.77	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV61	CAL	0.41	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV62	CAL	0.55	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV63	CAL	1.06	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV64	CAL	0.95	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV65	CAL	0.46	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV66	CAL	0.45	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV67	CAL	0.46	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV68	CAL	0.73	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV69	CAL	0.58	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV70	CAL	0.24	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV71	CAL	0.62	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV72	CAL	1.02	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
15EV73	CAL	0.88	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
16EV186	CAL	0.47	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
16EV187	CAL	0.41	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
16EV188	CAL	0.24	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
16EV190	CAL	1.55	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
16EV192	CAL	0.47	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
17EV151	CAL	2.55	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
17EV152	CAL	0.75	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
17EV16	CAL	2.54	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
17EV17	CAL	1.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
18EV254	SU	0.51	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
18EV256	SU	0.81	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
18EV272	GR	1.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
18EV273	GR	1.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
18EV274	GR	1.24	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
18EV306	SU	0.41	NAT	3	year-round	4/1-12/31	5/15-11/30
19EV104	GR	1.41	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
19EV105	GR	1.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
19EV106	GR	0.39	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
19EV114	SU	4.89	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
19EV115	SU	1.87	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
19EV43	CAL	1.51	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
19EV93	SU	1.78	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
19EV97	SU	0.84	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
21502A	MW	0.13	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
21502B	MW	0.31	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
21825H	GR	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
21930K1	GR	0.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
31622R	MW	0.16	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
41704X	SU	0.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41723A	SU	0.12	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
41723C	SU	0.11	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
41723D	SU	0.07	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
41723E	SU	0.12	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
41724D	SU	0.12	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
41725A	SU	0.34	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
41802C	SU	0.38	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41802D	SU	0.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41803B	SU	0.22	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41807D	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41808H	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
03N16Y	MW	1.50	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N17	MW	4.89	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N17B	MW	0.51	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N17Y	MW	1.30	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N18	MW	2.57	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N18Y	MW	0.33	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N19	MW	0.09	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
03N20	MW	7.49	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N20A	MW	1.11	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N20Y	MW	2.85	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N20YB	MW	0.11	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N20YC	MW	0.81	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N20YD	MW	1.33	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N21	MW	7.97	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N21B	MW	0.67	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N21Y	MW	2.57	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N21YA	MW	0.44	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N22	MW	1.85	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N22A	MW	1.32	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N22Y	MW	0.60	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N23	MW	0.78	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N23Y	MW	1.61	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N24	MW	4.87	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
03N24A	MW	0.09	NAT	2	no public	4/1-12/31	no public
03N24D	MW	0.29	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N25	MW	1.43	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N26	MW	3.90	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N26A	MW	0.45	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N26C	MW	0.30	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N26Y	MW	1.37	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N26YA	MW	1.02	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N26YA	MW	0.11	NAT	3	5/15-11/30	4/1-12/31	no public
03N26YB	MW	0.23	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N26YB	MW	0.28	NAT	3	5/15-11/30	4/1-12/31	no public
03N27	MW	4.44	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N27A	MW	1.03	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N27B	MW	0.34	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N27C	MW	2.71	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N27Y	MW	1.20	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N27YA	MW	0.40	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N28	MW	2.25	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N28Y	MW	1.18	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N28YA	MW	0.71	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N29	MW	9.69	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N29A	MW	0.70	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N29B	MW	0.64	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N29C	MW	1.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N29D	MW	0.34	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N29F	MW	0.40	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N30	MW	4.41	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N32	MW	1.68	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
03N32Y	MW	2.18	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N32YA	MW	0.28	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N33	MW	0.59	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N33A	MW	0.07	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N33Y	MW	0.70	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N34	MW	1.63	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N34A	MW	0.27	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N34Y	MW	0.75	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N34Y	MW	3.21	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N35	MW	1.90	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N36	MW	1.00	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
41809A	SU	0.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41809E	SU	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41809X04	SU	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41810K	SU	0.14	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41810M	SU	0.38	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41810P	SU	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41811D1	SU	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41811P	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41816D	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41818J	SU	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41818M	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41819A	SU	0.07	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
41820B	SU	0.02	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
41820C	SU	0.04	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
41825B	SU	0.02	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41825H	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41826D	SU	0.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41827F	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41827G	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41828E	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41829B	SU	0.04	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
41830C	SU	0.20	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
41836A	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41899Z21	SU	0.08	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
4191601	SU	0.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
4191602	SU	0.03	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
4191603	SU	0.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41918B	SU	0.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
41929A	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
4N34Y1	SU	0.19	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
4N34Y3	SU	0.70	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
4N39X2	SU	0.05	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
4N54Y041	SU	0.20	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
51701A	SU	0.15	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51713A	SU	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51723C	SU	0.11	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51725D	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51735E	SU	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51801B	SU	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51801G	SU	0.20	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51806B	SU	0.20	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51806C	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51810A	SU	0.15	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51810B	SU	0.13	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51811A	SU	0.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51811B	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51812D	SU	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51812F	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51814D	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51814F	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51814J	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51815B	SU	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51815C	SU	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51816A	SU	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51817	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51825A1	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51825B	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51827B	SU	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51827C	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51828A	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51829B	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51830E	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
03N37Y	MW	1.84	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N38	MW	0.04	NAT	1	year-round	year-round	year-round
03N38Y	MW	0.63	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N38YA	MW	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N39	MW	3.15	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N39Y	MW	2.35	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N40	MW	0.23	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N41	MW	1.68	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N41Y	MW	0.47	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
03N42	MW	0.65	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N42A	MW	0.18	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N42Y	MW	1.20	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N42YA	MW	0.75	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N42YB	MW	0.29	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N43	MW	0.84	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N43A	MW	0.55	NAT	3	no public	4/1-12/31	no public
03N43Y	MW	0.16	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N44	MW	1.62	NAT	1	year-round	year-round	year-round
03N44Y	MW	1.94	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N45	MW	0.19	NAT	1	year-round	year-round	year-round
03N45Y	MW	1.51	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N45YA	MW	0.54	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N46	MW	0.70	NAT	1	year-round	year-round	year-round
03N46Y	MW	0.80	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N47Y	MW	1.78	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N48	MW	0.77	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N48	MW	2.30	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N48A	MW	0.53	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N48B	MW	0.80	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N48Y	MW	0.75	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N49	MW	1.19	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N49A	MW	0.41	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N49B	MW	0.11	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N50	MW	2.96	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N50Y	MW	1.31	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N50YA	MW	0.76	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N51Y	MW	0.58	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N51YA	MW	0.38	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N51YB	MW	0.66	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N52	MW	0.22	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N52Y	MW	0.99	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N53	MW	0.50	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N53Y	MW	0.57	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N55Y	MW	0.58	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N56Y	MW	1.42	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N56YA	MW	0.62	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N57	MW	0.84	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N57A	MW	0.54	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N58	MW	3.75	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N58	MW	0.29	NAT	2	4/1-11/30	4/1-12/31	no public
03N59	MW	0.52	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N59A	MW	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N59Y	MW	1.18	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
03N59YA	MW	0.55	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
03N60	MW	1.33	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N60	MW	1.89	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N60A	MW	0.13	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N60B	MW	0.52	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N60C	MW	0.71	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N60D	MW	0.19	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N61	MW	0.75	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N61A	MW	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
51830F	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51831E	SU	0.19	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51832D	SU	0.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51832E	SU	0.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51832X	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51835B	SU	0.02	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51835D1	SU	0.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51836B	SU	0.47	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51836D	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51836E	SU	0.17	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51902A	SU	1.67	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51902A051	SU	0.21	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51902A052	SU	0.18	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51902AB	SU	0.11	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51904E	SU	0.16	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51906A	SU	0.24	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51910B	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51910B1	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51910B2	SU	0.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51910C	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51911A	SU	0.58	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51911B	SU	0.24	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51911C	SU	1.02	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51911F	SU	0.39	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51913A1	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51913C	SU	0.16	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51913D	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51913E	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51913F	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51920C	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51920D	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51922A	SU	0.03	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51927D	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51927E	SU	0.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51930C2	SU	0.23	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51933A	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51936052	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
51936053	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52005A	SU	0.27	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52005C	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52005F	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52005G	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52006C	SU	0.31	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52006D	SU	0.19	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52006F	SU	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52007A	SU	0.34	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52007H	SU	0.14	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52008A	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52017A	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52017B	SU	0.03	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52017C	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52017G	SU	2.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52018A	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52018C	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52018D	SU	0.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52018E	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
52018F	SU	0.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
5N34X	SU	0.14	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61724A	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61725A	SU	0.07	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
6182504A	SU	0.03	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61915A	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
03N62	MW	1.16	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N63	MW	1.26	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N64	MW	0.72	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N64A	MW	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N67	MW	0.34	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N68	MW	1.70	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N68Y	MW	0.88	NAT	1	year-round	year-round	year-round
03N69	MW	3.83	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N69	MW	1.38	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
03N69A	MW	0.61	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N69Y	MW	0.47	NAT	1	year-round	year-round	year-round
03N70	MW	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N70A	MW	0.13	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N71	MW	0.71	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N71	MW	0.01	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N71Y	MW	1.58	NAT	2	4/1-11/30	4/1-12/31	no public
03N72	MW	1.43	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N72Y	MW	0.81	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
03N72YA	MW	0.35	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
03N73	MW	2.05	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N73B	MW	0.30	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N75Y	MW	0.32	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N76Y	MW	0.77	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N77	MW	0.56	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N78	MW	0.20	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N79	MW	1.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N80	MW	0.01	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N80Y	MW	0.13	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
03N83	MW	5.40	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N83A	MW	0.95	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N83B	MW	0.59	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N83C	MW	1.99	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N84	MW	0.47	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N86	MW	0.33	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N86	MW	3.79	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N87	MW	2.23	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N89	MW	0.72	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N90	MW	3.77	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N91	MW	0.28	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03N91	MW	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N92	MW	1.18	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N93	MW	0.91	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N94	MW	2.89	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N95	MW	1.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N95A	MW	0.56	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
03N96	MW	5.18	AGG	3	5/15-11/30	4/1-12/31	5/15-11/15
03N99	MW	2.52	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
03S01	GR	2.74	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03S02	GR	6.39	NAT	1	year-round	year-round	year-round
03S03	GR	1.21	NAT	1	year-round	year-round	year-round
03S04	GR	0.97	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
03S06	GR	0.66	NAT	1	no public	year-round	no public
03S10	GR	2.52	NAT	1	year-round	year-round	year-round
03S10A	GR	1.12	NAT	1	year-round	year-round	year-round
03S15	GR	1.85	NAT	1	year-round	year-round	year-round
03S24	GR	0.08	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15
04N01	MW	0.91	AGG	1	year-round	year-round	year-round
04N01	MW	2.32	NAT	1	year-round	year-round	year-round
04N01	MW	5.33	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
04N01	MW	3.05	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
04N01	MW	6.88	AGG	2	4/1-11/30	4/1-12/31	4/15-11/15

Route	RD	MI	SUR	SEA	Season of Use		
					ALT 1	ALT 4	ALT 5
61916A	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61919A	SU	0.16	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61920A	SU	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61920D	SU	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61920F	SU	0.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61930A	SU	0.20	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61930B	SU	0.53	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61931A	SU	0.02	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61931A04	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61931B04	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61931E	SU	0.12	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61931G	SU	0.10	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61932B	SU	0.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61932C	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61932E	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61933E	SU	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
61933F	SU	0.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
62028A	SU	0.03	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
62034A	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
62035A1	SU	0.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
62035B	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
62127C	SU	0.14	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
62134A1	SU	0.01	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
72032C	SU	0.05	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
72032D	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
C20	CAL	0.81	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
FR10831	CAL	0.03	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
FR11116	CAL	0.04	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
FR12088	CAL	0.11	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
FR12476	CAL	0.05	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
FR12477	CAL	0.36	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
FR12607	SU	0.19	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
FR12848	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
FR12849	SU	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
FR13169	MW	0.05	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
FR14528	MW	0.02	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
FR14823	SU	0.25	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
FR14833	SU	0.09	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
FR4767	CAL	0.14	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
FR4898	GR	0.22	IMP	2	no public	4/1-12/31	no public
FR4898	GR	0.09	NAT	2	no public	4/1-12/31	no public
FR5219	CAL	0.03	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
FR58051	SU	0.03	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
FR7181	CAL	0.16	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
FR7368	GR	0.40	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
FR7856	GR	0.14	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
FR8080	CAL	0.04	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
FR8319	CAL	0.86	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
FR8322	CAL	0.08	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
FR8323	CAL	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
FR8445	GR	0.04	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
FR8602	GR	0.22	NAT	2	no public	4/1-12/31	no public
FR8797	GR	0.47	AC	2	4/1-11/30	4/1-12/31	4/15-11/15
FR8925	CAL	0.04	AC	3	5/15-11/30	4/1-12/31	5/15-11/15
FR8991	GR	0.18	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15
FR9330	CAL	0.11	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
FR9331	CAL	0.33	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
FS83231	CAL	0.06	NAT	3	5/15-11/30	4/1-12/31	5/15-11/30
R10	CAL	0.20	NAT	2	4/1-11/30	4/1-12/31	4/15-11/15

Legend

BST	Bituminous Surface Treatment
AC	Asphalt
AGG	Aggregate or Gravel
CAL	Calaveras
GR	Groveland
IMP	Improved Native Material
MI	Miles
MW	Mi-Wok
NAT	Native Material
RD	Ranger District
SEA	Season of Use Elevation Zone

	Alternative 1	Alternative 4	Alternative 5
1	year-round	year-round	year-round
2	4/1-11/30	4/1-12/31	4/15-11/15
3	5/15-11/30	4/1-12/31	5/15-11/15

SU	Summit
SUR	Surface